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The Supplemental Expenditure Poverty Measure: A New Method for Measuring Poverty

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Abstract

We propose a new measure of the rate of poverty we call the Supplemental Expenditure Poverty Measure, or SEPM. It is based on total current expenditure in the Consumer Expenditure survey and treats expenditures in that survey as a measure of resources available to the household to purchase the minimum bundle necessary to meet basic needs. An augmented poverty measure based on Liquid Available Resources, which adds resources available from liquid assets and accessible, but unused, borrowing, is also presented. Our expenditure poverty measure differs from conventional income poverty measures and from consumption poverty measures in both concept and measurement, and we argue it is superior to both. We find that poverty rates using what we call our Current Expenditure measure are slightly greater than those of the most preferred income-based poverty rate produced by the Census Bureau, the Supplemental Poverty Measure (SPM). However, both have trended downward at approximately the same rate for the last 10 years. But the relative levels of our SEPM poverty rates and those of the Census income-based measures are very sensitive to the choice of threshold. Our augmented poverty measure based on Liquid Available Resources shows lower poverty rates than the SPM but we are only able to present a range of estimates of the difference, not a point estimate. At maximum, we find poverty rates to be lowered by about two percentage points. But our Current Expenditure SEPM and Liquid Available Resources SEPM show the same decline as the Census income-based SPM quite closely. There are no available consumption poverty measures that are comparable to our SEPM, so we are not able to compare our SEPM levels or trends to such a measure.

The measurement of poverty has drawn the attention of economists for many decades. Both the level of poverty and its trend over time are important social indicators of the economic well-being of the most disadvantaged members of the society. Estimates of how poverty is affected by government policy in general, and by specific anti-poverty programs in particular, are also important indicators of the influence of government on improving the well-being of its poorest citizens.

Nevertheless, how to best measure poverty has been the subject of significant disagreement among researchers and policy analysts. There are two main types of measures which have attracted the most attention, one based on income and one based on consumption. And, within income measures, there are two primary types produced by the Census Bureau. We argue that all three have conceptual and measurement problems.

Income measures of poverty compare the income received by a household within a period (almost always a calendar year) to the income needed to purchase an independently-defined minimum bundle of goods deemed necessary to satisfy the basic needs of life. In the terminology of poverty measures, this involves a comparison of "resources" to the "threshold," with a household defined as poor if its resources fall below the threshold, and the poverty rate is calculated as the fraction of households who are poor. Since the early 1960s, the Census Bureau has published what is termed the "official" poverty measure that has been heavily criticized because it uses income before taxes and transfers, excludes in-kind poverty program benefits, and ignores costs that reduce the household's ability to purchase the minimum bundle. It is also what is called an absolute poverty measure because the threshold has been held fixed in real dollars since 1963, which means that it does not pick up changes in how being poor is socially

defined (which is ultimately not a scientific question, but a social one). Use of absolute poverty thresholds also necessarily implies that, over long eras when general economic growth lifts real incomes across the income distribution, poverty rates must necessarily fall. While the magnitude of that ultimate decline is important to know, it presents an incomplete measure of socially-defined well-being at best.

A new measure called the Supplemental Poverty Measure (SPM) was begun by the U.S. Census Bureau in 2009, motivated by an earlier Report of the National Academy of Sciences (Citro and Michael, 1998), which addresses many of the criticisms of the official measure and is widely accepted as superior to the official measure. It uses after-tax-and-transfer income, includes many major in-kind transfer benefits in income, and it subtracts certain costs from income as well. It uses a moving threshold based on how much it costs to purchase a minimum bundle of specifically defined necessities—food, clothing, and shelter and utilities—in the lower part of the expenditure distribution of those goods.

The conceptual problem with all single-period income measures is that they ignore the existence of saving and borrowing. Conventional wisdom is that the poor neither save nor borrow, because of liquidity constraints, so using single-period income should be accurate. We will show that, while this is true for some forms of intertemporal transfers, it is not true of all, with credit card debt the most important. Current income does not fully represent the ability to purchase the minimum bundle if households can borrow to make such purchases, and we will show that low-income households appear to do just that. In addition to this conceptual issue, a well-known measurement issue with Census income-based poverty measures is that many forms of income are underreported in the Current Population Survey, particularly government transfers, which will tend to bias poverty rates upward (Meyer et al., 2009).

An alternative measure which uses consumption as a measure of well-being has been proposed in these pages (Meyer and Sullivan, 2012), following on work by Cutler and Katz (1991) and Slesnick (1993). A recent government commission recommended that such a consumption poverty measure be added to the list of poverty measures produced by the Census Bureau (U.S. Office of Management and Budget, undated). Many economists prefer consumption as a measure of poverty because it directly measures the flow of goods and services received by a household over time and therefore directly measures its economic well-being. It is also often regarded as a better measure of permanent income, which is often taken to be the best long-term measure of that well-being.

The conceptual flaw in consumption measures is again related to whether intertemporal flows are possible. On the one hand, if the conventional wisdom is correct that low income households neither save nor borrow, consumption should equal income (aside from measurement problems) and both poverty measures should produce the same poverty rate regardless of which is used because income equals consumption (Hurst, 2012). But if intertemporal flows are possible—which is usually implied by the economic concept of permanent income in the first place—then consumption flows over more than one period must be included. A family with income just below the poverty threshold may decide to borrow on its credit card for a major purchase, raising its consumption above that threshold, while another family with exactly the same income may choose not to so borrow. The first family will be counted as non-poor and the second will be counted as poor by a single-period consumption measure, even though they have the same income and same command over resources. One family simply chooses to allocate its income to consumption in different periods than the other family.[1] Consumption in a given

[1] See Citro and Michael (1995, pp.210-214) who note similar difficulties with consumption poverty measures.

period does not represent permanent income as well. In fact, in this case, income may be a better measure of command over resources, if it is constant over time or fluctuating less than consumption.[2]

A related problem with consumption measures is that they recognize that even low-income households purchase consumer durables (houses, cars), so those measures impute service flows to those assets, as is proper in measuring consumption. But for low-income households, such service flows are essentially completely illiquid in the short run and cannot be used directly to purchase the minimum bundle. While it is possible that those service flows are inframarginal in the household's consumption allocation—i.e., that they would have spent more on transportation expenses than the service flow, if they had not owned a car, meaning that they are not constrained in the allocation of their remaining expenditure by owning the car—it is more likely that households with large consumer durables are constrained and cannot easily substitute those service flows to cash. Liquidity is an important issue to low income households and should be taken into account when judging the availability of resources over a short horizon in constructing a poverty measure.[3]

Our new poverty measure draws on the insights of both income and consumption poverty measures but addresses the main conceptual and measurement issues of both, and we argue consequently that it is superior to both. Drawing on the concept in consumption poverty measures that how much a household is actually observed to spend in a particular period is a better measure of well-being than current income, we use *total current consumer expenditure* in

[2] It has been shown repeatedly that, for most of the population, income fluctuates more than consumption. However, this may be less true in the lower part of the income distribution. This is purely an empirical question.
[3] The textbook life cycle model assumes no liquidity constraints and that cash can be moved around to different periods, so there should be no constraints. But low income households face major liquidity constraints.

a period to measure, as a first pass, ability to purchase the minimum bundle. This will exceed income if households make current purchases with credit cards or draw down liquid asset balances, and fall short of income if households save. But, drawing on the concept of potential resources that is behind income-based poverty measures, we consider current consumer expenditure as a measure of resources, not of consumption. If a household spent $2,000 in cash in a month, from whatever source, we consider that as available to spend on the minimum bundle, no matter what they actually spent it on. We include cash expenditure that pays down debt in our expenditure measure, because that is a liquid resource and not an illiquid service flow, consist with our overall concept. Our concept is therefore cash-flow in nature. We call this our Current Expenditure Resources measure.

In addition, we construct a second measure based on what we call Liquid Available Resources, which adds easily accessible (but unused) liquid assets and easily available (but unused) borrowing to current expenditures to generate a broader measure of resources available to purchase the minimum bundle. Liquid available assets are simply bank balances and we will consider unused but available credit card borrowing on the borrowing side. Adding available borrowing will put households who have the same credit card with the same credit card limit, but some of whom choose to borrow and spend and the others choose not to, on the same level, and not treat the former as better off than the latter (and hence less likely to be poor).[4]

The importance of liquidity in an assessment of available resources for low income households makes the time period used for poverty calculation an important issue. While an

[4] As a theoretical matter, we note that the economic theory of duality implies that well-being is equivalently measured by the total resources available to a consumer over multiple periods (discounted) and by the total consumption representing how those resources are spent over the same multiple periods (discounted). In this sense, an accurate calculation of total resources available to a consumer makes a calculation of total consumption unnecessary.

annual time frame is the most conventional period, items that should be considered illiquid might be considered more liquid over a longer time horizon. Consumer durables depreciate and must be replaced or not, for example, and assets can be either sold or gradually drawn down over time. We use short-term liquidity to define our resource measure.[5]

To calculate our new measure, we use the Consumer Expenditure Survey (CE), the same data set usually used to construct consumption poverty measures. If income in the CPS is significantly underreported, and spending in the CE is either perfectly reported or at least better reported than income in the CPS, using reported expenditures in the CE will represent a more accurate measurement of potential resources than CPS income. There is indirect evidence that for spending, what underreporting there is, is worse at the top of the income distribution (Bee et al., 2015; Sabelhaus, 2015). But there are no administrative or validated data to assess the accuracy of expenditure reporting the way there are for income reports, so most of the validation work compares total expenditure reports in the CE to aggregates in the National Income Accounts. However, while the CE may accurately measure expenditure for low income households, it is not well designed to measure liquid assets or potential credit card borrowing, as we will discuss, requiring us to make a number of approximations in our estimates of Liquid Available Resources.

The income-based poverty measure most widely accepted today is, as we have noted, the Supplemental Poverty Measure, which we rename for present purposes as the Supplemental Income Poverty Measure (SIPM). We construct our measure to be as comparable to that measure as possible, except for the use of a different measure of potential resources. We will

[5] On the other hand, many observers of low household finances believe that an annual time frame is too long, not too short. In this view, low income households are constrained on a monthly or weekly basis, and annual resources and spending does not capture the reduction in well-being that can occur from within-year volatility.

consequently use the same thresholds as in the SIPM and will mimic other details in its construction (discussed below).[6] We therefore term our measure the Supplemental Expenditure Poverty Measure (SEPM), and we will make direct comparisons of our estimates of both levels and trends in poverty to those using the SIPM over the period 2004-2019.

Another advantage of using an expenditure-based poverty measure is that there is no need to account for taxes in calculating poverty rates. For its SIPM income-based measure, the Census Bureau has to estimate what taxes households pay in order to subtract it from income, and this necessarily involves inaccuracies (CPS respondents are not able to accurately report their actual taxes paid). The household expenditures we use are, by definition, after tax. Also, to the extent that some households underreport some forms of cash income, such as under-the-table earnings and transfers from friends and relatives, they will be included in our available resources measure if the income is actually spent. In addition, any in-kind transfer program which gives the household chits to purchase the good in question will already be included in expenditures, and do not have to be imputed and added to cash income, as the Census Bureau does for its income-based poverty measure. For example, the CE collects information on food expenditures which includes food purchased with SNAP (Food Stamps). There is no need to estimate values for a program like the Food Stamp program in our expenditure measure.[7]

We have a number of key findings. First, we find that our Current Expenditures SEPM poverty rates are slightly above those in the Census income-based SIPM, by anywhere from 1 to 2 percentage points over the last 10 years. This perhaps unexpected finding—underreporting of

[6] Using the same thresholds as the SIPM is particularly easy because the SIPM thresholds are (mostly) constructed from the CE in the first place based on spending on food, clothing, shelter, and utilities. The Census Bureau takes the thresholds constructed from the CE for its SIPM construction. We therefore just construct the thresholds the same way the Census does.

[7] However, like the Census Bureau, we will have to impute some expenditure when that expenditure is financed directly by a government program and is not recorded as an expenditure in the CE. See below.

income in the CPS as well as the omission of asset drawdown and credit card borrowing in the SIPM would imply the opposite—appears mostly to be a result of different values of SIPM-style adjustments in the CE data compared to the CPS data. Absent adjustments, SEPM and SIPM poverty rates are very close to one another, implying little bias from income underreporting or omission of asset drawdown or credit card borrowing in the SIPM. The two measures also both trend downward over time.

However, the similarity masks an important feature of the distributions of income, on the one hand, and current expenditure, on the other hand, at the bottom of the distributions that make the SEPM and SIPM poverty rates sensitive to the exact location of the threshold. The fraction of income reports at very low values is much higher than the fraction of spending reports at very low levels (consistent with an income underreporting explanation), whereas the opposite is the case at slightly higher levels, including the fraction of values just around the threshold. Indeed, there is much greater mass of the spending distribution right around the threshold than of the income distribution. As a result, a slightly lower threshold moves many more expenditure values out of poverty than income values, leading to a higher SIPM than SEPM. A slightly higher threshold moves many more spending values below poverty and many fewer income values below poverty, making the SEPM larger than the SIPM. At the exact threshold, the differences in the two distributions almost exactly cancel out, which is why they are close to one another at that value.

A second set of findings arises from our Liquid Available Resources measure. We find, consistent with conventional wisdom, that the liquid asset balances (bank accounts) for those in the lower portion of the expenditure distribution are quite small, and their inclusion in resources has little effect on SEPM poverty rates. But unused and potential credit card borrowing has a greater possible effect. We use outside data on the utilization rate of low-income households

(that is, the fraction of their credit card credit limits that are actually utilized) to estimate potential additional credit card borrowing. We construct a lower bound for potential borrowing by estimating potential additional credit only for those in the CE who report having a credit card. Because that is 25 percent or less of the sample, this addition has little effect on poverty rates. Our upper bound assumes that all those who do not have credit cards could get them if they want them, and assuming that borrowing is available lowers poverty rates by about 2 percentage points. We conclude both that estimating potential credit card borrowing needs more analysis, and with better data than the CE, as well as that the potential for it to alter poverty rates is not insignificant.

The paper has three sections. The first briefly reviews previous poverty measures in the U.S., with more detail than we have given in this introduction, and shows their trends reported in other work. We also describe the construction of our new measures. The second section presents our SEPM measure based solely on current expenditures and compares its level and trend to that using income measures. We also present some demographic breakdowns, including child poverty and poverty of the older population, and we show the impact of some government transfer programs on poverty rates. The third section enlarges our definition of available resources and shows its effect on poverty rates. A short summary concludes.

I. Currently-Used Poverty Measures and the SEPM

We briefly review poverty rate estimates from current work on Official poverty, the SIPM, and consumption poverty. We then present a summary of our we construct the SEPM and how it differs, with details left to an Appendix.

Figure 1 shows current estimates of the level and trend of poverty using three different measures from 1990 to 2018. The Official measure compares cash income before taxes and

transfers to a threshold defined in 1963 estimated as the amount of income needed for a minimum level of food expenditure. It is held constant in real CPI-U dollars since then. It omits in-kind transfers from income, makes no adjustment for cross-area differences in the cost of living, and uses a non-standard equivalence scale.

The interesting aspect of the trend in Official poverty is how little it has changed over time, despite the expectation that poverty rates should eventually decline for any absolute poverty measure. While there are clear business cycle effects, the last value is only slightly lower than that in 1990. In part this reflects the growth in wage inequality and the associated slow rate of growth of wages for unskilled workers. But its omission of taxes and transfers and in-kind benefits programs makes its poverty rates too high (taxes have declined for the low income families and transfers have grown).

The Supplemental Poverty Measure which we denote as the SIPM bases its threshold on a minimum bundle composed of food, clothing, shelter, and utilities, and on a measure of how much is spent on those four goods in the lower part of its distribution. The threshold is updated over time as expenditures on those goods rise in that lower section, intended to represent changing social norms for where households are relative to others in ability to purchase that bundle. This obviates the need for a price index because the threshold is defined in nominal dollars. The income measure subtracts from gross money income an estimate of net taxes paid, which can be negative because of federal and state tax credits to lower income families, and it includes estimates of in-kind transfers received by each family (SNAP plus four others noted below). The SIPM also considers working families to incur work-related expenses, which are subtracted from income, as are child care expenses and any child support paid to a child caregiver outside the family. Somewhat more controversially, it subtracts from income a measure of medical out-of-pocket expenses, including health insurance premiums paid plus

medical costs not reimbursed by insurance (Medicaid is otherwise ignored in the SIPM).[8] The SIPM also deals with homeowning by using a separate threshold for homeowners with mortgages, without mortgages, and renters, on the assumption that homeowner with mortgages need more income to purchase the rest of the minimum bundle and those without mortgages need less. It also adjusts the thresholds for a state- and metro-area level price index.

Given the dramatic differences in the way the SIPM is constructed from the Official measure, the surprise in Figure 1 is how little they differ. The SIPM is slightly higher in level, which is not so much because of differences in the thresholds (Fox et al., 2015) but because the subtractions from income outweigh the addition of tax credits and in-kind transfers. The two follow similar trends over time.

Consumption poverty estimates are less standardized and differ from study to study. Those show in Figure 1 are drawn from Meyer and Sullivan (2019), which updates the estimates in Meyer and Sullivan (2012). The authors construct a measure of consumption which adds nondurable spending in a year from the Consumer Expenditure Survey to an estimate of service flows from houses and automobiles. It also excludes expenditure items like educational expenses and pension contributions on the grounds that these constitute saving rather than consumption.

The dramatically different shape of the consumption poverty level and trend in Figure 1 is at least partially explained by two factors. One is that the authors do not take a position on what the threshold should be and hence do not simply compare their estimates of consumption to either the Official threshold or the SPM threshold. Instead, they "anchor" their poverty measure

[8] The total of these expenses is capped, partly because high income families may have high medical expenses that are mostly discretionary. The latest Census report describing the details of this deduction as well other details on how the SIPM is constructed can be found in Fox and Burns (2021). We should note that work is currently underway to address the knotty problem of including Medicaid and health insurance in the SIPM. See Korenman et al. (2019) for an important contribution on that topic.

by finding a consumption threshold that would yield the same poverty rate as the Official measure would; in figure 1, their anchoring at 2015 is shown. They update that threshold forward and backward for prices alone, thereby constructing a absolute poverty measure rate. The other is that the authors use the CPI-U-RS, which shows a lower rate of inflation than the CPI-U, and they also subtract 0.8 percentage points from it every year on the argument that the CPI-U-RS. This leads to a greater decline of poverty over time than would result from using the CPI-U or the CPI-U-RS, ceteris paribus. This measure of consumption poverty is not comparable to either the Official measure or the SIPM, nor to our measure discussed next.

Our Current Resources SEPM poverty measure uses consumer expenditure from the CE as the basic building block of available resources. We do not exclude any items that might be regarded as investment or saving because those could have been used, instead, to buy the minimum bundle and hence should be included in resources. We also include all down payments on durables in our expenditure measure, because the household could have chosen not to purchase the durable and apply that expenditure toward the minimum bundle instead. We also include debt payments to the extent we can with the CE data, on the grounds that those are cash payments and are therefore liquid. We recognize that their inclusion could be objected to on liquidity grounds but, unlike service flows, they represent actual cash outlays that could in principle have been redirected toward the purchase of the minimum bundle if the debt had not been incurred in the first place.[9] As we noted in the Introduction, our expenditure measure includes that made with credit cards and any drawdown of assets, but the CE does not ask the source of expenditures or whether either of those methods were used for purchases.

[9] Appendix A describes many of the details involved in implementing these decisions. The CE only includes purchase price for some durables, even if financed by a loan, which we can do nothing about. It also does not include variables toward credit card debt, which we discuss more below.

Because we want to make the SIPM our main poverty measure of comparison, we adopt all other methods used in that measure. We use the same thresholds as the SIPM, the same differentiation of those thresholds by homeowner and mortgage status, the same type of geographic cost-of-living adjustments, and the same family size equivalency scale. We also add to our expenditure total estimated amounts of the four in-kind transfers other than SNAP which the SPM adds to income: implicit rent subsidies to those in government subsidized housing who pay below-market rents, lunch subsidies received by school children, transfers in federal nutrition programs for pregnant women and mothers of young children, and energy assistance. We recognize that liquidity issues can be raised with these estimates as well. Finally, we also, like the SIPM does for income, deduct from our expenditures work-related expenses and child care, child support paid, and capped medical out-of-pocket expenses, though all necessarily computed with CE data instead of the CPS. These "adjustments" are an important feature of the SPM poverty measure. With all these methods, we intend for our Current Resources SEPM and the SIPM to differ as much as possible only from the use of expenditures instead of income.[10]

One issue with the CE that is worth mentioning here in the text is that the CE data are collected in quarterly interviews, not annual interviews like the CPS. The Bureau of Labor Statistics (BLS) treats each quarter as an independent observation and then averages them with weights to arrive at calendar year estimates. This contrasts with some authors who use only a subsample (e.g., Bavier (2014) who uses only the Q2 interview) or use only households that complete all interviews (e.g. Fisher, et al. (2015)). If a sample of consumer units present in all four quarters is required, significant sample loss occurs from attrition. We follow BLS in constructing annual expenditures from quarterly amounts but this may have some effect on

[10] Again, see the Appendix for details on the implementation of these methods in the CE.

calculated poverty rates because quarterly expenditure may fluctuate more than annual expenditure. If so, calculated poverty rates may be higher over a shorter horizon and our poverty rates may exceed those from annual measures to some extent for this reason (see discussion in Citro and Michel (1995)).

The following section of the paper will expand the definition of total available resources to include liquid assets and potential "liquid" borrowing in our calculations. In that section, we will define our Liquid Available Resources (LAR) as

$$LAR = Current\ Expenditures + Additional\ Available\ Liquid\ Assets + Additional\ Available\ Liquid\ Borrowing$$

We use data on current savings and checking bank balances to calculate additional available liquid assets, and we will use estimates of additional potential credit card borrowing as our measure of additional available liquid borrowing, with some of the details postponed to the section below. The choice of what is liquid and what is illiquid necessarily involves judgement calls, and there is room for reasonable disagreement on the best choices. While neither income-based nor consumption-based poverty measures require making such judgements, we regard this as a defect of those measures rather than an advantage. It is conceivable that current income measures could be adapted by adding to current income current and potential expenditures out of credit cards, and current and potential expenditures out of bank balances, but it would be very difficult to adapt current consumption measures to meet the correct definition because that would require determining how the LAR is spread over consumption in different periods.

II. Current Expenditure SEPM Results

A. Levels in 2019

Before comparing trends in our poverty rate measure to that of the SIPM, we present levels of the two measures for our final year of data, 2019, to illustrate the building blocks for each and the nature of their construction. We also present a first major finding on the relationship between our expenditure poverty measure and income measures in this initial exercise

Table 1 shows the building blocks for our SEPM poverty rate using the CE and the SIPM using the CPS for 2019. The first rows present statistics on the distributions of gross CE expenditure and gross Adjusted CPS income. In the whole population, CE mean and median expenditures are much lower than those in the CPS, but this deserves little attention because it is the lower tails of each that are relevant to poverty measurement. A key result is that the income distribution in the CPS has a much longer left-hand tail than the expenditure distribution in the CE, and the difference gets larger, the lower in the distribution one goes. The best explanation for this is simple underreporting of income in the CPS but, whatever the cause, it implies that poverty rates may differ simply because of this difference.

Figure 2 shows the two distributions graphically but in dollar terms and not percentile terms. A vertical dotted line shows the average SIPM threshold we will use to calculate poverty rates as the fraction of the distribution to the left of that line. The most important difference, which as suggested by Table 1, is that expenditures are much more concentrated in a mass just above the threshold, unlike the most dispersed income distribution. Because the density curves cross and hence neither distribution first-order stochastically dominates the other, the relative poverty rates of the SEPM and SIPM will depend on where the threshold is located. In Figure 2, it is not visually apparent whether expenditures or income have a greater fraction to the left of

the line. But Table 1, showing gross SEPM and SIPM poverty rates, show that the fraction of income below the threshold, 8.8 percent of income observations, is almost identical to the fraction of expenditures, 8.7 percent. Thus the differences in the distributions of income and expenditure below the poverty line essentially cancel out.

As we noted above, the Census Bureau SIPM adds certain in-kind transfers to income and subtracts certain adjustments representing costs before calculating ability to purchase the minimum bundle. What we term the Net poverty rate is that based on net expenditure and net income after those additions and subtractions. Table 1 shows the distributions of net expenditure and net income, in parallel to those for the gross distributions. Not surprisingly, we find a longer left tail of net income than net expenditures, which should be the case if the in-kind transfers and deducted adjustments are roughly the same in the two data sets. The means of those in-kind transfers and deducted adjustments are shown in the lower half of the table, and shows that their means are not much different in the CE and CPS, with housing subsidies a partial exception.

However, the relationship between the two poverty rates changes when going to net expenditures and income. Both the SEPM and SIPM net poverty rates are higher than their gross counterparts, because the deductions are larger than the additions from in-kind values. However, the SEPM rises more than the SIPM, resulting in a higher poverty rate for the former—14.5 percent vs 12.2 percent, a 1.5 percentage point difference. The major reason for the change is apparent from Figure 3, which adds the distributions of net expenditures and net income to those for their gross counterparts which were shown in Figure 2. Both distributions are shifted to the left, but because of the greater mass of the expenditure distribution around the threshold, more household expenditures are moved below the threshold than household incomes. While it may seem paradoxical that underreporting of income leads to a higher expenditure poverty rate than

an income poverty rate, this is a simple mathematical result of the differences in the distributions relative to the threshold.

Table 2 illustrates the importance of the threshold by showing gross and net SEPM and SIPM poverty rates for what are called, in the literature, "Deep Poverty" and "Near Poverty." The first is calculated as the fraction of the population which is less than 50 percent of the threshold, and the latter is calculated as the fraction of the population which is less than 150 percent of the threshold. These are generally regarded as important alternatives because the threshold itself has certain arbitrary elements in its definition, and it helps to see more of what the full distribution looks like at the bottom, not just the fraction above and below one particular point. But, for our purposes, Table 2 reveals that SEPM poverty rates are lower than those for the SIPM when looking at Deep Poverty, but much higher than those for the SIPM when looking at Near Poverty. For net poverty rates, the SEPM Deep Poverty rate is 1.5 percent compared to a 4.1 rate for SIPM Deep Poverty, while the SEPM Near Poverty rate is 32.6 percent as against the 25.5 percent for SIPM Deep Poverty. The Deep Poverty rates capture more directly the effects of possible underreporting of income, while the Near Poverty rates show how many more US households have low—but not extremely low—expenditures.

B. Trends, 2004-2019

Trends in Gross and Net SIPM and SEPM poverty rates from 2004 to 2019 are shown in Figure 4. We show both Net and Gross since there are some differences between them, as there were in 2019. The Gross SEPM poverty rate was approximately 11 percent in 2004, fell to about 8 percent in 2007, then rose through 2010 to about 12 percent (no doubt because of the Great Recession), and then began a gradual decline to its 2019 value of 8.7 percent (the decline coinciding with a general economic growth period in the country). The Gross SIPM poverty rate

shows lower values in the 2004-2007 period, a somewhat sharper rise from 2007 to 2011, and then a sharper fall through 2019, ending at its final value of 8.8 percent, almost identical to that for the SEPM. We view these results as altering to some extent the 2019 results, for at least over the last 10 years the Gross SEPM has been below the SIPM for almost all of that period, even though both have fallen from the Great Recession peaks.

When moving to the Net Poverty rates, both the SEPM and SIPM shift upward, as already discussed, and the shift upward results in a somewhat similar pattern of time trends of each over the entire 2004-2019 period. Both continue to have declined since the Great Recession, for example. However, as in 2019, the Net SEPM is above the Net SIPM, and for all years since 2009. Once again, the reason is the larger mass of expenditures just above the poverty threshold than the fraction of income observations there, so that reductions in both increase expenditure poverty rates more than income poverty rates.

C. Demographic Patterns

We briefly discuss differences in poverty rates among different demographic groups for the SEPM and the SIPM. Table 3 shows those rates for households of different types. For the most part, the differences should be interpreted, as we have discussed above, as reflecting differences in where the distribution of expenditures, on the one hand, and income, on the other hand, are concentrated. For gross SEPM and SIPM, for example, SEPM rates for homeowners without a mortgage are higher than SIPM rates, but the opposite is the case for renters. Renters have a larger mass of income below the threshold than homeowners. The relationship between gross SEPM and SIPM are also the opposite for married and unmarried households, with the latter having a larger mass of income below the threshold than expenditures and hence higher SIPM rates than SEPM rates, with the opposite the case for married households. Households

with elderly heads and non-elderly heads have about the same gross SIPM and SEPM poverty rates. Differences by race and ethnicity, on the other hand, are quite close in magnitude with no major discrepancy as measured by the two poverty measures. Households with more educated heads have lower poverty rates than households with less educated heads, as expected, but the differential by expenditure is greater than that by income. As for the net measures, once again, they almost always increase poverty rates more for the expenditure measure than for the income measure for the same reason noted above. This sometimes reverses the relative magnitudes of SEPM and SIPM rates.[11]

One question that has been the focus of attention of much of the literature on trends in poverty concerns trends in poverty rates of children and the elderly. Figure 5 shows trends in net SEPM and SIPM poverty for children and for households with elderly head. For children, SEPM poverty rates climbed during the Great Recession and are much higher than SIPM poverty rates since 2010, reflecting the large number of children in households with low expenditures—more than with low incomes. However, both have declined since the Great Recession period. For the elderly, expenditures and income distributions are more similarly distributed resulting in similar SEPM and SIPM poverty rates, and similar trends over the last 10 years as well.

III. Liquid Available Resources

In this section, we add liquid available assets and additional potential credit card borrowing to current expenditures to arrive at the measure of LAR we referred to previously. The current expenditure used in the last section already incorporates *realized* spending out of

[11] Appendix Table A1 shows differences in various characteristics for the SEPM and SIPM poor. As expected, the SEPM poor have higher expenditures than the SIPM poor have income. There are a few demographic differences as well. For example, the SEPM poor have larger family sizes, and the household has less education.,

assets and *realized* credit card borrowing, necessarily. But a household could have had more liquid assets that they could have used for purchasing the minimum bundle and could have borrowed more on their credit cards to purchase it as well. However, particularly on the credit card side, the CE have significant limitations which allow us only to make educated guesses.

A. Credit card repayment

We first deal with a measurement problem with the CE data, which is that they do not record credit card principal payments in expenditures (credit card interest and fees are already included as expenditure). Consistent with our treatment of other forms of payments for debt reduction, we need to estimate principal repayments and add it to expenditures and include it in Current Expenditures as our measure of available resources. We draw on Keys and Wang (2019) who estimate credit card payments toward credit debt at between 1 to 4 percent per month. We arbitrarily pick the approximate midpoint of 2 percent. At an annual rate, this is about 27 percent. This adds very little to CE expenditures, as shown in Figure 6, whose top line represents the Net SEPM poverty rate and the line just below shows the rate after adding credit card repayments to expenditures.

B. Liquid Available Assets

The CE asks about bank balances (checking or saving) in the Q5 interview. The bank balances are therefore those at the end of the quarter, whereas expenditures are asked over the past three months. Thus the balances represent funds left over after all income and expenditures in the quarter have occurred, and we regard those left-over funds as money that could have been used to purchase the minimum bundle. We necessarily restrict our attention to households who

complete the final interview (quarter 5), which makes our sample a bit different than that used in the last section because of attrition that has occurred by that interview.

Table 4 shows the mean and median bank balances (liquid assets) at Q5 for households in bottom quartile of the CE current expenditure distribution in 2019, shown separately by the three housing statuses employed by the Census Bureau in its threshold calculations, and also broken out by whether the household head is or is not over 65. For the total population, median bank balances are zero except for owners without mortgages. This is primarily because they are more likely to be 65 or older, and have larger assets from their savings. Indeed, median bank balances are zero for those homeowners below 65. However, the percent with a positive bank balance is usually quite far above zero, and is as high as 47 percent even for groups with a 0 median balances. In addition, mean bank balances are often non-trivial, especially for those with heads over 65. This also reflects distributions with a rather long right hand tail. Figure 6 shows that adding these bank balances to available resources lowers the SEPM net poverty rate by about 1 percentage point, which is slightly growing over time.

C. Potential Credit Card Borrowing

Estimating potential unused credit card borrowing is even more difficult with the CE. The simplest definition would be to determine what the credit card limits are for each household and then subtract their credit card balances from that limit. While credit balances are asked in the survey, respondents are not asked their credit limits. In addition, CE respondents are not asked in every year if they have a credit card, and some who report zero balances may indeed have them. And, finally, many of those CE households who do not have credit cards could probably obtain them and, in principle, these households should be considered to have ways to borrow that they are not using. As noted in the Introduction, this issue is substantive because

spending from credit card borrowing is already included in current expenditures in the CE (but not identified as such) and treating households who borrow more on their cards differently than those who borrow less is an inconsistent treatment of the problem.

Unfortunately, most large credit card data bases have extensive credit card balance and limit information but no information on household income, which we need for our analysis. But there are a few special surveys that have obtained information on both, and we draw on the results of Fulford (2015, Table 2) who found, on average, that credit card limits were positively correlated with household income and, in magnitude, about 53 percent of monthly income. We therefore use that estimate plus reported CE income to estimate limits. However, the credit card balances reported by CE respondents sometime exceed this, so we estimate the limit for each household as Max(balance, .53 * monthly income).

There remains the issue of how to treat those with zero balances, which includes those with a credit card but no charges and those without a credit card (we cannot distinguish them). As a lower bound on potential unused credit card borrowing, we simply calculate limits (and therefore unused credit as the limit minus their reported balance) only for those who report a positive balance. As an upper bound, we assume that all of those with zero balances could obtain a credit card, and we estimate their limits—and therefore unused credit—as .53 times monthly income.

Table 4 shows the lower bound and high, upper bound of unused credit calculated in this way, again in 2019 and for separate housing groups. The median value of that credit for the lower bound is always zero, because the percent of the sample with credit cards is less than 25 percent. The median values for the upper bound are often substantial, often just below or above $1,000. The mean values are, as should be expected, a bit higher, but not by that much, indicating not as much skewness as might be thought. Figure 6 shows that adding the low

estimate of unused credit to each household's liquid available resources has only a miniscule effect on SEPM poverty rates, effectively zero. But the upper bound has a much larger impact, up to 2 percentage points, and growing slightly over time. While these are obviously only crude guesses as to the real magnitudes, they do establish the potential importance of the issue. More research on liquid credit card borrowing is needed to more accurately establish the magnitude of its importance.

IV. Summary and Conclusions

This paper has proposed a new poverty measure that we argue is superior conceptually to income poverty and consumption poverty measures. Our measure is based on observed, realized spending as a measure of the resources available to a household, either alone or supplemented with access to resources from bank balances and credit cards. We argue that it is superior to income measures because it includes in resources spending from credit cards and spending out of liquid bank balances, and it is superior to consumption measures measured annually, which do not properly capture well-being as our resource measure does. Empirically, it is superior to income if Consumer Expenditure survey expenditures are measured more accurately than income in surveys like the Current Population Survey. Our measure also has several practical advantages over income poverty measures because it does not require estimation of taxes, adjustments for underreporting of transfers, or the imputation of some in-kind transfers.

We implement our SEPM on the Consumer Expenditure survey data from 2004 to 2019. We find that what we call gross SEPM poverty rates—based just on total household expenditures in a period—were smaller in 2019 than those estimated with income data from the CPS. However, expenditure poverty rates depend critically on exactly where the poverty line is drawn

because there is a large mass of low-expenditure households whose expenditures are just below and above the most preferred threshold used by the Census Bureau. As a consequence, for example, netting out certain costs from expenditures moves more into poverty using our SEPM expenditure measure than netting those same costs out of income, making SEPM net poverty rates higher than those using income. Also, moving the poverty line up slightly to capture those households who are "almost" poor but not quite, also makes SEPM poverty rates higher than those using income. Overall, we find that there are many more low-expenditure households in the U.S. than low-income households, in percentage terms.

We also assess the ability of households to escape poverty by drawing on available liquid bank balances and by using available, but unused, credit debt to finance purchases of basic goods. Many low-income households already do that, but some do not use all the potential borrowing they could. We find that bank balances are quite small and, when counted toward ability to escape poverty, make only a small 1 percentage point difference in reducing poverty rates. But we find that available credit card borrowing could potentially lower poverty rates further by up to 2 percentage points. But these estimates are highly uncertain and much more research is needed on credit cards as an available resource over a relevant time horizon before any definite conclusion can be reached.

We suggest that our work be considered only as a preliminary, initial investigation of our new conceptual measure. There are many data issues with the Consumer Expenditure survey that make implementation of our measure difficult, and better data are needed to implement what we regard as the best approach to measuring poverty. Further work should result in improved measures of estimated poverty in the United States.

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Table A1: Means of SEPM and SIPM Poor, 2019

	SEPM	SIPM
Median Resources		
Gross Expenditure or Gross Adjusted Income	17,399	11,214
Net Expenditure or Net Adjusted Income	13,318	8,687
Means Adjustments and In-Kind		
Adjustments		
MOOP	2,796	3,197
Work Expenses + Childcare	1,408	910
Age	54	52
Child Support	11	119
Total Adjustments	4,216	4,226
In-Kind Transfers		
School Lunch Subsidy	205	148
Energy Asst.	31	32
WIC	42	28
Housing Subsidy	116	669
Total In-Kind	393	879
Demographics		
Home		
Family Size	2.701	1.946
Children	0.786	0.433
Adults	1.915	1.514
Presence of Elderly	0.354	0.331
Own w/ Mortgage	0.117	0.153
Own w/o Mortgage	0.306	0.287
Renters	0.577	0.560
Education		
< High School	0.258	0.212
High School	0.556	0.506
AS, BA, or More	0.185	0.281
Race		
White	0.511	0.499
Black	0.200	0.190
Hispanic	0.217	0.222
Other Race	0.073	0.089

Notes: Values are expressed in 2014 dollars. Gross Expenditure is total household spending on all items in the year. Gross Adjusted Income is total income in the year after-tax and with SNAP benefits added. Net Adjusted Income includes four in-kind transfers and exclude three types of capped adjustments. Weighted by household weights. See Appendix.

The Supplemental Expenditure Poverty Measure:

A New Method for Measuring Poverty

Data Appendix

Supplementary Appendix 1: Main

This Appendix discusses treatment of data from the Consumer Expenditure Survey. For definitions of resources for the CPSP historical series using ASEC data, see Fox et al.(2015).

The Consumer Expenditure Survey (CE) is a nationally representative survey of U.S. consumer units conducted by the U.S. Bureau of Labor Statistics designed to produce expenditure weights for the consumer price index. It conducted five quarterly interviews of households selected for the survey which we label Q1-Q5, and with the first interview just a "bounding" interview, but the BLS stopped that in 2015 and now just has four quarterly interviews (labeled Q2 to Q5). We use CE data starting in 2004, the first year that the BLS starting imputing income for the (large number) of missing income values, which we use to compare to our expenditure series. Imputation of income in the CE is an important feature of the data and the distribution of income on the data files changed markedly in 2004. Our last year of data is 2019. The CE collects data on expenditure, income, and a limited number of asset and debt variables.

A.1 Survey Calendar Year Dating

Each CE interview period asks about the prior three months. The interviews done in the first quarter (Jan-Mar) reach back into the prior calendar year. We follow Garner and Gudrais (2018) and define the data year as the year of interview for the last 3 quarters of the year, and define the data year as the prior year for interviews from the first quarter. Any CPI adjustment is based on the calendar data year.[12] For the CPS, the data year is the year prior to the March interview year.

A.2 Sample Units

For CE data we use the consumer unit CU, a unit sharing resources. BLS defines it as follows: "A consumer unit comprises either: (1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or (3) two or more persons living together who use their income to make joint expenditure decisions." BLS https://www.bls.gov/cex/csxgloss.htm, cited 1-27-22.

The Center for Poverty and Social Policy (CPSP) ASEC comparison files use the SPM poverty unit as constructed by Fox et al. . (2015). These are family units sharing resources, broadening the definition of families to include unmarried partners and their families, unrelated children under 15, and foster children under age 22. See Fox et al. for more details.

[12] As noted in the text, we have put several of our variables into real dollars for convenience in comparisons across years, but price adjustments have no effect on our poverty rate calculations.

A.3 Weights

We construct our samples on a consumer unit basis (one record per consumer unit) and weight them by unit size when computing proportion of persons poor.

For the CE data, we use the fnlwg21/4 for consumer units for each quarterly observation. It is divided by four so that sum of weights of all 4 quarters is the number of CU units in that year. For proportions of persons we multiply that weight by the number of members in the CU unit

Perpopwt=fnlwgt21/4*fam _size

For the CPSP ASEC data, the population numbers published numbers are on a person basis and use the marsupwt (March supplement weight) on a person level file. To make a method more comparable to the CE method, we extract a sample with one record per SPM unit and construct a weight equal to the SPM unit weight, times the number of persons in the unit,

SPM_perWeight = SPMu_Weight* SPMu_NumPer.

This produces poverty rates weights very similar to those using the marsupwt on the full samplke of persons (within .001).

Computing poverty on a person basis reduces the poverty rate by a small amount because income poor households on average have smaller households.

For the graphs and tables of children or elderly in poverty, we construct the weight based on SPMu_Weight times either number of children in the unit or number of elderly in the unit.

B Resources

After 2004, the CE uses a method to impute income described on the CE website. For many aggregates, they prepare 5 imputations and provide a mean imputation. We used the mean of the imputations.

B.1 Income

In CE, gross income is money income and selected money receipts received in the 12 months prior to interview for all members of the CU age 14 or over. Income is asked in the Q2 and Q5 interviews.

B.2. Expenditures

In the CE, expenditures are aggregate outlays for each quarter (etotalcq+etotalpq) multiplied by 4 to annualize it. Each quarter is treated as an independent observation. Outlays come closer to out-of-pocket spending than BLS "total expenditure." Outlays include interest, principle and down payments for housing and vehicles and excludes the purchase price. For other durables the purchase price is included as an outlay. (E.g. for an early discussion, see Rogers and Gray, 1994, *Monthly Labor Review* Vol. 117, No. 12 (December 1994), pp. 32-37).

B.3 In-kind aid

We include the cash amount for Food Stamps and SNAP in food expenditures. We impute the value of in-kind aid for several programs following the methods of Garnar and Gudrais (2018) and Fox et al. (2015, Appendix). We impute values for participation and benefits for the WIC, the National School Lunch Program, and the LIHEAP program. Participation in these programs is not asked in the CE but participation is asked in the CPS, so we follow a modified method of imputing participation from the CPS

to the CE developed by Garner and Gudrais, and we use their benefit values as well to estimate benefits conditional on participation. In addition, for those who receive housing assistance, we impute the subsidy value as the difference between estimated rent paid and the shelter-and-utility portion of the FCSU, following Fox et al. (2015) and the CPSP (this is different from the Census method).

C.1 Adjustments: Medical out of pocket expenditures (MOOP).

MOOP includes health insurance premiums and out-of-pocket medical expenses. We impute MOOP following the CPSP method described in Fox et al. (2015). We define 15 imputation cells based on family size (1,2+), number of elderly (0,1,2+) and a 3 category poverty ratio. For the CPSP ASEC data we use income poverty (pre-tax gross income/SPM threshold <1, 1 to 2, and 2+), and for CE we use expenditure poverty (gross expenditure/SPM threshold <1, 1 to 2, and 2+) From the CE we compute the deciles of MOOP expenditure in each cell, and randomly assign a value to all in the cell. The MOOP expense is capped at a maximum real value times family size.[13] We differ from Fox et al. in that we use three poverty ratio groups whereas CPSP uses two (poverty ratio <2, 2+), which we found to make a difference and to improve the imputation for poverty calculation purposes. We use three groups because adjustments have different impacts for expenditure poverty and income poverty and we wanted a finer distinction across poverty groups. This was done for CE and ASEC.

We make a correction to values prior to 2014 when the CE made a change in the survey that resulted in greater reporting of health insurance. BLS concluded that the new survey questions were an improvement, so we inflate prior values of the health insurance component by 26% so that it is consistent over time. . See the Supplementary Appendix 2.

C.2 Adjustments: Child Care and Work Expense

We followed the CPSP method described in Fox et al. (2015) to impute to both CE and ASEC households. Child care cost is computed from CE data and by cells based on number of children, family size, and a three category poverty ratio (<1, 1-2,2+) using a gross income poverty ratio for ASEC and using a gross expenditure poverty ratio for CE. These are imputed to households based on the probability of using paid childcare. Annual work expenses are based on annual weeks worked times 85% of median weekly work expenses estimated from the SIPP. The sum of child care and work expense is capped at the earnings of the lower earner of the head or spouse.

C.3 Adjustments: Child Support Paid

Child support paid is deducted from resources. (Child support received is counted as income.). Child support is measured in both the CE and ASEC surveys.

C.4 Adjustments: Taxes paid

Taxes paid for federal, state and local, and FICA are deducted from income for SIPM calculations for both the ASEC and CE. For the CE, we did our own calculations using the NBER TAXSIM program. For

[13] We use the 2011 maximum of $6,700 as in Fox(2015) but put it in 2014 dollars for every year.

the SEPM, we look at expenditures not including FICA but make no other tax adjustment because expenditures are already on an after-tax basis.

D.1 Poverty Thresholds

We use the SPM thresholds from the Census Bureau. These are based on CE data for expenditure for the basic bundle of food, clothing, shelter, utilities plus a little more. The SPM threshold is equivalence scaled based on family size and single parenthood. See Fox (2015). The threshold is revised annually and is not anchored in real terms. That is, in any year we compare nominal adjusted income or expenditure to the nominal threshold. The thresholds are adjusted for geographic differences in cost of living. The ASEC adjustment (metadj) is based on median gross rent differences. The CE geographic adjustment is based on area differences in HUD Fair Market Rent (FMR) differences for two-bedroom rental units. See Supplementary Appendix 3.To make our CE and ASEC poverty thresholds consistent with each other, we normalized the geographic cost of living adjustment to have a weighted mean of one in each year, for each survey separately. Anchored thresholds use the 2012 threshold in all years.

D.2 CPI

Although CPI adjustments are not needed for SPM poverty measures over time (because. both the threshold and resources change together in nominal terms), when we report dollar values, they are adjusted to 2014 dollars using the annual CPI-U-RS for ease of comparison.

E.1 Liquid Assets

The CE Survey collects liquid asset data in the final interview for each consumer unit. This is the 5th interview until 2015 and relabeled as the 4th interview after 2015. We construct estimates of liquid assets for each unit by adding balances for checking account, money market accounts, and savings account. Respondents who said that they did not have a particular asset or account are "valid blanks" and were assigned zero for that asset. For years prior to 2014, we sum the values reported in the survey for checking and savings. For years 2014 and later, respondents were asked for the sum of liquid balances.

If a respondent was a nonresponse (refused, said "don't know" or nonresponse) they were offered the option of giving an answer by bracket category. Of this group of initial nonrespondents, some provide a bracket value and some do not. Those who do not are treated as missing. For those who provided a bracketed amount, we then imputed an amount to the bracket category by assuming that the distribution of amounts within a bracket category is the same as the distribution of amounts from those with continuous data that fell within that bracket. This was done separately by year and by official poverty status (the same three income ratio groups used for the MOOP imputation). For example, the lowest bracket response was 0-500 dollars. Based on the continuous data for those with 0-500 dollars in the poverty/income<1 group, 96% of households were zeros and the rest positive. So for the bracketed data 0-500 asset households in the poorest group, we randomly assigned 96% to zero, and the rest to median value for those with positive values in the bracket. For higher brackets, we assigned the median asset value for those in the bracket group, done separately by poverty status. To be clear, this imputation applies only to the bracketed cases—we used the reported value for nonbracketed cases if liquid assets were coded as valid data or "valid blanks" and assign missing if no response and no bracket was reported.

E.2 Credit

The CE Survey collects information on credit debt in the final interview for each consumer unit. We measure credit card balances for major credit cards and store credit cards. The procedure is the same as that for liquid assets. We compute the credit balance (amount owed) for those with valid data and assign zero to "valid blanks."

Credit limits are not recorded in CE. We estimate a credit limit for each household in two ways and estimate the unused credit balance as the limit minus the balance. We estimate the credit limit using an assumed credit limit to income ratio based on Fulford (2015,Table 2). Limit=max(credit balance, .53 * monthly after tax income) (Negative incomes are set to zero.) Our "high" limit estimates applies this income based limit and unused balance to all households. Our "low" estimate assumes this limit applies only to households with a positive credit balance and assigns a zero limit to those without a balance.

Credit card interest and fees are already included in expenditure in the CE. The annual amount of credit card principal repayed is not. We estimate annual amount of credit principal repayed (beyond interest and fees) at 2 percent per month or repaid=credit balance(1.02^{12}-1). Our 2% is admittedly arbitrary. Keys and Wang (2019) note that minimum payments are dictated by the card issuer and are typically between 1-4% of the balance.

Supplementary Appendix 2: Medical Out-of-Pocket Expenditures (MOOP)

MOOP is measured using the Consumer Expenditure Survey (CE) using consumer units (CU). These expenditures must be imputed to CPS data as done in the Columbia Center on Poverty and Social Policy (CPSP) historical series (Fox, et al. (2015)). Although MOOP can be directly measured in the CE, we impute it in the same way for both data sets. This makes the series more comparable. In addition, the raw recorded data on MOOP in the CE has some significant outliers and negative values. These are smoothed in the imputation.

In the CE, MOOP includes medical out-of-pocket expenditures on medical services, supplies, and drugs, and expenditures on health insurance. The imputation process is the same as that used in the CPSP historical series, except for items 1 and 5:

1. In the CPSP method, the annual mean of MOOP is measured in CE by 10 imputation groups based on family size (1,2 or more), number of elderly (0,1, 2 or more), and poverty status (<=200% OPM, >200% OPM). Prior to taking the mean, negative MOOP values are recorded to zero. We instead use 15 groups based on family size, elderly, and either a 3 category income poverty status for the ASEC data, or a 3 category expenditure poverty status for the CE (<=100% SPM threshold, 100-200% SPM threshold, >200% SPM thrshold)

2. The mean MOOP is imputed by year by imputation group. The deciles of MOOP are computed for each imputation group, then randomly assigned to members of the group. This preserves the variation within each group,

3. Following the imputation, the MOOP is capped at real value of $6700 (in 2011) per person in the household (consumer) unit.

4. The original CPSP series changes in 2013 to use the Census Research File. To make our series consistent, over time, we impute MOOP using the same method over our whole time frame 2004-2019.

5. We make an allowance for change in CE survey instrument in 2014 that revealed underreporting of health insurance. We adjust CE health insurance expenditures upward by 26% in the years prior to 2014 when the instrument was changed. This adjustment affects imputations for both our CE series and our revised CPSP series. (See Foster (2016)).

Supplementary Appendix 3: Geographic Cost of Living Adjustments for CE

The Supplemental Poverty Measure (SPM) adjusts poverty thresholds for cost of living in different locations. The Census bureau makes this adjustment based on 5 year averages of rental costs for a standardized unit in various MSAs and areas based on rental data from the American Community Survey (ACS). These adjustments are then applied to poverty thresholds based on the residence of families as identified in the Current Population Survey (CPS ASEC).[14] The CPS is used to calculate family resources which are then compared to the adjusted thresholds to determine poverty rates. The poverty threshold for an area is adjusted by multiplying the rent index by the proportion of shelter cost in the SPM threshold (Renwick 2011). Specifically, for area i, the
adjusted SPM threshold$_i$ =
(sheltershare* (rentindex$_i$/rentindex$_{national}$) +(1-sheltershare)) * unadjusted SPM threshold.

We are using data from the public use Consumer Expenditure Survey (CE). This uses a different geographic coding so that the CPS adjustments cannot be easily applied. The residence information in the CE is less precise than that in CPS to protect confidentiality of respondents. The CE includes the state of residence for most people, an indicator for SMSA residence, and the Primary Sampling Unit codes for some respondents.[15] We develop an annual measure of median rents for these locations based on county level HUD Fair Market Rent (FMR) surveys for 2 bedroom apartments. We compute the mean FMR by location, weighted by county population. We then divide this mean FMR by the national population weighted mean to form a rental index that serves as an input to our geographic adjustment for poverty thresholds as explained above. These geographic factors are assigned to consumer units in the CE as follows:

By PSU if identified,
By State and metro/non-metro status if PSU is not identified,
By national average if state is not identified.

Table G1 shows values of the rental index by state and metro status for 2004 and 2019. There is some variation over time but large variation across areas. The rental index is higher in the Northeast. In 2019 the index varies from .587 in non-metro Tennessee to 1.217 in non-metro Hawaii, and from .691 in metro Kentucky to 1.799 in metro Hawaii.

Table G2 shows the PSUs identified in the CE and the mean rent index. The PSUs have shifted slightly over time, so cannot be compared directly, but there appears to be some small differences between the mean geographic adjustments in 2004 and 2019. In 2004 the index varies from 0.98 in Cleveland-Akron, OH to 1.963 in San Francisco-Oakland-San Jose, CA. In 2019, the range is slightly larger, ranging from 0.814 in St. Louis, MO-IL to 2.156 in San Francisco-Oakland-Hayward, CA.

Table G3 shows the rent index by state and metro status. There is some variation across the surveys by area but the indices are broadly consistent.

[14] From Fox (2020), The Supplemental Poverty Measure: 2019 Current Population Reports P60-272 September 2020

[15] For example, in the 2018 public use CE data, State is identified for 89.5 % of responding units, and PSU is identified for 40% of the units.

Table G1

Rent Index by Geographic Area In the CE Survey

	Year			
	2004		2019	
	non metro	metro	non metro	metro
New England Region				
Connecticut	1.062	1.374	1.006	1.153
Maine	.821	1.176	.732	.893
Massachusetts	1.062	1.408	1.184	1.393
New Hampshire	1.029	1.305	.961	1.204
New Jersey		1.297		1.317
New York	.8	1.399	.727	1.421
Pennsylvania	.686	1.037	.658	1.185
Rhode Island	1.249	.943		.947
Vermont	.923	1.137	.899	1.285
Midwest Region				
Illinois	.583	1.163	.636	.966
Indiana	.636	.978	.644	.899
Iowa	.625	.665	.618	.754
Kansas	.608	.749	.658	.766
Michigan	.647	.998	.669	.811
Minnesota	.665	1.101	.676	.97
Missouri	.548	.777	.617	.797
Nebraska	.602	.744	.632	.772
North Dakota	.571	.796	.784	.758
Ohio	.643	.908	.647	.704
South Dakota	.667	.728	.64	.742
Wisconsin	.641	1.063	.674	.958
Southern Region				
Alabama	.522	.669	.589	.714
Arkansas	.549	.628	.593	.693
Delaware	.863	.986		1.066
Washington D.C.		1.422		1.542
Florida	.757	1.032	.739	1.069
Georgia	.634	1.073	.622	.896
Kentucky	.552	.632	.594	.691
Louisiana	.55	.669	.627	.779
Maryland	.85	1.196	.891	1.312
Mississippi	.555	.651	.644	.729
North Carolina	.647	.802	.658	.783
Oklahoma	.544	.715	.65	.713
South Carolina	.629	.676	.642	.766
Tennessee	.539	.715	.587	.769
Texas	.591	1.006	.685	.93
Virginia	.665	1.201	.689	1.339
West Virginia	.56	.942	.617	1.106
Western Region				
Alaska	1.173	.748	1.114	1.155
Arizona	.746	1.019	.709	.893
California	.858	1.414	.912	1.566
Colorado	.858	1.12	.864	1.183

Hawaii	1.336	1.061	1.217	1.799
Idaho	.671	.496	.67	.73
Montana	.709	.738	.711	.771
Nevada	.938	1.082	.796	.888
New Mexico	.618	.798	.69	.789
Oregon	.766	.9	.716	.993
Utah	.766	.823	.73	.815
Washington	.772	1.067	.784	1.319
Wyoming	.673	.826	.764	.783

Notes: Rent Index is the mean of HUD Fair Market Rents aggregated to CE areas, weighted by county population, as proportion of national average FMR each year. The metro means are for metro areas not specifically identified.
Table transferred to word doc with asdoc program; command: asdoc table regstate metro year if year == 2004 | year == 2019, c(mean geoadj) save(geoadjustmenttable.doc) replace

Table G2
Primary Sampling Units in the Consumer Expenditure Survey and Rental Costs In 2004 and 2019

Mean Geographic Rent Adjustments for Primary Sampling Units in 2004

PS_name	Geoadjust (mean)
Atlanta, GA	1.200
Baltimore, MD	1.062
Boston-Brockton-Nashua, MA-NH-ME-CT	1.398
Chicago-Gary-Kenosha, IL-IN-WI	1.211
Cleveland-Akron, OH	0.980
Dallas-Forth Worth, TX	1.096
Detroit-Ann Arbor-Flint, MI	1.058
Houston-Galveston-Brazoria, TX	0.987
Los Angeles Suburbs, CA	1.032
Los Angeles-Orange, CA	1.312
Miami-Fort Lauderdale, FL	1.099
Minneapolis-St. Paul, MN-WI	1.160
New Jersey Suburbs	1.385
New York, NY	1.416
New York-Connecticut Suburbs	1.492
Philadelphia-Wilmington-Atlantic City, P	1.165
Phoenix-Mesa	1.063
San Diego, CA	1.421
San Francisco-Oakland-San Jose, CA	1.963
Seattle-Tacoma-Brem	1.142
Washington, DC-MD-VA-WV	1.401

Mean Geographic Rent Adjustments for Primary Sampling Units in 2019

PS_name	Geoadjust (mean)
Anchorage, AK	1.146
Atlanta-Sandy Springs-Roswell, GA	0.930
Baltimore-Columbia-Towson, MD	1.247
Boston-Cambridge-Newton, MA-NH	1.467

Chicago-Naperville-Elgin, IL-IN-WI	1.073
Dallas-Fort Worth-Arlington, TX	0.954
Denver-Aurora-Lakewood, CO	1.239
Detroit-Warren-Dearborn, MI	0.848
Honolulu, HI	1.849
Houston-The Woodlands-Sugar Land, TX	0.932
Los Angeles-Long Beach-Anaheim, CA	1.531
Miami-Fort Lauderdale-West Palm Beach, F	1.235
Minneapolis-St.Paul-Bloomington, MN-WI	0.994
New York-Newark-Jersey City, NY-NJ-PA	1.501
Philadelphia-Camden-Wilmington, PA-NJ-DE	1.132
Phoenix-Mesa-Scottsd	0.909
Riverside-San Bernardino, Ontario, CA	1.110
San Diego-Carlsbad, CA	1.570
San Francisco-Oakland-Hayward, CA	2.156
Seattle-Tacoma-Belle	1.441
St. Louis, MO-IL	0.814
Tampa-St. Petersburg-Clearwater, FL	0.963
Washington-Arlington-Alexandria, DC-VA-M	1.532

Notes: Tables transferred manually from Stata using copy table command..

Table G3

Comparison of 2018 CE and CPS ASEC geographic rent adjustments based on rent costs

	CE Rent Index		ASEC Rent Index	
	non metro	metro	non metro	Metro
Alabama	.604	.712	.608	
Alaska	1.099	1.187	1.185	1.274
Arizona	.718	.886	.65	1.132
Arkansas	.597	.703	.647	.743
California	.934	1.442	.979	
Colorado	.868	1.082	.986	
Connecticut	1.008	1.169	1.108	
Delaware		.979		
Washington DC		1.57		
Florida	.753	1.009	.63	.858
Georgia	.64	.859	.674	.676
Hawaii	1.219	1.726	1.169	
Idaho	.679	.733	.712	.696
Illinois	.647	1.008	.679	.797
Indiana	.656	.732	.705	.774
Iowa	.623	.756	.66	.839
Kansas	.669	.781	.68	.898
Kentucky	.605	.692	.636	.695
Louisiana	.65	.778	.665	.777
Maine	.739	.88	.758	
Maryland	.932	1.353	.941	
Massachusetts	1.271	1.302	1.039	.915
Michigan	.682	.779	.779	.755
Minnesota	.688	.941	.753	.795
Mississippi	.66	.748	.639	.779
Missouri	.63	.79	.682	.66
Montana	.715	.77	.794	.821

Nebraska	.628	.767	.707	.816
Nevada	.814	.926	.865	.958
New Hampshire	.978	.941	1.034	
New Jersey		1.329		1.179
New Mexico	.693	.807	.751	
New York	.747	1.334	.754	.78
North Carolina	.673	.771	.667	.784
North Dakota	.798	.751	.863	.851
Ohio	.658	.712	.683	.696
Oklahoma	.656	.712	.667	.72
Oregon	.728	.959	.8	.909
Pennsylvania	.677	.928	.704	.815
Rhode Island		.952		
South Carolina	.663	.752	.641	
South Dakota	.641	.744	.674	.839
Tennessee	.598	.763	.656	
Texas	.694	.9	.78	.844
Utah	.728	.815	.709	.706
Vermont	.909	1.326	.958	
Virginia	.696	1.163	.668	.836
Washington	.778	1.148	.711	.823
West Virginia	.631	.675	.676	.679
Wisconsin	.688	.813	.734	
Wyoming	.775	.797	.787	.849

Notes: Rent Index is the mean of HUD Fair Market Rents aggregated to CE areas, weighted by county population, as proportion of national average FMR.
Source for ASEC data: https://www2.census.gov/programs-surveys/demo/tables/p60/268/pov-threshold-2018.xlsx

Table 1: CE SEPM and CPS SIPM Poverty Rates and Components, 2019

	CE		CPS	
	Statistic	**SE**	**Statistic**	**SE**
Gross Expenditure or Gross Adjusted Income				
Mean	63,117	365	83,091	313
Median	52,054		64,990	
1st Percentile	9,817		23	
3rd Percentile	13,995		7,834	
5th Percentile	16,963		12,000	
10th Percentile	22,235		19,817	
20th Percentile	30,112		32,249	
Net Expenditure or Net Adjusted Income				
Mean	56,197	351	75,218	305
Median	45,028		56,305	
1st Percentile	7,716		0	
3rd Percentile	11,264		5,843	
5th Percentile	13,685		9,787	
10th Percentile	18,313		16,430	
20th Percentile	25,253		26,896	
Poverty Rates				
Gross SEPM or SIPM	0.087		0.088	
Net SEPM or SIPM	0.145		0.122	
Means Adjustments and In-Kind in Bottom Quintile of the Distribution				
Adjustments				
MOOP	3,087	44	2,796	22
Work Expenses + Childcare	829	22	1,074	9
Child Support	21	3	48	6
Total Adjustments	3,937	47	3,918	23
In-Kind Transfers				
School Lunch Subsidy	182	6	236	4
Energy Asst.	30	1	40	1
WIC	49	4	47	2
Housing Subsidy	283	22	725	19
Total In-Kind	543	24	1,048	21
Demographics				
Family Size	2.416	0.024	2.243	0.011
Children	0.666	0.017	0.665	0.009
Adults	1.751	0.013	1.578	0.006
Presence of Elderly	0.340		0.299	
Own w/ Mortgage	0.160		0.150	
Own no Mortgage	0.320		0.323	
Renters	0.520		0.528	
Sample Size	16,032		63,092	

Notes: Values are expressed in 2014 dollars. Gross Expenditure is total household spending on all items in the year. Gross Adjusted Income is total income in the year after-tax and with SNAP benefits added. Net Adjusted Income includes four in-kind transfers and exclude three types of capped adjustments. Poverty rates weighted by person, Household weighted by unit weight.

Table 2: SEPM and SIPM Poverty Rates

Expenditure or Adjusted Income	SEPM	SIPM
Deep Poverty Resource < 0.5 SPM Threshold		
Gross	0.009	0.035
Net	0.015	0.041
Poverty Resource < SPM Threshold		
Gross	0.087	0.088
Net	0.145	0.122
Near-Poverty Resource < 1.5 SPM Threshold		
Gross	0.242	0.188
Net	0.326	0.255

Notes: Values are expressed in 2014 dollars. Gross Expenditure is total household spending on all items in the year. Gross Adjusted Income is total income in the year after-tax and with SNAP benefits added. Net Adjusted Income includes four in-kind transfers and exclude three types of capped adjustments. Sample person weights applied. See Appendix.

Table 3: Poverty Status by Demographic Groups, 2019

	SEPM Gross	SEPM Net	SIPM Gross	SIPM Net
Home				
Owner w/ Mortgage	0.029	0.059	0.029	0.050
Owner w/o Mortgage	0.085	0.160	0.075	0.116
Renter	0.163	0.245	0.183	0.230
Family Type				
Unmarried	0.133	0.203	0.156	0.207
Married	0.061	0.112	0.047	0.072
Elderly Status of the Head				
Elderly	0.093	0.189	0.094	0.157
Non-Elderly	0.086	0.135	0.087	0.114
Race and Ethnicity				
White	0.053	0.100	0.058	0.084
Black	0.145	0.226	0.155	0.197
Hispanic	0.158	0.237	0.148	0.203
Other Race	0.103	0.153	0.096	0.136
Education				
< High School	0.286	0.374	0.239	0.319
High School	0.099	0.179	0.107	0.149
AS, BA, or More	0.026	0.056	0.044	0.062
Poverty Rate	0.087	0.145	0.088	0.122
Sample Size	63,092		16,032	

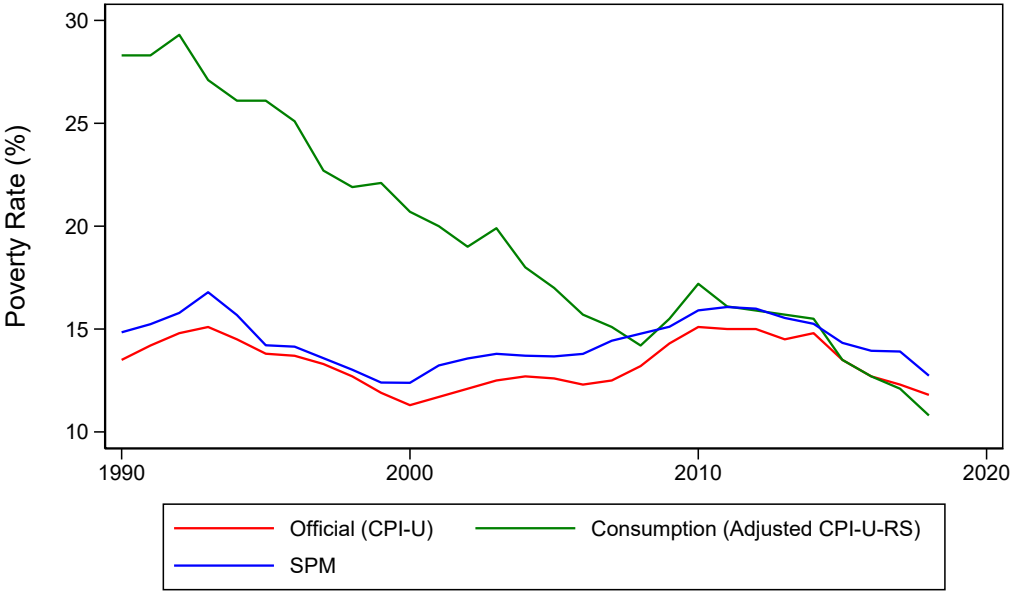
Notes: Characteristics of Household Reference Person. Sample person weights applied. See Appendix.

Table 4: Liquid Assets and Unused Credit for Bottom Quartile of Households, 2019

	< 65	65+	Total
Owners w/ Mortgage			
Median			
Liquid Assets	0	0	0
Unused Credit, High	890	677	754
Unused Credit, Low	0	0	0
Mean			
Liquid Assets	865	5,373	2,773
Unused Credit, High	1,036	868	966
Unused Credit, Low	26	35	29
Positive Liquid Asset Balance (%)	0.390	0.396	0.393
Positive Credit Balance (%)	0.166	0.188	0.175
Owners w/o Mortgage			
Median			
Liquid Assets	0	463	46
Unused Credit, High	1,212	915	981
Unused Credit, Low	0	0	0
Mean			
Liquid Assets	1,970	19,926	11,977
Unused Credit, High	1,188	1,026	1,096
Unused Credit, Low	111	159	139
Positive Liquid Asset Balance (%)	0.472	0.516	0.497
Positive Credit Balance (%)	0.163	0.228	0.200
Renters			
Median			
Liquid Assets	0	9	0
Unused Credit, High	800	610	767
Unused Credit, Low	0	0	0
Mean			
Liquid Assets	893	2,533	1,145
Unused Credit, High	872	746	852
Unused Credit, Low	45	87	51
Positive Liquid Asset Balance (%)	0.348	0.494	0.370
Positive Credit Balance (%)	0.121	0.163	0.128

Note: Sample is composed of the bottom quartile of the gross expenditure distribution. Credit limits are imputed as the maximum of an individual's credit balance and 53% of their monthly income. Unused Credit is the difference between an individual's limit and their balance. The High version applies the credit limit to all credit users. The Low version applies the limit to credit users with positive balances. Weighted by person weight. See Appendix.

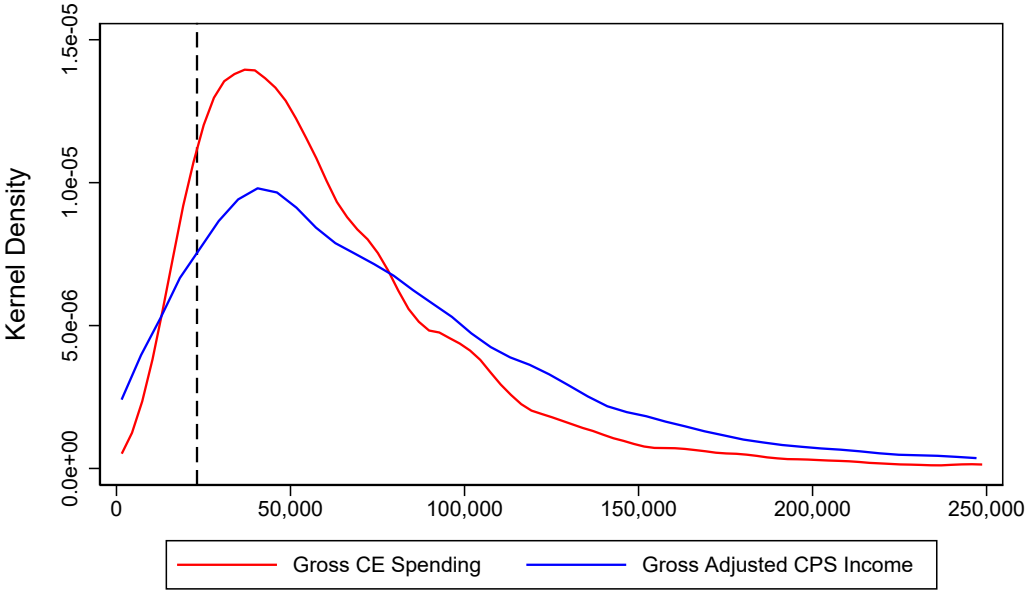
Figure 1: Official, SPM, and Consumption Poverty Rates, 1990–2018



Notes: Consumption rate is anchored to 2015 Official threshold.

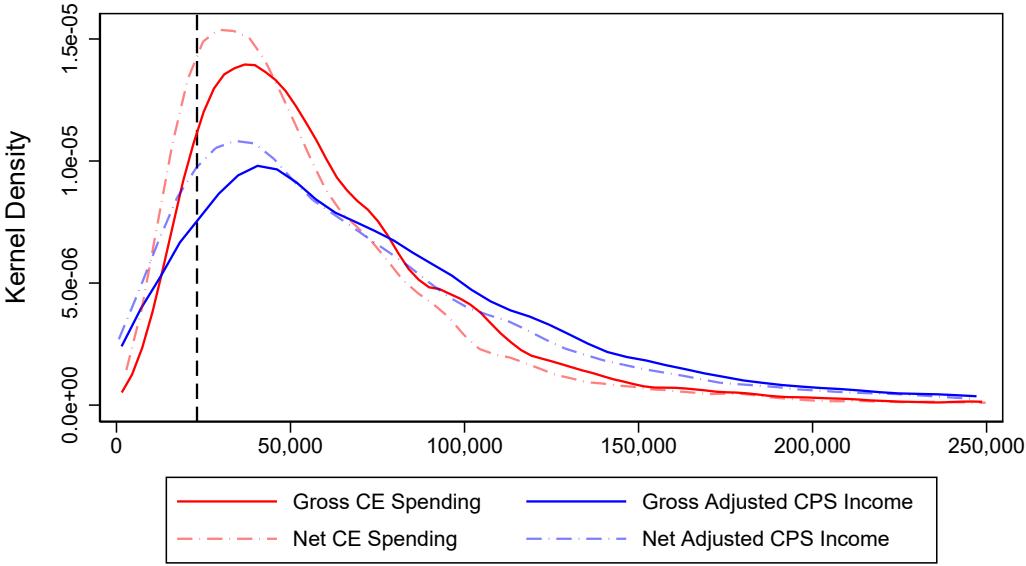
Sources: U.S. Census Bureau (2021), Columbia Center for Poverty and Social Policy, Meyer and Sullivan (2019).

Figure 2: Distribution of Gross CE Spending and Gross Adjusted CPS Income, 2019



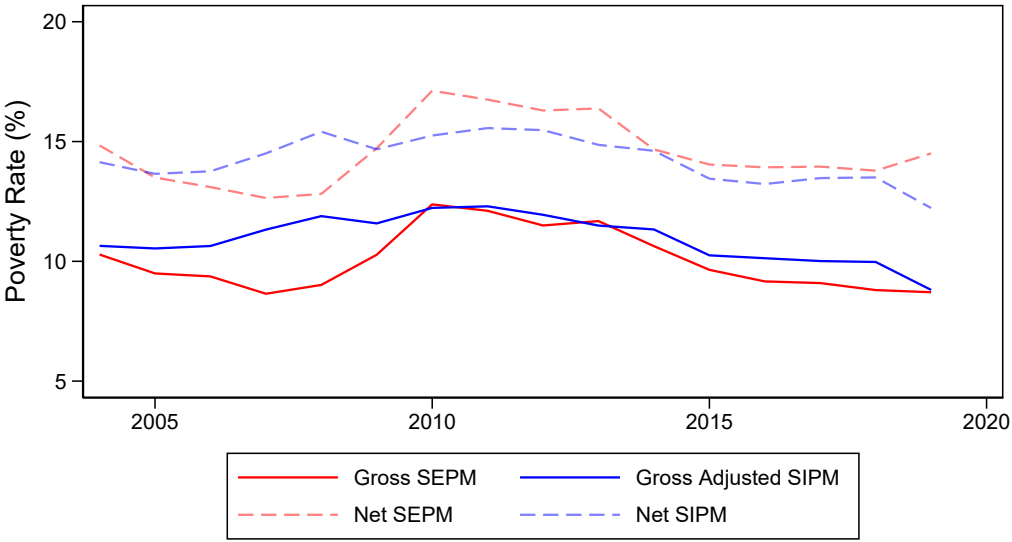
Notes: Gross CE Spending is total household spending on all items in the year. Gross Adjusted CPS Income is total income in the year after-tax and with SNAP benefits added. Dashed line denotes average threshold.

Figure 3: Gross and Net CE Spending and Adjusted CPS Income, 2019



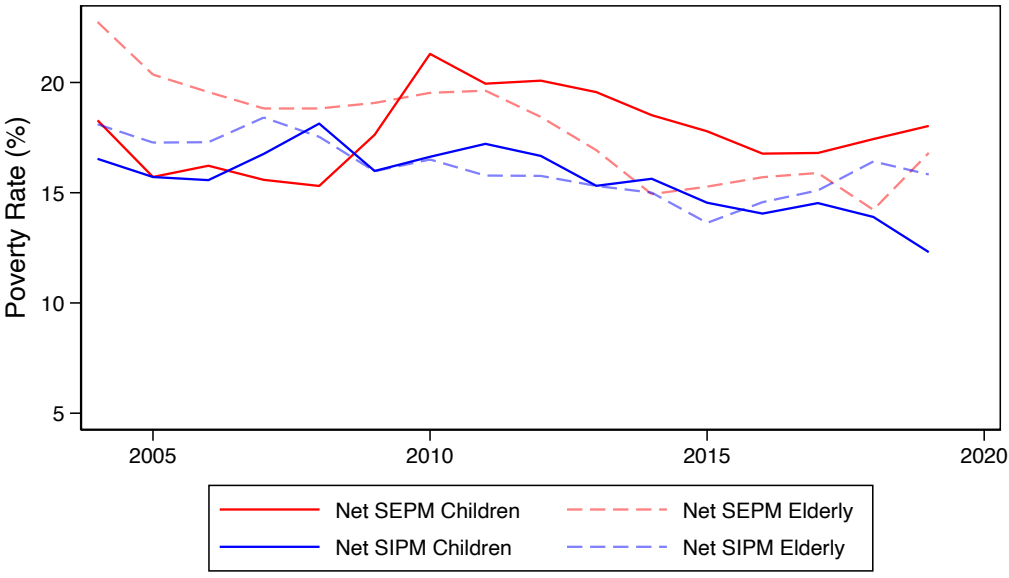
Notes: Gross CE Spending is total household spending on all items in the year. Gross Adjusted CPS Income is total income in the year after-tax and with SNAP benefits added. Net measures include four in-kind transfers and exclude three types of capped adjustments (work-related and child care costs, child support paid, and medical out of pocket expense). Dashed line denotes average threshold.

Figure 4: SEPM and SIPM Poverty Rates, Gross and Net, 2004–2019



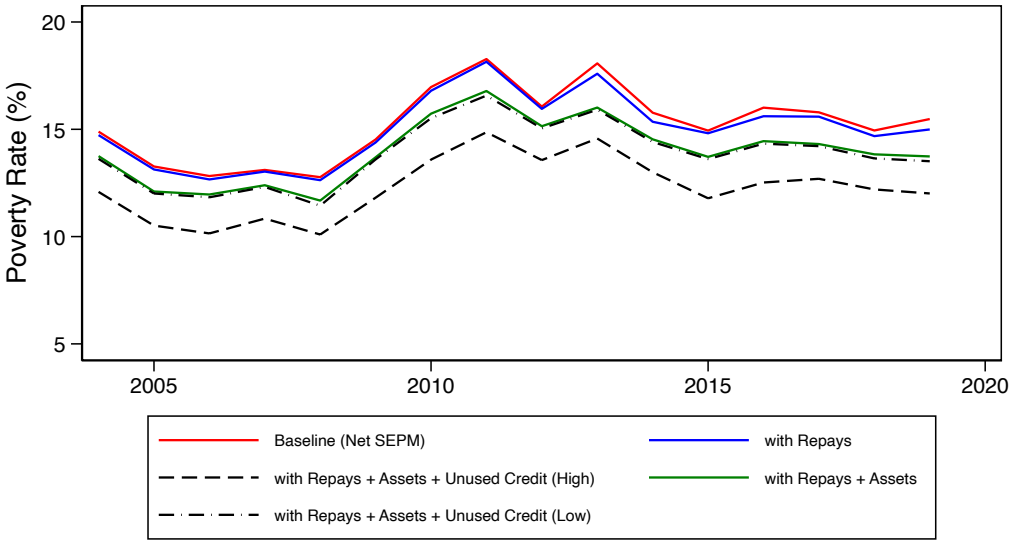
Notes: Gross SEPM poverty rate is based on total household spending on all items in the year. Gross Adjusted SIPM poverty rate is based on total income in the year after-tax and with SNAP benefits added. Net poverty rates are based on total spending and income after tax and with SNAP that include three in-kind transfers and excludes three types of capped adjustments (work-related and child care costs, child support paid, and medical out of pocket expense).

Figure 5: Net SEPM and SIPM Poverty Rates, Children and Elderly, 2004–2019



Notes: Net poverty rates are based on total spending and income after tax and with SNAP that include three in-kind transfers and excludes three types of capped adjustments (work-related and child care costs, child support paid, and medical out of pocket expense).

Figure 6: Net SEPM Poverty With and Without Repays, Liquid Assets, and Unused Credit, 2004–2019



Notes: Net measures include four in-kind transfers and exclude three types of capped adjustments (work-related and child care costs, child support paid, and medical out of pocket expense). Credit limits are imputed as the maximum of an individual's credit balance and 53% of their monthly income. Unused Credit is the difference between an individual's limit and their balance. The High version applies the credit limit to all credit users. The Low version applies the limit to credit users with positive balances.