FURTHER ANALYSES REINFORCE OUR CONCLUSIONS ABOUT EXTREME POVERTY*

David Brady  
*University of California, Riverside & WZB Berlin Social Science Center*  
Zachary Parolin  
*Columbia University*

April 22, 2020

Word Count: 2371 (excluding title, authors, date, figures & references)

*Direct correspondence to David Brady, School of Public Policy, University of California, INTS 4133, 900 University Ave., Riverside, CA 92521; email: dbrady@ucr.edu. The authors are listed alphabetically, each contributed equally. We thank Bob Kaestner and Tom VanHeuvelen for comments.*
Our study shows that deep and extreme poverty have increased in the U.S. from 1993 to 2016, particularly for childless households. In his response, James Sullivan raises concerns that (i) TRIM3 over-allocates SNAP benefits to lower-income households, and (ii) earnings among lower-income households are underreported. Sullivan largely sidesteps that we directly addressed his concerns in our article. Several appendices demonstrate that our conclusions held even after addressing these concerns. Sullivan ignores these analyses while stubbornly claiming that extreme poverty must be lower than our study finds.

Sullivan claims extreme poverty must be lower even though his own critique undermines this claim. Although Sullivan argues that the underreporting of earnings leads us to overestimate deep/extreme poverty, the bulk of his critique argues that TRIM3 leads us to underestimate deep/extreme poverty. While Sullivan takes this contradictory position about our estimates at one point in time, he provides no challenge to our finding of significant over-time increases.

Sullivan’s critique relies heavily on a National Bureau of Economic Research working paper by Bruce Meyer and colleagues (2019, henceforth: Meyer et al). However, Sullivan overstates Meyer et al’s evidence, neglects major differences between our study and Meyer et al., and overlooks our unique contributions that surpass Meyer et al.

Before proceeding, we note that Sullivan’s contributions (Meyer et al. 2015) on the crisis in household surveys and underreporting partly inspired our study. We agree on the salience of underreporting, the crucial role of SNAP, the prominence of childless adults among the deep/extreme poor, and the need to improve income measurement. Like Sullivan (and Meyer et al), we find that levels of $2 per day poverty are far lower than estimates provided by Edin and Shaefer (2015). Sullivan ignores that our Figure 6 reports nearly identical results to Meyer et al. Specifically, we estimate that 0.29 percent of the U.S. lived in $2 per day poverty in 2011 (after
accounting for SNAP benefits using TRIM3). Meyer’s estimates from the same year range from 0.18 to 0.29 percent.

While responding to Sullivan, we present new analyses that reinforce our conclusions. We reaffirm that the best approach to analyzing deep/extreme poverty is to conduct open science, report a range of estimates under a variety of transparent assumptions, follow prevailing international standards in income measurement, and use justifiable thresholds.

THE POTENTIAL OVER-ALLOCATION OF SNAP IN TRIM3

Our study explicitly addressed Stevens, Fox, and Heggeness’ (2018) valuable analysis showing that TRIM3 appears to over-allocate SNAP benefits toward lower-income households in the CPS ASEC. In Appendix V, we presented evidence that even after accounting for this possibility, our conclusions held. In his comment, Sullivan cites the same research we cited. Here, we provide additional evidence that over-allocation of SNAP benefits from TRIM3 do not affect our conclusions.

We underline that Sullivan’s critique of TRIM3 contradicts his broader claim that deep and extreme poverty must be lower than our estimates. To the extent that TRIM3 over-allocates SNAP benefits to lower-income households, it should lead to a downward bias in our estimates. Indeed, Figures 6-8 in our article confirm this: if we do not use TRIM3, levels of deep and extreme poverty are higher and rise more quickly over time. That we still find an increase in deep and extreme poverty over time even when applying TRIM3 demonstrates that our use of benefit adjustments is not biasing our results in the direction Sullivan claims. Moreover, Sullivan ignores the evidence we provided (see Figures 7-8) that households without children – a group much less likely to receive SNAP benefits and thus less likely to be affected by TRIM3 – are the
primary driver behind the aggregate rise in deep/extreme poverty. Correcting SNAP benefits will not change levels of deep/extreme poverty among people who do not receive SNAP.

Nevertheless, we did and do take seriously the claim that TRIM3 may over-allocate SNAP benefits to lower-income households. In Appendix V, we scaled back TRIM3’s assignment of SNAP benefits among zero-earnings households to meet participation rates that fall halfway between the rates estimated in the unadjusted CPS ASEC and the TRIM3-adjusted CPS ASEC. This follows evidence that administrative data on SNAP participation place the “real” participation rate near the midpoint of those two estimates (also demonstrated by Sullivan’s two figures). Our results held even after scaling back TRIM3’s imputations this way. Here, we extend this procedure to higher brackets in the income distribution and demonstrate again that potential measurement error in TRIM3 does not meaningfully affect our conclusions.

Figure 1 displays the share of households in each income group receiving SNAP benefits in 2015 when applying the unadjusted CPS ASEC, the TRIM3-adjusted CPS ASEC, and our modified version of TRIM3. The figure shows that our modifications to TRIM3 successfully meet the midpoint of SNAP participation rates in TRIM3 and the unadjusted CPS ASEC for each of 21 income bins. While we only show the 2015 pattern, we repeat this process for each year.
Figure 1. Share of Households by Income Bins Receiving SNAP Benefits in 2015. Note: Income group 1 = zero countable income for SNAP benefit purposes. Subsequent income groups divided into 20 income ranks. Modified TRIM3 benefits set to meet midpoint between TRIM3 and unadjusted SNAP participation for each income grouping.

Figure 2 presents updated trends in extreme poverty when applying the scaled back version of TRIM3’s SNAP imputations. The top line presents the trend in extreme poverty when SNAP is excluded from household resources. As detailed in our study, excluding SNAP leads to a clear rise in extreme poverty. When adding SNAP in, but not yet using TRIM3, we still see a rise in extreme poverty. The third and fourth lines show, respectively, the trends when applying our modified version of TRIM3 adjustments and the full TRIM3 adjustments. Both show rising levels of extreme poverty over time. Obviously, the modified TRIM3 estimates show slightly higher rates of extreme poverty than the full TRIM3 adjustments.
Put simply, our conclusions hold whether we exclude TRIM3, apply an adjusted version of TRIM3, or apply the full version of TRIM3. Indeed, Figure 2 is consistent with our general approach to report a range of estimates with transparent assumptions. While we share Sullivan’s concerns about TRIM3 potentially over-imputing SNAP benefits (hence our Appendix V in the article), his claim that our use of TRIM3 affects our conclusions is not substantiated.

![Figure 2](image)

**Figure 2.** Trends in Extreme Poverty (<10% Federal Median) Before and After SNAP and TRIM3 Adjustments.

---

1 One may be concerned that our use of TRIM3 accounts for why our estimates of $2 per day poverty are far below Edin and Shaefer (2015). However, Figure 2 illustrates that even if we do not use TRIM3 at all, our estimates of extreme or $2 per day poverty (available upon request) remain far below Edin and Shaefer (2015).
THE UNDERREPORTING OF EARNINGS

Sullivan claims: “evidence from linked administrative and survey data indicate that underreported earnings are by far the most important reason why survey-based estimates of extreme poverty are biased upwards.” He cites Meyer et al. as evidence that “earnings are significantly underreported for very low reported income households.” If so, we may overestimate deep/extreme poverty. However, Sullivan overstates Meyer et al.’s evidence while ignoring analyses we already did to address his concern.

In particular, Meyer et al.’s survey-based adjustments for earnings underreporting are only relevant for the Survey of Income and Program Participation (SIPP). With the CPS ASEC data that we use, Meyer et al. (p. 33) find that “households almost never report positive hours worked and extremely low earnings in the CPS. . . In the CPS, all households that report 0 earnings also report 0 hours worked across all members.” Put simply, Meyer et al. do not find that survey-based adjustments to earnings underreporting are consequential for estimates of extreme poverty in the CPS ASEC.

Meyer et al. do find that earnings adjustments based on administrative records reduce levels of $2-per-day poverty in the CPS. However, even this evidence cannot be used to directly critique our analyses. First, because they only analyze 2011, Meyer et al provide no evidence that their adjustments affect trends in deep/extreme poverty. Second, Meyer et al do not analyze extreme poverty at our much higher threshold of 10% of medians. Any effect of earnings underreporting is likely to be less consequential to the share of respondents below 10% of

---

2 Sullivan’s footnote 6 argues: (i) Meyer et al use the Social Security Administration Detailed Earnings Records (DER) to prove earnings are underreported among the survey-coded extreme poor; but (ii) we should not trust the DER when others show more over-reporting than under-reporting of earnings in the far left tail. We encourage readers to consult the studies we cited.
medians than the share below $2 per day. Third, Meyer et al’s particular sequence of corrections makes it impossible to say that earnings underreporting matter after the use of TRIM3. Because our estimate of $2-per-day poverty in 2011 is nearly identical to Meyer et al, it seems unlikely that underreported earnings affect our conclusions after using TRIM3. Nonetheless, we now present additional evidence to validate our conclusions.

Following Meyer et al., our Appendix VI multiplied hours worked by the minimum wage for any respondent reporting zero earnings. As we mentioned, this is a rather heroic assumption that hours worked are reported accurately, but earnings are not. It also assumes all self-employed individuals receive earnings at the minimum wage level of higher. Regardless, Appendix VI showed that survey-based adjustments for earnings underreporting matter very little for estimates of deep/extreme poverty. Strikingly, Sullivan’s critique never even mentions Appendix VI.

Below, we provide further evidence that the underreporting of earnings does not change our conclusions. Specifically, we adjust earnings for all individuals below the product of hours worked and the minimum wage. This bottom-codes every respondent as having a minimum of earnings at the product of hours worked and the minimum wage. Given Sullivan’s concern that households reporting zero income are underreporting either earnings or transfer income, we also present estimates of deep/extreme poverty after excluding all zero-income households.

---

3 Meyer et al (Tables 3a, 3b, and 5 and Figure 2) always correct earnings before (in the survey and/or with administrative data) using administrative data to correct OASDI/SSI, housing assistance, and SNAP. They do not show what happens if you only correct those income transfers, or correct income transfers before correcting earnings. Given we arrive at almost identical estimates of $2 per day poverty, it is plausible that using TRIM3 makes earnings corrections much less consequential than Sullivan and Meyer et al imply.

4 In his footnote 6, he quotes our main text but incorrectly cites Appendix VI as the source of the quote, which it is not. That is his only mention of Appendix VI.
Figure 3. Trends in Deep and Extreme Poverty After Adjusting for Potential Earnings Underreporting and Zero-Income Households
Note: Adjustments for potential earnings underreporting replace reported earnings with the product of hours worked and the minimum wage for any individual reporting earnings below that amount. Base estimates and estimates with earnings adjustment overlap entirely.

Figure 3 shows our results are robust when making these aggressive adjustments for earnings underreporting. There is no difference between our base estimates (i.e. those reported in the article) and the estimates after adjusting for potential earnings underreporting (similar to what we already showed in Appendix VI). Indeed, the trend lines overlap so much that readers will probably be unable to see any difference at all between our base estimates and the estimates adjusting for potential earnings underreporting. When removing all zero-income households – the group that is most likely to underreport sources of income – levels of deep/extreme poverty are lower, but again, we still find an increase from 1993 to 2016.
TOWARD A BETTER SCIENCE OF DEEP/EXTREME POVERTY

As mentioned above, Sullivan’s response relies heavily on Meyer et al. who find that $2 per day poverty is almost non-existent in survey data. Again, Sullivan fails to realize that Figure 6 of our article finds nearly identical results.

Sullivan also does not address the ways in which our analyses surpass Meyer et al. We investigate trends in deep and extreme poverty 1993-2016, while Meyer looks at levels only in 2011.\(^5\) Moreover, we follow best practices in the international poverty literature. We present a range of poverty thresholds (i.e. 20 and 10 percent of federal, state, and anchored median incomes as well as $2 per day poverty) and apply an equivalence scale. Meyer et al do neither. While raising measurement concerns that end up being inconsequential, Sullivan ignores the far more consequential measurement challenge of homelessness.\(^6\) While we present estimates that incorporate the homeless population, Meyer et al omit the homeless population. As mentioned above, Meyer et al’s particular sequence of corrections make it impossible to say exactly how much consequence each correction has for reducing estimates of $2 per day poverty (see footnote 3). By contrast, we present many results with and without corrections to make the consequence of each correction transparent.

\(^5\) Illustrating the value of trends, our article’s Figure 6 shows that 2011 had one of the lowest $2 per day poverty rates 1993-2016 (only 2010 was significantly lower, 1996 was insignificantly lower). Because Meyer et al (and Edin and Shaefer 2015) analyze only 2011, they do not appear to appreciate that 2011 is an unrepresentatively low year.

\(^6\) We conjecture that any measurement error from omitting the homeless dwarfs Sullivan’s (and probably Meyer et al’s) measurement concerns. As a reviewer, Sullivan argued some homeless should not be coded as deep/extreme poor, writing: “Some homeless individuals work, and others are experiencing a temporary negative shock.” While providing no evidence for these claims, he implied that adding the homeless would lead us to over-estimate deep/extreme poverty. We conjecture that any non-poor homeless are trivial compared to the larger homeless population that is missed by the national point in time counts. We are also comfortable assuming that over the course of a year most homeless are actually extremely poor (i.e. <10% of median).
Most important, Sullivan obscures that Meyer et al. concentrate on $2 per day (except one column in their Table 6). Although we show some $2 per day analyses, our article devotes several paragraphs to advocating against the $2 per day threshold and for much higher thresholds. Indeed, our extreme poverty thresholds (at 10% of medians) are almost three times higher. Sullivan’s comment obfuscates this crucial distinction as he never mentions that his claims about “extreme” poverty are based on a $2 per day threshold, never defines “extreme” poverty, and simply substitutes the word “extreme” for “$2 per day”. Because our thresholds are much higher, Sullivan’s critique is much less relevant. Worse, Sullivan’s critique even conceals how little he can say about extreme poverty with our thresholds.

This contrast in thresholds suggests that Meyer et al and Sullivan should be far more cautious with claims about the composition and material deprivation of the extreme poor. With the $2 per day threshold, Meyer et al only have a sample of 250 SIPP households (Table A.11 column 6). This bottom 0.77 percent of the SIPP sample is highly unlikely to be representative of the 2.4 million people in the bottom 0.77 percent of the population in 2011. Indeed, Meyer and Sullivan’s own work on the crisis in household surveys suggests it is inappropriate to draw any inferences based on the 250 households in the far left tail of the SIPP (Meyer et al. 2015). By contrast, samples below our thresholds for extreme poverty would be much larger. Thus, a clear advantage of our more reasonable thresholds is that the sample will better represent the true population of extreme poor.

Finally, although Meyer et al.’s analysis of administrative data is obviously valuable, our combination of survey data and simulation also has advantages. Meyer et al. only have administrative data for 11 states in 2011. We are able to use nationally-representative data for all income sources from 1993 to 2016. Because their administrative data is not publicly available,
replication is impossible. Despite Meyer et al.’s admirably meticulous methodological appendix, replication also requires publicly available code. Even given the advantages of administrative data, our combination of public protocols (i.e. the Luxembourg Income Study and TRIM3), publicly available data, and open code is more replicable.

**CONCLUSION**

Our study finds that deep/extreme poverty have increased in the U.S. from 1993 to 2016, particularly among childless households. Sullivan fails to directly challenge our conclusions. Instead, he recites his reviewer criticisms regarding TRIM3 and earnings underreporting, two issues we had already addressed in the revision process. This comment adds new analyses that reinforce our conclusions and demonstrate that Sullivan’s concerns are misplaced.

Debates on deep/extreme poverty have become unfortunately polarized in recent years. On one side, Edin and Shaefer (2015) find very high levels of $2 per day poverty. On the other side, Sullivan and Meyer et al. suggest that extreme poverty is basically non-existent. Rather than carefully considering our analyses, Sullivan digs in on his side and makes the unsubstantiated claim that levels of extreme poverty must be lower. By contrast, we reaffirm that the best approach to analyzing deep/extreme poverty is to conduct open science, report a range of estimates under a variety of transparent assumptions, follow prevailing international standards in income measurement, and use justifiable thresholds. Doing so, we confirm that deep and extreme poverty in the U.S. remain significant and increasing social problems.
REFERENCES