INCREASING DEEP AND EXTREME POVERTY IN THE U.S., 1993-2015*

David Brady
University of California, Riverside & WZB Berlin Social Science Center

Zachary Parolin
University of Antwerp

September 5, 2018

Word Count (excluding significance and appendices): 7,421
Character Count (including spaces): 46,652

* Direct correspondence to David Brady, School of Public Policy, University of California, INTS 4133, 900 University Ave., Riverside, CA 92521; email: dbrady@ucr.edu. We thank Liana Fox and Bruce Meyer for sharing their preliminary work. We are grateful for comments from Thomas Biegert, Ryan Finnigan, Shawn Fremstad, Marco Giesselmann, and Scott Winship.

SIGNIFICANCE

Recently, there has been tremendous interest in deep and extreme poverty in the U.S. However, the literature has been based on problematic measurement, has not used the best available data, and has not adhered to leading standards in international income research. As a result, previous estimates vary widely between dramatically overestimating (e.g. Edin and Shafer 2015) and dramatically underestimating (e.g. Meyer et al. 2018) the levels of deep and extreme poverty. Using the best scientific methods possible and several innovations, we estimate 5.72-6.51 million Americans were deeply poor and 2.67-3.40 million were extremely poor in 2015. We also demonstrate there has been a significant increase in deep and extreme poverty from 1995 to 2015.

ABSTRACT

We estimate deep (measured as less than 20% of medians) and extreme (measured as less than 10% of medians) poverty in the U.S. from 1993-2015. Addressing limitations of prior research, we adjust the Current Population Survey following the Luxembourg Income Study, the Urban Institute’s TRIM3 model, and leading standards from international income research. In 2015, 5.72-6.51 million Americans were deeply poor and 2.67-3.40 million were extremely poor. Deep and extreme poverty fluctuated over time, including declines 1993-1995, 2007-2010, and 2014-2015. Nevertheless, deep and extreme poverty significantly increased from lows in 1995 to peaks in 2014. Deep poverty increased 60-72% 1995-2015, from 1.1-1.2% to 1.8-2.1%. Extreme poverty rose 60-99% 1995-2015, from 0.5% to 0.8-1.1%. We find significant increases even with thresholds anchored in 1993, alternative inflation adjustments, and correcting for earnings underreporting. Adding homelessness, deep poverty would be 10-12% higher and extreme poverty would be 23-26% higher, which suggests our estimates are probably lower-bounds. Contrary to the focus on children and the 1996 welfare reform, childless households became the vast majority of deep/extreme poor, while the share in households with children declined. Ultimately, we demonstrate that estimates of deep/extreme poverty depend critically on the quality of income measurement.
Many have recently called attention to deep and extreme poverty in the U.S. This literature is notable both for suggesting extreme and deep poverty are disturbingly high, and for the tremendous variation in estimates. Edin and Shaefer (2015) claim that more than 4% of all households (HHs) with children – 1.5 million HHs with 3 million children – lived on less than $2 per day in a month in 2011. Using a more comprehensive measure of income and including all HHs, Chandy and Smith (2014) find only slightly less $2 per day poverty. With a higher threshold, Fox and colleagues (2015b) find that 5.3% – roughly 16.5 million people – was deeply poor in 2011. Deaton (2018) estimates that 3.2-5.3 million Americans have less than $4 per day per person. Philip Alston (2018), the United Nations Special Rapporteur on extreme poverty and human rights, reports that 18.5 million Americans live in deep poverty. In contrast, the Heritage Foundation claims that only about 0.5% of the U.S. population is in deep poverty (Hall and Rector 2018). Meyer and colleagues (2018) conclude that only 326,000 Americans, about 0.11% of the population, were extremely poor in 2011.

Equally important, many claim that American deep/extreme poverty has increased in recent decades. Edin and Shaefer (2015: xvii) conclude, “The number of families in $2-a-day poverty had more than doubled in just a decade and a half.” Adjusting for means-tested programs and including all households, Shaefer and Edin (2013: 260) find that the percent of HHs in this form of extreme poverty increased 36.9% between 1996 and 2011. Several contend that increases in deep and extreme poverty resulted from the 1996 welfare reform and related social policy changes (Danziger 2010). Shaefer and colleagues (2015) find that $2 per day poverty is much less common if HHs receive Temporary Assistance for Needy Families (TANF). Because TANF receipt has declined (Danziger 2010), Edin and Shaefer (2015) infer that the 1996 welfare
reform contributed to the rise of extreme poverty. In response, a contentious debate has ensued (Meyer et al. 2018; Shaefer and Edin 2018; Winship 2016).

Given the salience of the topic and the wide variation in estimates, there is a clear need for scientific scrutiny. Using higher quality data and several thresholds, and making many unique adjustments, we describe the levels and trends in deep and extreme poverty in the U.S. from 1993 to 2015. As we focus solely on these empirical questions, we now move immediately to data and methods. Throughout, we demonstrate that estimates of deep/extreme poverty depend critically on the quality of income measurement.

DATA

We use the 1993–2015 Annual Social and Economic Supplement of the Census Bureau’s Current Population Survey (CPS ASEC). This is similar to Fox and colleagues’ (2015b) study of deep poverty, and unlike those using the Survey on Income and Program Participation (SIPP) (Meyer et al. 2018; Shaefer and Edin 2013). Although the SIPP has some attractive features, the CPS ASEC has two major advantages. First, the CPS ASEC has about twice as many HHs as the SIPP. Previous SIPP estimates rely on strikingly small counts of deep/extreme poor people. For instance, Shaefer and Edin (2013) have only 256 households in extreme poverty in the first wave and 392 in the last wave. Meyer and colleagues (2018) estimate extreme poverty based on only 70 individuals below the threshold. Because rates of deep and extreme poverty are very low with any measure, a larger sample size is essential to obtain reliable estimates. Obviously, any measurement error is magnified when the sample size is small. Also, more efficient estimates

1 Meyer et al (2018) also find fewer inconsistencies between reported earnings and reported hours working, and lower extreme poverty in the CPS vs. SIPP.
improve assessments of over-time change. Relatedly, most previous estimates do not report confidence intervals.

Second, the CPS ASEC measures income over an entire year while the SIPP measures income on a monthly basis. Shaefer and Edin (2013: 256) acknowledge the short-time horizon is “an important limitation”, are constrained by the SIPP weights, and conduct sensitivity analyses on a quarterly basis. Meyer and colleagues (2018) also use the SIPP to average income over 4 months. Indeed, Shaefer and Edin (2013: 261) find, “Fewer households experience extreme poverty for a calendar quarter when compared to a month.” This is not surprising as HH incomes smooth over time, short-term deprivation is more dependent on assets than just income, and longer-term HH income is higher and more equally distributed (Brady et al. 2018).

All analyses use weights to make the estimates representative of the U.S. population. We include all individuals (Fox et al. 2015b; Meyer et al. 2018). This differs from Shaefer and Edin (2013), who focus on HHs with children.\(^2\) The individual is the unit of analysis and we estimate the proportion of individuals who reside in deep or extremely poor households. This also differs from Shaefer and Edin (2013), who mainly treat HHs as the unit of analysis and report the raw number and percent of HHs who are extremely poor.\(^3\) For samples sizes, please see Appendix I.

It is important to acknowledge that the CPS ASEC does not capture many of the most severely disadvantaged people (e.g. the homeless) or those residing in institutions such as prisons or military bases (Fox et al. 2015b). Therefore, our estimates could be lower-bound estimates.

\(^2\) We view deep and extreme poverty as important regardless of which demographic group is poor. Notably, Shaefer and Edin (2013) find that extreme poverty is higher among HHs without children, so including all individuals should elevate our rates.

\(^3\) Shaefer and Edin’s (2013) counts of the number of extreme poor HHs could increase simply because of population growth. Without standardizing for population, it is unclear how trends in raw counts should inform our understanding of trends in extreme poverty.
and actual levels of deep and extreme poverty could be higher. As a result, below we estimate deep and extreme poverty after adding the national homelessness point in time counts (Corporation for National and Community Service 2018).

THE MEASUREMENT OF INCOME

In the 1990s, the United Nations convened “The Canberra Group” to identify best practices in income measurement (United Nations Economic Commission for Europe 2011). As a result, a consensus emerged on how to measure income (Brady et al. 2018; Duncan and Petersen 2001; Rainwater and Smeeding 2003; Smeeding 2016; Smeeding and Weinberg 2001). Among the leading international standards, measures of income should be: (1) as comprehensive as possible incorporating taxes and transfers (i.e. be “post-fisc”); and (2) equivalized for HH size. People live, consume, manage volatility, and maintain well-being by sharing expenses and resources with others in HHs, by accessing transfers, and based on disposable income after taxes and transfers (Brady et al. 2018; Gundersen and Ziliak 2003).

Incorporating Taxes and Transfers

Shaefer and Edin’s “headline results” – in the 2013 article abstract, in the 2015 book, and in the media – are based on cash income only. As others note (Meyer et al. 2018; Winship 2016), their measure omits near-cash transfers (e.g. the Supplemental Nutrition Assistance Program [SNAP], housing vouchers, rent and heating subsidies) and taxes and tax credits (e.g. the Earned Income Tax Credit [EITC]). Edin and Shaefer (2015: xviii) argue that including SNAP would be, “A problematic assumption because SNAP cannot legally be converted to cash, so it can’t be used to pay the light bill, the rent, or buy a bus pass.” On balance, Shaefer and Edin’s (2013) report results with alternative income definitions and note the increase is more modest with these
alternatives. For instance, including welfare transfers and tax credits, Shaefer and Edin (2013: 256) conclude that only 1.6% of HHs with children were extremely poor – less than half of their estimate of more than 4% of HHs with children.

By contrast, we propose that the omission of SNAP, the EITC, and any taxes and transfers weakens income measurement. Much evidence shows SNAP plays a crucial role in smoothing and stabilizing the consumption of low-income HHs (e.g. Gundersen and Ziliak 2003). SNAP and other transfers are also essential to families’ ability to offset the turbulence of economic recessions (Bitler and Hoynes 2016), and access to SNAP significantly improves short and long-term well-being (Hoynes et al. 2016). Since the 1990s, the EITC has grown into the largest social assistance programs for families with children in the U.S. and SNAP receipt has grown substantially (Danziger 2010). In turn, over-time trends are likely biased by the omission of these programs (also see Appendix V).

A few in this literature incorporate taxes and transfers (Chandy and Smith 2014; Fox et al. 2015b). However, their key limitation is that the survey data they use systematically underreport the receipt of welfare transfers. As even Shaefer and Edin acknowledge (2013, 2018), there is convincing evidence that the incomes and welfare transfers of low-income HHs are underreported in most HH surveys (Meyer et al. 2015; Meyer et al. 2018; Meyer and Mittag 2015; Winship 2016).4

We improve the CPS ASEC in several ways (Parolin 2017). First, we follow the Luxembourg Income Study’s (LIS, 2017) protocol to construct cash income. Cash income includes labor market earnings, plus income from Social Security, TANF, General Assistance, Unemployment Insurance, retirement, interest, dividends, rent, Workers Compensation, veterans' 

4 Below, we also examine the underreporting of earnings. See Appendix VII.
benefits, survivors' assistance, disability assistance, education assistance, alimony, child support, and other sources not specified.

Second, we address undercounting of means-tested welfare transfers such as SNAP and Temporary Assistance to Needy Families (TANF) by employing the Urban Institute’s (2017) TRIM3 program (Meyer et al. 2015; Shaefer and Edin 2018). TRIM3 matches administrative records on TANF caseloads across states to impute benefits back into the survey data. Whereas the uncorrected CPS ASEC survey data misses about half of TANF cash transfers (Meyer and Mittag 2015), the augmented data comes much closer to capturing the full amount of cash assistance identified in administrative data. The first year that the TRIM3 model is available is 1993 and the last year is 2015. This explains our temporal scope.

Third, most analyses include TRIM3-corrected SNAP benefits. In some analyses, we only add 50% of the SNAP benefits because Edin and Shaefer (2015) argue SNAP benefits are not as liquid and useful as cash benefits. Nevertheless, we doubt SNAP has zero value and monetize SNAP at 50 cents on the dollar. This is consistent with Edin and Shafer’s (2015) estimates of the exchange rate at 50-60 cents on the dollar.

Finally, we follow the LIS protocol to incorporate tax liabilities, tax credits (EITC, CTC, ACTC), temporary benefits (stimulus credit, Make Work Pay tax credit), housing allowances, energy assistance (LIHEAP), and the Women, Infants and Children (WIC) programs. We use the Census simulations to subtract taxes from and add tax credits to HH income. This definition

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5 Although Shaefer and Edin (2013: 257) claim the underreporting of income and welfare transfers is smaller in the SIPP than the CPS ASEC, the problem is still present in the SIPP.
6 We even improve on the LIS protocol by including state EITCs, which are not included by the LIS. However, unlike Meyer et al. (2018), we do not incorporate assets. We also do not monetize the value of health benefits (Winship 2016).
7 The Census tax simulation appears to over-correct at times. In 1993-1994, the simulation recodes some high gross income households into low incomes. In 1993, for example, 415
is disposable “post-fisc” (i.e. after taxes and transfers) HH income, and is widely viewed as high quality (Brady 2009; Rainwater and Smeeding 2003; Smeeding 2016).

Adjusting for Household Size

HHs have economies of scale such that there is a declining cost to an additional person. There are various adjustments for HH size available. The literature suggests that it is less consequential which equivalence scale one uses, but it is essential to use an equivalence scale (Brady 2009; Brady et al. 2018; Rainwater and Smeeding 2003). We equivalize income for HH size by dividing by the square root of HH members. By contrast, Shaefer and Edin’s (2013) main results do not adjust for HH size. The World Bank’s metric of $2-a-day that they apply assumes there are zero economies of scale as each additional HH member requires a proportional and linear increase in resources. Shaefer and Edin (2013: 261) also note results with our equivalence scale. Doing so, they find a lower level of extreme poverty, but a similar increase.

THE CONCEPTUALIZATION OF POVERTY

We define poverty with the classic, simple conceptualization of a shortage of resources compared to needs (Smeeding 2016). Following the discussion of income measurement, resources should be measured as comprehensively as possible. This simple definition clarifies individuals in the CPS ASEC have zero disposable income (i.e. their tax liability exceeds their gross incomes), but have gross income of $100,000+. There are only 10 such individuals in the 1995 sample. Although 415 is a small share of the 1993 sample of 150,943, this could bias the very low estimates of extreme poverty. Therefore, we imposed a decision rule that if gross income was above the median, we do not code these households as deeply or extremely poor regardless of the tax simulation.

8 To the best of our knowledge, the World Bank never justified this measure’s zero economies of scale. Indeed, there was never much scientific basis for the $2-a-day threshold even in developing countries (Smeeding 2016). It was always a politically and rhetorically constructed measure that was never truly based on an absolute measure of deprivation.
that poverty is always based on some standard of needs. We make this transparent to emphasize that none of the literature defines the standard of needs in an objective and scientific way. All standards of needs are at least somewhat arbitrary. There is a dearth of standards of needs based on an absolute health, basic needs or well-being benchmark. A few anchor the standard of needs to a fixed point in time, and we also employ such “anchored” measures below. However, there is nothing linking that fixed point in time to absolute health, basic needs or well-being.

We acknowledge the temptation to think of deep/extreme poverty in absolute terms. Such an image of absolute deprivation certainly is present in debates on deep/extreme poverty (Alston 2018; Deaton 2018; Edin and Shaefer 2015; Meyer et al. 2018). However, this literature provides no evidence or basis for an absolute standard of needs. To the best of our knowledge, no physiological data, dietary/caloric requirements, or objective budget of basic necessities has been linked to a standard of needs employed in deep/extreme poverty measures.

Some perceive the official U.S. poverty measure (OPM) as based on a standard of needs to feed a family multiplied by three. However, this is mistaken. As has been thoroughly documented, the OPM has many problems undermining its reliability and validity. For brevity here, we detail the problems with the OPM in Appendix II.

The fact that there is no absolute standard of needs in the deep/extreme poverty literature is one of the major reasons that international poverty scholars overwhelmingly use relative measures. A relative measure defines poverty as a shortage of resources relative to needs defined by the prevailing standards of a given time and place. Relative measures better predict well-being, health, and life chances; are more valid for leading conceptualizations of poverty (e.g. capability deprivation and social exclusion); are more reliable for over-time and cross-place comparisons; and are justified because of the absence of defensible absolute alternatives with
fewer problems (Brady 2009; Fox et al. 2015a, 2015b; Rainwater and Smeeding 2003; Smeeding 2016). Therefore, we define poverty relatively. People are deeply and extremely poor because they lack sufficient resources relative to the needs of the U.S. in this historical period. To say individuals are in “deep” or “extreme” poverty simply means the gap between resources and needs is deeper or more extreme.

THRESHOLDS FOR DEEP/EXTREME POVERTY

We employ relative and anchored poverty thresholds (Smeeding 2016). Relative thresholds define the standards of need based on the median equivalized household income in a given setting. We examine deep/extreme poverty based on the median in each year for the entire U.S. Because there are meaningful differences in the cost of living and standards of needs across the U.S., we also define deep/extreme poverty based on the median in each state in each year. Because the CPS ASEC is not necessarily large per state-year, we pool three years (t-1, t, and t+1) for each state to estimate the median. To the best of our knowledge, this is the one of the first empirical studies with state-specific poverty thresholds in the U.S. The advantage of state-specific thresholds is an even more precise definition of relative poverty that incorporates more local living standards, costs, and needs.

To assess poverty at the same threshold over time, we use anchored poverty measures. Anchored measures adjust HH income for inflation with CPI-U, and fix the threshold to one time point (Smeeding 2016). While a relative measure may be less sensitive to the business cycle and economic development (or, as in the 2008 recession, overly sensitive; see Appendices II-III), an anchored measure should be responsive.

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9 For an alternative inflation adjustment, see below and Appendix VI.
We draw an explicit distinction that is often implicit between the more moderate “deep”
poverty and the much worse “extreme” poverty. To measure deep poverty, we employ three
thresholds. First, we estimate the proportion with less than 20% of the national median in each
year. Second, we estimate the proportion of the population with less than 20% of the median in
each state and year. Third, we estimate the proportion with less than 20% of the inflation
adjusted 1993 national median. To measure extreme poverty, we again employ three thresholds.
We estimate the proportion with less than 10% of the national median in each year, 10% of the
median in each state-year, and 10% of the inflation adjusted 1993 national median.

Again, we are transparent and explicit that there is no objective scientific justification for
thresholds of deep poverty at 20% of the median and extreme poverty at 10% of the median. We
emphasize that there is no scientific justification for any of the other thresholds employed in this
literature either, and any threshold is somewhat arbitrary (Smeeding 2016). Instead of 20%, one
could define deep poverty at 25% of the median and extreme poverty at 5% or 15%.10 For
comparison, we also report trends at 30% and 50% of medians (see Appendices II-III).

Appendix I lists the national poverty thresholds for each year (state-specific poverty
thresholds available upon request). We stress that even at our highest national threshold (20% of
median), being deeply poor implies a very low income. To be deeply poor in 2015, an individual
had less than $7,044 annually or $587 per month in 2018 dollars.

To facilitate replication, we provide Stata code for augmenting the CPS ASEC data, and
for calculating thresholds and poverty rates (see Appendices V and VIII; Parolin 2017).

10 That said, we would be cautious about setting the threshold lower than we do. The reason is
that the sample sizes (even in the CPS ASEC, which are much larger than the SIPP) get very
small, so it may be difficult to discern trends.
Our approach for extreme poverty differs with Shaefer and Edin’s (2013) thresholds of $2 per day. Their threshold is “absolute” in that it defines extreme poverty according to a predetermined threshold of basic needs regardless of time and place. For example, their threshold for a family of three would be $2,190 (i.e. $2*3*365) in 2015, or $2,440 in 2018 dollars. This is much lower than our thresholds for extreme poverty. In 2015, for a family of three, 10% of the national median would be $6,152 (or $3,522 per person, in 2018 USD). Below, we replicate their estimates alongside a series of alternatives that improve on their measures in steps. With each improvement, it becomes clear how the results differ from Shaefer and Edin (2013).

Before proceeding, it is important to explain the problems of two alternatives that we do not utilize. Because of these problems, we propose our measures are more defensible. First, some measure deep poverty at 50% of the OPM (Alston 2018). As explained in Appendix II, the problems with the OPM are so significant that we discourage confidence in such measures.

Second, a reasonable alternative would be to define deep poverty as 50% of the Supplemental Poverty Measure (SPM) (e.g. Fox et al. 2015a, 2015b; Iceland 2005). The key limitation is that the SPM requires using the Consumer Expenditure Survey (CES) to calculate the thresholds (as these are about 33% of median consumption expenditures). In a pair of convincing critiques, Bavier (2008, 2014) shows that the CES has several anomalies that are not present in similar datasets, and which make over-time comparisons questionable (Shaefer et al. 2015). For example, Bavier (2014) shows employment and poverty are positively correlated in the 2000s, and poverty measured with the CES diverges substantially from all other surveys in the 2000s (including the CPS ASEC, SIPP, as well as Panel Study of Income Dynamics). Indeed, challenges with HH survey data (Meyer et al. 2015) are probably worse in the CES than in the CPS ASEC (Bavier 2014). To the best of our knowledge, Bavier’s compelling critiques have not
been answered. Because the SPM relies on median consumption expenditures to define the poverty threshold, this would require augmenting the CES with something like the TRIM3 model. Therefore, one advantage of our approach is that we do not need two separate surveys (i.e. both the CES and CPS ASEC) to be trustworthy, and only need the corrected and augmented CPS ASEC to calculate both the thresholds and HH resources. Rather than median consumption expenditures as in the SPM, our thresholds are based simply on median equivalized HH income. The limitations of consumption data apply as well to other consumption-based measures (e.g. Hall and Rector 2018; Meyer et al. 2018).

LEVELS AND TRENDS IN DEEP POVERTY

Figure 1 shows the trends in deep poverty. We present annual estimates and 95% confidence intervals on those estimates. In all figures, the confidence intervals are fairly small, partly because the CPS provides a large sample. As a result, over-time comparisons can be made as the differences tend to be statistically significant.

In 2015, 6.51 million (2.06% of the U.S. population) were deeply poor at 20% of the national median, 6.37 million (2.02%) were deeply poor at 20% of state medians, and 5.72 million (1.81%) were deeply poor at 20% of the 1993 national median.11

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11 All estimates are based on the WDI (2018) estimates of the U.S. population.
Figure 1. Trends in Proportion Deeply Poor in U.S., 1993-2014.

All three measures show substantial over-time variation. There were notable declines in
measures, 1995 exhibited the lowest rates of deep poverty and 2014 exhibited the highest rates.12
While the over-time trend is not quite as stark comparing 1993 to 2015, all three measures show
a significant increase in deep poverty since 1995.

12 Because all measures of deep and extreme poverty show a peak in 2014, we scrutinized the
2014 data, but found no major problems. We reestimated the results before applying TRIM3, and
still see an upward trend in 2014. In 2014, there was a decline in SNAP and TANF benefit
levels, which explains part but not all of the trend. One factor is the end of the Emergency
Unemployment Compensation program on Jan 1, 2014. UI benefits see a large drop from 2013 to
2014. Estimates without UI shows no increase from 2013 to 2014.
In 1993, deep poverty measured as 20% of the U.S. median was 1.50%. This measure of deep poverty fell to 1.16% in 1995-1996 and then rose to hover near 2.0% in the 2000s. However, it increased to 2.19% in 2014 and 2.06% in 2015. From 1993 to 2015, deep poverty at 20% of the national median increased 38%. From its low point in 1995 to 2015, this measure of deep poverty increased 70%. We find a similar trend with deep poverty measured at 20% of each state’s median. This measure of deep poverty declined from 1.43% in 1993 to 1.18% in 1995, and peaked at 2.16% in 2014 and 2.02% in 2015. Overall, deep poverty at 20% of state medians increased 42% 1993-2015 and 72% 1995-2015.

The bottom panel in Figure 1 shows the trend in deep poverty anchored by the 1993 U.S. median. Of the three measures of deep poverty, this measure should be least likely to show an increase as it should decline due to over-time increases in economic development. According to this anchored measure, about 1.5% were deeply poor in 1993. This rate fell to 1.14% in 1995-1996, and then rose steadily to 1.95% in 2014, before declining to 1.81% in 2015. From 1993 to 2015, anchored deep poverty increased about 21%. However, this conceals that the U.S. made some progress in reducing anchored deep poverty 1993-1996. From its low point in 1995-1996 to 2015, anchored deep poverty increased 60%.

Thus, even with a measure anchored in 1993, there was a significant increase in deep poverty. The increase in anchored deep poverty is even more striking as there was a decline in anchored poverty at 30% and 50% of the median (see Appendices III-IV). The declines in anchored poverty at 30% and 50% of the median should build confidence in the validity and reliability of our measures of income, and suggest that increases at 10% and 20% are not artefacts of income measurement.
LEVELS AND TRENDS IN EXTREME POVERTY

Figure 2 shows the trends in extreme poverty. In 2015, 3.40 million (1.08%) were below 10% of the national median, 3.10 million (0.98%) were below 10% of state medians, and 2.67 million (0.85%) were below 10% of the 1993 national median.

![Figure 2](image)

**Figure 2.** Trends in Proportion Extremely Poor in U.S., 1993-2014.

All three measures show over-time fluctuation, with high points in 1998, 2006-2007, and 2014 and low points 1995-1996, 1999, and 2009-2010. Compared to deep poverty, there is even more temporal fluctuation. Still, there are statistically significant increases from 1993 to 2015 and from the low points in 1995 to high points in 2014.
Measuring extreme poverty at 10% of the national medians, 0.66% of the U.S. was below the threshold in 1993. This rate fell to a low of 0.54% in 1995, and then rose to a high of 1.11% in 2014 and 1.08% in 2015. At 10% of the national medians, extreme poverty increased 16% 1993-2015, and increased 99% 1995-2015.

In 1993, 0.66% of the U.S. population was below 10% of each state’s median. State-specific extreme poverty declined to a low of 0.53% in 1995 and then rose to a peak of 1.10% in 2014 and 0.98% in 2015. Thus, extreme poverty at 10% of state medians increased 49% 1993-2015 and 85% 1995-2015.

Anchoring extreme poverty at 10% of the 1993 national median, the over-time trend is less pronounced than with the two relative measures. This measure declined from 0.66% in 1993 to 0.53% in 1995. It then rose to 0.94% in 2014 and 0.85% in 2015. Still, this measure increased 29% over the entire period and 60% 1995-2015.

THE IMPORTANCE OF INCOME MEASUREMENT

We argue that income measurement is essential to measuring deep and extreme poverty. One of the reasons our estimates differ from prior research is that we utilize better measures of income. To demonstrate this, we display two sets of results in Figures 3 and 4. Both demonstrate how problematic measures of income bias estimates of and trends in extreme poverty.

Figure 3 shows what happens to extreme poverty anchored at 10% of the 1993 median with different definitions of income. The estimates from Figure 2 are shown in the bottom panel of Figure 3 for comparison. In the upper left panel of Figure 3, we estimate extreme poverty with cash income only. This definition does not correct for underreporting of TANF or SSI, and does not include near-cash benefits like SNAP. Moreover, it does not incorporate taxes paid, tax
credits (e.g. the EITC) and some other benefits. Unsurprisingly, this income measure results in a dramatically higher rate of extreme poverty. Instead of the 0.85% reported for 2015 in Figure 2, the upper left panel of Figure 3 shows a 2.59% rate of extreme poverty.

![Figure 3. Extreme Poverty at 10% of 1993 U.S. Median With Different Income Definitions.](image)

The upper right panel in Figure 3 uses this measure of cash income, but corrects for underreporting of TANF and SSI with the TRIM3 model. Instead of a rate of 2.59%, extreme poverty would be 2.04% in 2015. The second row left panel maintains the TRIM3 adjustment but adds 50% of SNAP benefits. With this measure, extreme poverty would only be 1.60%. Adding 100% of SNAP benefits to TRIM-adjusted cash income in the middle right panel, extreme poverty would be 0.93%. Finally, we show in the bottom panel that anchored extreme
poverty would fall from 0.93% to 0.85% once we include tax liabilities, tax credits (EITC, CTC, ACTC), temporary benefits (stimulus credit, Make Work Pay tax credit), housing allowances, energy assistance (LIHEAP), and the Women, Infants and Children (WIC) programs.

Figure 4 replicates Shaefer and Edin (2013) while improving on their measure of income. The upper left panel uses their measure of cash income. Their threshold is $2 per day and does not equivalize income for household size. Their measure results in an estimate of extreme poverty of 1.87% or 5.9 million people. Their measure increased 80.3% from 1993 to 2015, and 113.9% from its low in 1996 to its peak in 2014.

Figure 4. Estimates of $2/Day Extreme Poverty With Different Adjustments.
The upper right panel of Figure 4 maintains Shaefer and Edin’s income measure but equivalizes for household size. This reduces extreme poverty from 1.87% to 1.64%. The middle left panel builds on that measure, and corrects for underreporting of TANF and SSI with TRIM3. With this income measure, extreme poverty declines to 1.35%.\textsuperscript{13} The middle right panel adds 50% of SNAP to income, and extreme poverty declines to 0.45%. This substantial reduction illustrates how consequential even a fraction of SNAP benefits are to very low income households. The bottom left panel incorporates the full 100% of SNAP benefits and extreme poverty declines to 0.43%.

Finally, the bottom right panel uses disposable income. With this “best” definition of income, only 0.40% of the U.S. lived on less than $2 per day in 2015. Thus, instead of 5.9 million living on less than $2 per day with Edin and Shaefer’s definition, our estimate is approximately 1.26 million. With this measure, $2/day poverty increased 11.5% from 1993 to 2015 and 87% from its low in 1996 to its peak in 2014.

\textbf{LOWER- AND UPPER-BOUNDS}

We consider one way our estimates may undercount and two ways our estimates may overcount deep and extreme poverty. Considering all three, our estimates are more likely to

\textsuperscript{13} Recently, Shaefer and Edin (2018) use the CPS and TRIM3 to estimate $2 per day poverty 1995-2012 for children. However, they do not equivalize income for household size and continue to use cash income by omitting SNAP and other aspects of disposable income. They find 1.2 million children (1.6%) were poor in 2012. They also find a more than 300% increase in the raw count of children in extreme poverty 1995-2012. Even using the CPS and TRIM3, their estimates of the level and trend are much higher than ours. They (p. 26) write: “When we control for underreporting, we find that the downward spiral since 1995 is even more dramatic than previously reported.”
underestimate than overestimate deep and extreme poverty. As a result, we conclude our estimates are lower-bounds.

First, the CPS ASEC does not include the homeless, which could be a salient segment of the extremely poor in the U.S. The national point in time estimates suggest that 564,708 were homeless in the U.S. in 2015. The point in time estimates are only available since 2007, and the average annual (2007-2015) point in time estimate of homeless was 614,579. We conjecture that the homeless are likely extremely poor. In turn, estimates of extreme poverty that are far below the counts of homelessness raise questions about face validity (Hall and Rector 2018; Meyer et al. 2018). Moreover, it is worthwhile to estimate how much larger the extreme poverty would be if the homeless were added to our estimates. Figure 5 shows the trends 2007-2015 in extreme poverty with and without each year’s count of homelessness.

Extreme poverty would be much higher in every year if the homeless are added. For example, anchored extreme poverty in 2015 would be 1.03% of the U.S. population instead of our estimate of 0.85%. Unfortunately, the homelessness point in time estimates do not include confidence intervals so we cannot say if there are statistically significant differences between our estimates with and without homelessness. Taking the estimates as they stand, extreme poverty would have been 17-21% higher in 2015 and an average of 23-26% higher 2007-2015. Though not shown, deep poverty would have been 9-10% higher in 2015 and 10-11% higher 2007-2015 if the homeless were added. This provides evidence to reasonably suggest that estimates of deep and extreme poverty that solely use the CPS ASEC are probably lower-bound estimates. This suggests deep and extreme poverty would be higher including those unobserved by the CPS.
Second, there are reasons our estimates might overestimate deep and extreme poverty. We adjust for inflation with the standard CPI-U index, which some view as overestimating inflation. Therefore, Appendix VI shows trends in anchored poverty using the Personal Consumption Expenditure (PCE) deflator (Winship 2016). We also detect a significant increase in anchored poverty with PCE as well. The one exception is that PCE results in a more pronounced low point in extreme poverty in 2010.

In addition, the CPS ASEC probably contains underreporting of earnings. Unfortunately, unlike TRIM3 it is far less clear how to correct for underreporting of earnings. Nevertheless, we follow Meyer and colleagues’ (2018) strategy of multiplying reported hours “usually worked” per week and the minimum wage in respondent’s state-year. We substitute this value if it exceeds
reported earnings. This requires the strong assumption that earnings are underreported but hours worked are reported accurately. As shown in Appendix VII, we observe an even steeper increase in deep and extreme poverty. Deep poverty rose 98.7% from its low point of 0.85% in 1994 to 1.69% in 2015. Extreme poverty rose 137.8% from its low point 0.41% in 1994 to 0.98% in 2015. Of course, this correction lowers levels. Among 18-65 year olds in extreme poverty in 2013-2015, 8.5 percent reported market earnings lower than the substituted value of hours worked times the minimum wage. After correcting earnings, the share in extreme poverty in 2013-2015 declines by 9 percent (from 1.03% to 0.93%).

CONCLUSION

This study presents levels and trends 1993-2015 in deep and extreme poverty in the U.S. We use uniquely augmented CPS ASEC to construct measures of income that more comprehensively incorporate taxes and transfers. We report several measures of poverty, although even the highest thresholds presume a very low level of income. In 2015, we estimate 5.72-6.51 million Americans were deeply poor and 2.67-3.40 million were extremely poor. Our evidence suggests that there has been an increase in deep and extreme poverty in the U.S. in recent decades. From low points in 1995 to 2015, deep poverty increased 59-72% and extreme poverty increased 60-99%. We find significant increases in deep and extreme poverty even with thresholds anchored in 1993. We also observe significant over-time increases if we use an alternative inflation adjustment, and with a correction for earnings underreporting.

Advancing beyond prior research, we demonstrate that it is essential for studies of deep and extreme poverty to incorporate leading international standards of income measurement. We show the value of measuring income comprehensively, of correcting for the underreporting of
taxes and transfers, and of equivalizing for household size. We also examine a variety of thresholds and make several unique adjustments. For all these reasons, we propose that our estimates of deep and extreme poverty are more valid and reliable than prior alternatives. More generally, this study provides methodological guidance and as an example for broader literatures on income and poverty.

Our analyses can inform debates about the 1996 welfare reform. On one hand, we find significant increases in deep and extreme poverty after welfare reform. At the same time, we do not find an increase at 30% or 50% of the median (see Appendices II-III). These results are consistent with claims that welfare reform shifted the poor towards deeper and more extreme poverty. On the other hand, our data reveal an increase in deep/extreme poverty for households without children and a decline for children and households with children. From 1993-1995, 31.6% of the extremely poor (<10% of U.S. median) and 44.6% of the deeply poor (<20% of U.S. median) were households with children. By contrast, in 2013-2015, only 16.4% of the extremely poor and 34.1% of the deeply poor were households with children.14 From 1993-1995 to 2013-2015, children as a share of those in deep poverty declined from 23.9% to 18.2% and in extreme poverty from 16.5% to 7.7%. These patterns contradict claims that welfare reform resulted in a greater concentration of children in deep/extreme poverty.

We conclude by juxtaposing the levels and increases in deep and extreme poverty against the nation’s high and rising GDP per capita (WDI 2018). In 2015, the U.S. GDP per capita in purchasing power parity was over $60,000 (in 2018 dollars). As the highest threshold for deep poverty was about 1/10th of gross domestic product per capita in 2015, it seems plausible that

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14 In 1993-1995, 68.4% of the extremely poor and 55.4% of the deeply poor were households without children. From 2013-2015, 83.6% of the extremely poor and 65.9% of the deeply poor were households without children.
feasible income redistribution could substantially reduce deep and extreme poverty. Moreover, real GDP per capita increased over 40% from 1993 to 2015 (WDI 2018). Given this rising economic affluence, it would be reasonable to have expected extreme poverty anchored in 1993 to have mechanically declined. That deep and extreme poverty increased as much as they did during a period where the nation was growing much richer is noteworthy.
REFERENCES


WDI. 2018. *World Development Indicators*. The World Bank. url:  
## APPENDIX I. Poverty Thresholds in 2018$ in Per Person Equivalized Household Income for Various National Measures by Year and Sample Sizes.

<table>
<thead>
<tr>
<th>Year</th>
<th>20% of Current National Median</th>
<th>20% of Real 1993 Median</th>
<th>10% of Current National Median</th>
<th>10% of Real 1993 Median</th>
<th>Sample Size</th>
</tr>
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<tbody>
<tr>
<td>1993</td>
<td>6079.44</td>
<td>6079.44</td>
<td>3039.72</td>
<td>3039.72</td>
<td>150,943</td>
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<td>1994</td>
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<td>3085.79</td>
<td>3039.72</td>
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<td>6079.44</td>
<td>3158.69</td>
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<td>3197.15</td>
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<tr>
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<td>3443.93</td>
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<td>3524.04</td>
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<td>3039.72</td>
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<td>3425.42</td>
<td>3039.72</td>
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<tr>
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<td>6079.44</td>
<td>3522.20</td>
<td>3039.72</td>
<td>185,487</td>
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Notes: State-specific annual thresholds available upon request. All thresholds can be generated with Stata code in Appendix VIII.
Appendix II. Summary of Problems with Official U.S. Measure of Poverty (OPM).

We encourage skepticism of estimates based on any variant of the OPM. The OPM has serious validity and reliability problems that have been well-documented (e.g. Brady 2009; Fox et al. 2015a, 2015b; Iceland 2005; Katz 2013; O’Connor 2001; Rainwater and Smeeding 2003; Smeeding 2016). Largely because these problems were known soon after its implementation, Orshansky disavowed the OPM only a few years after it was adopted (Brady 2009; O’Connor 2001). Indeed, the impetus for the Supplemental Poverty Measure (SPM) was the widespread knowledge of the deep limitations of the OPM (Fox et al. 2015a, 2015b; Iceland 2005). We focus on two major problems that are particularly relevant to this study. In addition, unlike the SPM and our measures based on state-year medians, the OPM is held constant across the entire U.S., which further undermines reliability.

1) **The Standard of Needs and Threshold**

Despite popular impressions, the standard of needs underlying the OPM does not actually have any scientific basis (Brady 2009; Katz 2013; O’Connor 2001). Calling it a “crude calculus”, Orshansky never had any scientific basis for multiplying food times three. Using data from the mid-1950s, there was evidence that food amounted to roughly one-third of expenses for most households on average. There was never evidence this applied to low-income households. Further, the Johnson administration ended up substituting the “economy food plan”, which was about 25% below the “low-cost food budget” used by Orshansky. The economy food plan was meant for emergencies and on a temporary basis. Indeed, historians have shown that the threshold was intentionally set low as a political maneuver to classify millions as “not poor” and make the War on Poverty look more successful (Brady 2009; O’Connor 2001). Also, the food budgets were not subsequently revised. A few years later, the government began updating the OPM thresholds using standard inflation adjustments rather than calibrating the thresholds according to changing food budgets. This had the consequence of severing any tie to the food budget as a standard of needs. Moreover, and as is well known, food is certainly much less than 1/3rd of HH expenses today. As a result, the OPM effectively ignores the costs of important household needs like childcare and healthcare, which were less essential or much cheaper when the OPM was created.

2) **The Definition of Income**

The definition of income used in the OPM is ignores taxes, tax credits (e.g. the EITC), and near-cash transfers (e.g. SNAP) that we include. As noted above, the EITC and SNAP have grown substantially in recent decades and far more receive either the EITC or SNAP than TANF (Danziger 2010). Also, while the OPM includes any Social Security transfers, it ignores childcare vouchers, housing subsidies, any state taxes, and state and federal payroll taxes. Comparisons over time, across states, and between age groups are therefore quite problematic. As our more comprehensive measure of income incorporates all taxes and transfers, it is inappropriate to for us to utilize the OPM threshold. For comparison, 50% of the OPM in 2015 would range from $5,555 (for a single adult) to $11,445 (for a family of four with two children) in 2018 real dollars. This translates to thresholds of $5,555 - $5,722 in equivalized HH income. That the OPM deep poverty thresholds in equivalized HH income differ depending on whether there are one or three people in the HH also illustrates how the OPM equivalence scale is not consistent. As others have shown, the OPM equivalence scale also did not have a scientific basis.
either (Brady 2009; O’Connor 2001). Hence, as Appendix I shows, the OPM thresholds for deep poverty are lower than 20% of the national median.

Additional References:
Appendix III. Trends in Poverty at 30% of the Median.
Appendix IV. Trends in Poverty at 50% of the Median.
Appendix V. Adjustments to TRIM3.

Recent evidence suggests that TRIM3 may slightly over-allocate imputed SNAP benefits to households with zero gross incomes (Stevens, Fox and Heggeness 2018). During 2011-2015, for example, Stevens, Fox, and Heggeness (2018) find that, according to administrative records, an unknown amount below 5% of annual SNAP participation is concentrated among households with zero gross income. Conversely, our TRIM-adjusted CPS ASEC data suggests that 5.26% of SNAP participation is concentrated among zero-income households in those same years. To account for the possibility that the TRIM-adjusted SNAP allocations overcorrect at the very bottom of the income distribution, we conduct a sensitivity analyses that simulates the share of zero-income households receiving SNAP benefits. We assume that the reported SNAP participation in the unadjusted CPS ASEC is a lower-bound estimate of the true SNAP participation, and that participation in the TRIM-adjusted CPS ASEC is an upper-bound estimate. For each year, we then calculate the midpoint between the unadjusted and TRIM-adjusted SNAP participations rates among zero-income households, and remove SNAP benefits from households at zero income (using a random number generator) until participation rates reach the midpoint value. In 2015, for example, the unadjusted participation was 3%, the TRIM-adjusted was 5%; thus, we adjust the participation rate to 4%.

We then re-estimate all the $2 per day measures. As expected, the share of households living in $2-per-day poverty increases slightly after these adjustments. Using our measure of equivalized disposable household income, the $2 poverty rate increases from 0.4% to 0.49% in 2015. In these new estimates, the highest estimated rate of $2 per day poverty is 0.59% in 2007 (versus our reported 0.55% in Figure 4 above). The lowest estimated rate becomes 0.28 in 1996 (versus 0.25 in 1996 in Figure 4). Though the estimated levels of $2 per day poverty increase slightly in each year, the trends remain unchanged.

Additional Reference:
Appendix VI. Trends in Anchored Poverty at 10% and 20% of the Median with CPI-U and PCE Inflation Adjustments.
Appendix VII. Trends in Deep Poverty at 10% and Extreme 20% of the U.S. Median WITHOUT and With CORRECTIONS FOR EARNINGS UNDERREPORTING.
**APPENDIX VIII.** Stata Code.

**Create Poverty Thresholds**

* National Poverty Lines

```stata
forvalues x = 10/50 {
    foreach y of numlist 1993/2015 {
        local y = `y'
        cap gen fpovline`x' = .
        qui sum edhir [w=wtsupp] if year==`y', de
        replace fpovline`x' = (r(p50)*(`x'/100)) if year==`y'
    }
}
```

* State Poverty Lines

```stata
levelsof statefip, local(levels)
forvalues x = 10/50 {
    foreach y of numlist 1993/2015 {
        foreach z of local levels {
            cap gen spovline`x' = .
            qui sum edhir [w=wtsupp] if ( year==`y' | year==(`y'-1) | year==(`y'+1) ) & statef==`z', de
            replace spovline`x' = (r(p50)*(`x'/100)) if year==`y' & statef==`z'
        }
    }
}
```

* Anchored Thresholds

```stata
forvalues x = 10/50 {
    cap gen afpovline`x' = .
    qui sum edhir [w=wtsupp] if year==1993, de
    replace afpovline`x' = (r(p50)*(`x'/100))
}
```

**Removing high-income households with high tax liabilities from poverty.**

```stata
gen zerotaxed = 0
forvalues x = 1993/2015 {
    qui sum hhincome [w=wtsupp] if year==`x', de
    replace zerotaxed = 1 if hhincome>r(p50) & year==`x'
}
```

* Concept 1: Disposable Household Income, Equivalized

```stata
replace edhir = 0 if edhir < 0
// edhir = equivalised disposable housing income in 2014 USD
gen realedhir = edhir*.95 // converting from 2014 USD to 2011 USD
gen twodollarpov = 0 if realedhir<.93
replace twodollarpov = 1 if realedhir<.73
replace twodollarpov = 0 if zerotaxed
forvalues x = spov f pov af pov {
    gen `x'10 = 0
    replace `x'10 = 1 if edhir < `x'line10
    replace `x'10 = 0 if zerotaxed
    gen `x'20 = 0
    replace `x'20 = 1 if edhir < `x'line20
    replace `x'20 = 0 if zerotaxed
    gen `x'30 = 0
    replace `x'30 = 1 if edhir < `x'line30
    replace `x'30 = 0 if zerotaxed
    gen `x'50 = 0
    replace `x'50 = 1 if edhir < `x'line50
```
* Concept 2: Labor Market Income, Pre-TANF
replace emir = 0 if emir < 0
gen realmir = emir * .95 // 2011 USD
gen mi_twodollarpov=0 if realmir!=. replace mi_twodollarpov=1 if realmir<(730)
replace mi_twodollarpov = 0 if zerotaxed
foreach x in spov fpov afpov {
gen `x'10_mi = 0
replace `x'10_mi = 1 if emir < `x'line10
replace `x'10_mi = 0 if zerotaxed

gen `x'20_mi = 0
replace `x'20_mi = 1 if emir < `x'line20
replace `x'20_mi = 0 if zerotaxed

gen `x'30_mi = 0
replace `x'30_mi = 1 if emir < `x'line30
replace `x'30_mi = 0 if zerotaxed

gen `x'50_mi = 0
replace `x'50_mi = 1 if emir < `x'line50
replace `x'50_mi = 0 if zerotaxed
}

* Concept 3: Pre-Tax Cash Income, with PRE-TRIM Cash Benefits (SSI, Child Allowances, TANF)
by year hseq, sort: egen hinctot = total(inctot)
replace hinctot = 0 if hinctot < 0
gen e_hinctot = hinctot /(sqrt(perhh)) / cpi
gen realhinctot = e_hinctot * .95
gen mic_twodollarpov = 0 if realhinctot!=. replace mic_twodollarpov= 1 if realhinctot < (730)
replace mic_twodollarpov = 0 if zerotaxed
foreach x in spov fpov afpov {
gen `x'10_mic = 0
replace `x'10_mic = 1 if e_hinctot < `x'line10
replace `x'10_mic = 0 if zerotaxed

gen `x'20_mic = 0
replace `x'20_mic = 1 if e_hinctot < `x'line20
replace `x'20_mic = 0 if zerotaxed

gen `x'30_mic = 0
replace `x'30_mic = 1 if e_hinctot < `x'line30
replace `x'30_mic = 0 if zerotaxed

gen `x'50_mic = 0
replace `x'50_mic = 1 if e_hinctot < `x'line50
replace `x'50_mic = 0 if zerotaxed
}

** Concept 4: Pre-Tax Cash Income, with TRIM-CORRECTED Cash Benefits (SSI, TANF)
gen inctot_trim = inctot - incwelf - incssi + socassist + tanftrim_p + ssitrim_p
by year hseq, sort: egen hinctot_trim = total(inctot_trim)
gen e_hinctotTrim = hinctot_trim /(sqrt(perhh)) / cpi
gen realhinctot_trim = e_hinctot_trim * .95
gen mict_twodollarpov = 0 if realhinctot_trim!=. replace mict_twodollarpov= 1 if realhinctot_trim < (730)
replace mict_twodollarpov = 0 if zerotaxed
foreach x in spov fpov afpov {

}
gen `x'10_mict = 0
replace `x'10_mict = 1 if e_hinctot_trim < `x'line10
replace `x'10_mict = 0 if zerotaxed

gen `x'20_mict = 0
replace `x'20_mict = 1 if e_hinctot_trim < `x'line20
replace `x'20_mict = 0 if zerotaxed

gen `x'30_mict = 0
replace `x'30_mict = 1 if e_hinctot_trim < `x'line30
replace `x'30_mict = 0 if zerotaxed

gen `x'50_mict = 0
replace `x'50_mict = 1 if e_hinctot_trim < `x'line50
replace `x'50_mict = 0 if zerotaxed

}

** Concept 5: Pre-Tax Cash Income + SNAP, with TRIM-CORRECTED Cash Benefits (SSI, TANF) and CORRECTED SNAP

- gen inctot_trimsnaptrim = inctot - incwelf - incssi + socassist + tanftrim_p + ssitrim_p + snaptrim 
  by year hseq, sort: egen hinctot_trimsnaptrim = total(inctot_trimsnaptrim) 
  replace hinctot_trimsnaptrim = 0 if hinctot_trimsnaptrim < 0 
  gen e_hinctot_trimsnaptrim = hinctot_trimsnaptrim / (sqrt(perhh)) / cpi 
  gen realhinctot_trimsnaptrim = e_hinctot_trimsnaptrim * .95 
  gen mictst_twodollarpov = 0 if realhinctot_trimsnaptrim != . 
  replace mictst_twodollarpov = 1 if realhinctot_trimsnaptrim < (730) 
  replace mictst_twodollarpov = 0 if zerotaxed

foreach x in spov fpov afpov {
  gen `x'10_mictst = 0 
  replace `x'10_mictst = 1 if e_hinctot_trimsnaptrim < `x'line10 
  replace `x'10_mictst = 0 if zerotaxed 
  gen `x'20_mictst = 0 
  replace `x'20_mictst = 1 if e_hinctot_trimsnaptrim < `x'line20 
  replace `x'20_mictst = 0 if zerotaxed 
  }

** Concept 6: Market Income, w/TRIM-CORRECTED Cash Benefits (SSI, TANF), but CORRECTED SNAP at 50%

- gen inctot_trimsnaptrim50 = inctot - incwelf - incssi + socassist + tanftrim_p + ssitrim_p + (snaptrim * .5) 
  by year hseq, sort: egen inctot_trimsnaptrim50 = total(inctot_trimsnaptrim50) 
  replace inctot_trimsnaptrim50 = 0 if inctot_trimsnaptrim50 < 0 
  gen e_hinctot_trimsnaptrim50 = inctot_trimsnaptrim50 / (sqrt(perhh)) / cpi 
  gen realhinctot_trimsnaptrim50 = e_hinctot_trimsnaptrim50 * .95 
  gen mictst_twodollarpov50 = 0 if realhinctot_trimsnaptrim50 != . 
  replace mictst_twodollarpov50 = 1 if realhinctot_trimsnaptrim50 < (730) 
  replace mictst_twodollarpov50 = 0 if zerotaxed

foreach x in spov fpov afpov {
  gen `x'10_mictst50 = 0 
  replace `x'10_mictst50 = 1 if e_hinctot_trimsnaptrim50 < `x'line10 
  replace `x'10_mictst50 = 0 if zerotaxed 
  gen `x'20_mictst50 = 0 
  replace `x'20_mictst50 = 1 if e_hinctot_trimsnaptrim50 < `x'line20 
  replace `x'20_mictst50 = 0 if zerotaxed 
  }

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