NBER WORKING PAPER SERIES

THE CHANGE IN POVERTY FROM 1995 TO 2016 AMONG SINGLE PARENT FAMILIES

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The Change in Poverty from 1995 to 2016 Among Single Parent Families
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NBER Working Paper No. 29870
March 2022
JEL No. C42,C81,I32,I38

ABSTRACT

This paper is the first to examine changes in poverty over time using a comprehensive set of linked survey and administrative data, implementing recommendations of the Interagency Technical Working Group on Evaluating Alternative Measures of Poverty. Using the Comprehensive Income Dataset (CID), we correct for measurement error in survey-reported incomes, focusing on single parent families from 1995 to 2016. Our preferred estimates indicate that single parent family poverty declined by 62% over time, while it fell by only 45% using survey data alone. Moreover, survey-reported deep poverty among single parent families increased over time, while it fell using the CID.

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1.   Introduction

Whether poverty has risen or fallen over time is a key barometer of societal progress in reducing material deprivation. Between 1970 and 2020, the official poverty rate in the U.S. fell by just 1.2 percentage points (9.5%), suggesting limited economic gains for the disadvantaged despite large investments in anti-poverty programs. In contrast, several recent studies have found much larger declines in poverty. These studies rely on broader resource measures and/or account for price index bias in the updating of poverty thresholds (e.g., Meyer and Sullivan 2012; Fox et al. 2015; Burkhauser et al. 2019). However, these estimates of changes in poverty over time rely on surveys that suffer from substantial and growing income misreporting (Meyer, Mok, and Sullivan 2015), leaving uncertain the true decline in poverty in the U.S. over time.

This paper is the first to use comprehensive income data to examine changes in poverty over time in the U.S., implementing many of the recommendations of Interagency Technical Working Group (ITWG) (2022). By comprehensive, we mean survey data linked to an extensive set of administrative tax and program records, such as those of the Comprehensive Income Dataset (CID) Project. Using the CID allows us to correct for measurement error in survey-reported incomes while analyzing family sharing units identified using surveys. In this paper, we focus on individuals in single parent families in 1995 and 2016, providing a two-decade-plus assessment of the change in poverty for a policy-relevant subpopulation. Single parents were greatly affected by welfare reform policies in the 1990s that imposed work requirements in the main cash welfare program and rewarded work through refundable tax credits. Single parents are also targeted by many current and proposed policies, including a 2021 proposal to expand the Child Tax Credit to all low- and middle-income families regardless of earnings.

Using our preferred estimates, we find that single parent family poverty, after accounting for taxes and non-medical in-kind transfers, declined by 62% between 1995 and 2016 using the CID. In contrast, it fell by only 45% using survey data alone. Moreover, survey-reported deep poverty among single parent families increased over this time period. Linked survey and administrative data, however, reveal that this misleading result is due to declining survey quality, as linked CID data show that deep poverty decreased between 1995 and 2016. Our paper builds on previous efforts to use linked survey and administrative data to improve our understanding of poverty, economic well-being, and the effects of government programs at a point in time (see, e.g., Meyer and Wu 2018; Meyer and Mittag 2019; Corinth et al. 2021; Meyer et al. 2021).

II. Data

We use the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for survey years 1996 and 2017, which cover reference years 1995 and 2016. We link the CPS ASEC to individual tax records and an extensive set of administrative program data to correct for survey misreporting. Administrative data on earnings, asset income, and adjusted gross income (AGI) come from Internal Revenue Service (IRS) Forms 1040 and the Detailed Earnings Record from the Social Security Administration (SSA), and administrative amounts for retirement income come from IRS Forms 1099-R. Our tax extracts lack tax payments or liabilities, but we use information from tax records to calculate federal and state income and payroll tax liabilities using the National Bureau of Economic Research's TAXSIM model. Appendix Section A provides additional details on how we calculate and allocate tax benefits across families.

Data on government program benefits including Old Age, Survivors, and Disability Insurance (OASDI) and Supplemental Security Income (SSI) come from the SSA. Rental housing assistance data come from the Department of Housing and Urban Development, and Supplemental Nutrition Assistance Program (SNAP) benefit information from 14 states in 2016. For this paper, we do not bring in administrative data from state agencies on Temporary Assistance for Needy Families (TANF, formerly known as Aid to Families with Dependent Children), because these program data are available only for a less populous subset of states.[1]

We link each administrative data source to the CPS ASEC using Protected Identification Keys (PIKs), which can be thought of as anonymized Social Security Numbers. PIKs are created by the U.S. Census Bureau's Person Identification Validation System (PVS) and are based on a reference file containing Social Security Numbers linked to names, addresses, and dates of birth (Wagner and Layne 2014). Over 99% of most administrative records have a PIK, and 93% and 92% of CPS ASEC families have at least one PIKed member in 1995 and 2016, respectively. We drop families with no PIKed members or any whole-imputed individuals, reweighting appropriately. We include families with both PIKed and unPIKed members even though administrative data cannot be linked to those without PIKs.

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[1] To expedite Census Bureau review, we also do not include administrative values for service-connected disability payments to veterans from the U.S. Department of Veterans Affairs.

III. Methodology

We calculate head count poverty rates by determining the share of all people who are in families, as defined by the Supplemental Poverty Measure (SPM), that have resources below given thresholds. The SPM family unit includes related individuals, cohabitating unmarried couples, unrelated children under 15, and foster children under the age of 22. We consider three resource measures: (i) pre-tax money income (the income concept used for the Official Poverty Measure), (ii) post-tax money income, and (iii) post-tax money income plus the value of non-medical in-kind transfers (namely housing assistance, SNAP, school lunch, and energy assistance).[2]

For survey versions of the two post-tax income concepts, we rely on tax liabilities and credits calculated by the Census Bureau using their internal tax model (O'Hara 2004, Wheaton and Stevens 2016). We also calculate survey values of housing assistance by subtracting monthly rent paid (imputed as the greater of one-third of survey "adjusted" income or one-tenth of survey gross income) from imputed fair market rent (based upon county of residence, year, and number of bedrooms).[3,4] For school lunch, we multiply the number of children receiving free lunch by the USDA's reimbursement rate per lunch multiplied by 180 (the average number of school days per year). For in-kind transfer values reported or imputed at the household level, we prorate the values based on the ratio of family size to household size when there are multiple families within a household. In future work, we plan to account for health insurance and the flow of resources from home and car ownership as recommended by the ITWG.

To calculate CID versions of these income concepts, we replace survey reports of most income sources with administrative counterparts where available. These income sources include asset income (namely interest and dividends), retirement income, OASDI, SSI, tax liabilities and

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[2] We do not impute the value of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), as it is not reported in the 1996 CPS ASEC.

[3] Following Currie and Yelowitz (2000), we impute the number of bedrooms in the survey as follows: 1) For households without children, we assign 1 bedroom to households with 1 or 2 adults and add 1 bedroom for each additional adult, and 2) for households with children, we assign 2 bedrooms to households with 1 or 2 same-gender children and add 1 bedroom for each additional child. Following Johnson, Renwick, and Short (2011) and Fox and Burns (2021), we define "adjusted income" in the survey as cash income minus income from the employment of children, student financial assistance, earnings above $480 for each full-time student aged 18+, deductions of $480 for each dependent and $400 for each elderly or disabled family member, and deductions for childcare and medical expenses. Note that the latter expenses are reported in the 2017 CPS ASEC but not in the 1996 CPS ASEC.

[4] Alternatively, we could use the housing assistance amounts directly available on the Census Bureau SPM files, which are capped at the housing portion of the SPM poverty thresholds. By instead using our own imputation that yields higher (uncapped) housing assistance amounts, our estimates of poverty levels based on survey data alone will be understated relative to estimates that rely on SPM imputations.

credits, and SNAP. For earnings and housing assistance, we continue to bring in survey values if they reflect incomes plausibly missed in the administrative records.[5] We also use administrative AGI amounts (which incorporate values for taxable income sources such as Unemployment Insurance and alimony) as a lower bound for CID pre-tax money income. Our methods for combining survey and administrative values for these income sources are likely to err on the side of understating income. For example, our combined measure of earnings using the CID yields a total of $8.84 trillion in 2016 (Appendix Table A1), which falls short of the $9.15 trillion in earnings found in NIPA aggregates (Table 1).

To construct absolute poverty thresholds in 1995 and 2016, we use as a starting point the official threshold in each year for a family of two adults and two children multiplied by the SPM 3-parameter equivalence scale to account for family size and composition.[6] Note that the official thresholds are updated for inflation using the CPI-U, which has a widely documented upward bias (see Moulton 2018 for a recent review and additional citations). We therefore also construct alternative poverty thresholds in 2016, which use an adjusted inflation measure that subtracts 0.8 percentage points off the annual growth in the CPI-U-RS each year starting from the 1995 baseline (Meyer and Sullivan 2012). We also show poverty estimates that use the Personal Consumption Expenditure (PCE) price index to adjust for inflation, which has been used by several prior studies to update thresholds over time and corrects for some but not all of the bias in the CPI-U. While the level of the baseline thresholds is fundamentally arbitrary, we use the 1995 official thresholds because they allow us to show how the poverty rate in 1995 falls after using a broader income definition and correcting for survey misreporting.

We focus on poverty (income below 100% of the threshold) and deep poverty (income below 50% of the threshold). We also focus on single parent families rather than single mother families, although – as Appendix Table A2 shows – the percentage of single parent families headed by a female remains largely consistent over time (85% in 1995 and 84% in 2016). We define single

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[5] We bring in survey earnings if they are not imputed, if employment characteristics (hours/weeks worked, industry of job, job occupation, and employer size) are not imputed, and if one of the following conditions holds: 1) earnings are missing across all tax records, 2) the number of survey-reported employers exceeds the number of employers in the tax records, 3) the survey respondent reports being self-employed, or 4) the survey respondent reports working for a small employer. Prior work has found that these situations constitute a minority of cases where survey earnings exceed administrative data earnings (Meyer, Wu, and Medalia 2020). For housing assistance, we treat survey respondents reporting receipt that do not appear in the administrative data as true recipients and assign them average amounts from the administrative data based on zip code, year, and the number of bedrooms.

[6] The SPM three-parameter equivalence scale is given by $(adults)^{0.5}$ for units without children, $(adults + 0.8 + 0.5 \times (children - 1))^{0.7}$ for single-parent units, and $(adults + 0.5 \times children)^{0.7}$ for all other units.

parent families as sharing units with a single adult (aged 18 or over) and at least one child (under age 18), and we estimate that there were 7.2 million single parent families in 1995 and 6.4 million single parent families in 2016.[7]

IV. Results

Comparisons of Total Survey and CID Dollars

Before describing the poverty estimates, we first discuss how the share of dollars reported in the CPS ASEC for key income sources has changed over time. For most income sources (8 out of 10) in Table 1, the percent of total dollars reported in the survey – compared to benchmarks from publicly available administrative aggregates – fell between 1995 and 2016. For TANF, the dollar gap in reporting decreased despite an increase in the percent gap in reporting, which can be attributed to the general decrease in total TANF benefits over time. Conversely, the increase over time in the percent of SSI dollars reported in the survey may be associated with respondents being less likely to confuse SSI receipt with OASDI receipt (whose dollar reporting rate correspondingly fell over time).[8] Across all income sources in Table 1, the share of dollars reported decreased by 3.2 percentage points between 1995 and 2016. These aggregate comparisons suggest that estimates of poverty changes relying solely on survey data are likely be biased upward. It is worth noting that Table 1 does not include many other income sources such as child support and retirement income that may be increasingly underreported over time in surveys.

Appendix Table A1 further reports comparisons between aggregate survey dollars – reported by all families and by single parents – and the weighted totals obtained using the CID. When looking across all families, many of the patterns in the levels and changes in dollars reported

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[7] These numbers are approximately a third lower than those estimated by the Census Bureau, which defines a single parent family as a unit containing an individual living with his/her related children (regardless of age). The major reason for the differences is that our definition of single parent families excludes those residing with a cohabiting adult or with children aged 18 and over (which would be counted under the Census definition). Appendix Section B contains a fuller discussion of the differences between the Census Bureau definition of single parent families and the definition used in this paper.

[8] The increase in SSI reporting may be partly associated with the redesign of the CPS ASEC starting in 2014. The changes to the CPS include the elimination of the family income screener (an initial question about family income that excluded families from being subsequently asked about certain means-tested benefits), the implementation of a "dual-pass" approach (where questions on the receipt of income sources are asked before amounts are requested), and – and for low income individuals – changing the order of questions so that SNAP and Public Assistance are asked about before Social Security and SSI (Czajka and Rosso 2015). Semega and Welniak (2015) estimate that the redesign led to a 10.2% increase in SSI dollars being reported, compared to a 1.7% increase in Social Security dollars reported.

are similar to those of Table 1, although our available administrative income sources do not include several key income sources (e.g., AFDC/TANF, General Assistance) with increased percent underreporting in Table 1.[9] Focusing on single parents (our subgroup of interest), we find that both the percent and amount of total earnings in the survey have increased over time, such that survey earnings in 2016 exceed CID earnings. These patterns, however, may be driven in part by increased imputation rates for survey earnings which mechanically dampen the growth in CID earnings over time. Conversely, in 2016, retirement income and SNAP in the CID substantially exceed survey reports for single parents.

Poverty Estimates

Table 2 shows poverty rates in 1995 and 2016. Focusing first on 1995 survey levels, we find that the poverty rate for single parent families using survey-reported pre-tax money income is 47.4% (Column 1). While this rate is calculated using the reweighted sample of individuals in PIKed and non-whole imputed families, it is virtually identical to the rate (47.0%) calculated using the full survey sample and original survey weights (Appendix Table A3). Incorporating tax liabilities and credits in the resource measure leads to a reduction of 3.8 percentage points (8%), while the combination of taxes and non-medical in-kind transfers reduces survey poverty by 17.1 percentage points (36%) to a rate of 30.3%. Switching to the CID further reduces the poverty rate (relative to the survey baseline) for each income concept, as it falls by 5% for pre-tax money income, 2% for post-tax money income, and 14% for post-tax/in-kind transfer income – yielding a final rate of 26.1%.

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[9] Appendix Table A1 also includes additional income sources that are not in Table 1. Retirement income, for example, is heavily underreported in the survey in both 1995 and 2016; while the percent of retirement income dollars reported in survey increased over time, the total amount of dollars reported decreased (as a result of the overall increase in retirement distributions over time). On the other hand, tax liabilities prior to accounting for credits (which include federal and state income taxes and payroll taxes) are generally higher in dollar terms using the survey than using the CID. While this may at first glance be inconsistent with survey earnings generally understating CID earnings, the differences can be rationalized by the fact that CID taxes are calculated only using taxable earnings from IRS data while CID earnings include potentially non-taxable (e.g., informal) earnings that are reported in the survey. Finally, for housing assistance, both the percent and amount of total dollars in the survey have increased over time. There are two reasons that may explain these patterns, both of which are associated with survey imputations of monthly rent paid (which are subtracted from fair market rent to obtain housing assistance amounts) falling over time. First, survey incomes overall are increasingly underreported over time, and survey imputations of monthly rent paid are direct functions of survey incomes. Second, deductions from income for childcare and medical expenses are available in 2016 but not in 1995, leading survey imputations of monthly rent paid to be mechanically lower in 2016 than in 1995.

In 2016, using thresholds adjusted by the CPI-U, the poverty rate for single parent families is 39.9% using survey-reported pre-tax money income (Column 2). The poverty rate falls by 7.6 percentage points (19%) after incorporating taxes, and by 18.3 percentage points (46%) after incorporating both taxes and in-kind transfers. Again, switching to the CID causes the poverty rate to fall for each income concept, with post-tax/in-kind transfer poverty falling the most by 28% to a final rate of 15.5%. Not only is the percent decline in poverty due to changes in the income concept larger in 2016 (reflecting increased spending on tax credits and in-kind transfers over time), but the percent decline due to employing the CID is also larger in 2016 than in 1995. The latter result is consistent with increased underreporting of survey incomes, indicating that survey estimates of changes in poverty – regardless of income concept – will be biased upward.

Changes in poverty from 1995 to 2016 are explicitly shown in Column 5, 6, and 7 of Table 2. When updating thresholds based on the CPI-U, the percent decline in poverty is greater using the CID than using the survey alone. Poverty based on pre-tax money income fell by 21% using the CID, compared to 16% using the survey. Poverty based on post-tax money income fell by 38% using the CID, compared to 26% using the survey. And poverty based on post-tax/in-kind transfer income fell by 41% using the CID, compared to 29% using the survey.

The poverty reductions are even larger after correcting for the upward bias in the CPI-U by updating thresholds using either the PCE price index or the adjusted CPI-U-RS. Using the PCE price index, CID poverty fell by 28% using pre-tax money income, 44% using post-tax money income, and 49% using post-tax/in-kind transfer income. Using the adjusted CPI-U-RS (our preferred inflation adjustment), CID poverty fell by 37% using pre-tax money income, 51% using post-tax money income, and 56% using post-tax/in-kind transfer income. Further accounting for administrative SNAP in 2016 leads to a 62% decrease in poverty over time and a 2016 poverty rate among single parent families of 9.8%. This final estimate of the change in poverty is our preferred estimate because it reflects the broadest set of income sources available for consumption, corrects for survey misreporting using the CID, and corrects for bias in the inflation measure used to adjust official poverty thresholds. Given the large increase in aggregate SNAP underreporting and its bias toward poverty rate increases, we prefer estimates that include administrative SNAP data for 2016 even though we do not have administrative data available for 1995.

Table 2 also reports results for deep poverty. Based on pre-tax money income, deep poverty between 1995 and 2016 fell by 8 to 21% (depending on the inflation measure used to update

thresholds) when relying only on the survey and by 31 to 46% when relying on the CID. After incorporating both taxes and in-kind transfers into the resource measure, survey-reported deep poverty rose between 1995 and 2016 by 9 to 23% (depending on the inflation measure used to update thresholds). In contrast, CID deep poverty fell either slightly (when using the CPI-U) or by more than 20% when using the adjusted CPI-U-RS.

IV. Discussion

Since welfare reform in the 1990s, the trajectory of poverty among single parent families has been the subject of debate. Several studies find that survey-reported deep and extreme poverty increased for single parent families or all households with children over the time period we examine (Shaefer and Edin 2013; Brady and Parolin 2020).[10] However, these results contrast sharply with those of other studies. Research relying on consumption data has found that the well-being of single mother families increased throughout the distribution after welfare reform, with larger gains for the most disadvantaged (Han et al. 2021). Substantial evidence shows that differences in the levels of income and consumption poverty could be due to the underreporting of income in surveys (Meyer et al. 2021 and the references cited there). Recent work using the CID has also found that the level of extreme poverty (income below $2/person/day) for single parents in the U.S. is very low (Meyer et al. 2021).

Consistent with the estimates from consumption data, this paper shows that – after correcting for survey misreporting and incorporating taxes and in-kind transfers – poverty and deep poverty among single parent families fell by 62% and at least 20%, respectively, in the two decades after welfare reform. These declines contrast sharply with results relying on survey data only, which indicate that poverty fell by 45% and deep poverty increased by 9% among single parent families. These results provide strong evidence that correcting for underreported incomes can substantially change poverty patterns over time, and they hold implications for current and future policies that would affect assistance to low-income families.

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[10] Brady and Parolin (2020) state that "among households with children, the expansion of SNAP benefits has led to declines in deep/extreme poverty", with this result being estimated over the 1993 to 2016 time period. However, between 1995 and 2016 (the years we analyze), the authors find that deep and extreme poverty increased for households with children over all the income measures they analyze (Figures 7 and 8).

It is worth noting a number of caveats to our estimates which, on net, have likely understated the true decline in single parent poverty over time. First, when constructing CID amounts for earnings (the largest single income source), our methods tend to understate the growth in incomes over time. This bias occurs because we incorporate survey earnings into the CID amount only when they are not imputed, but the increase over time in survey imputation rates implies that we bring in fewer survey earnings (and thus informal sources of income) over time. Second, there are many income sources for which we are unable to bring in administrative data to correct for increased survey underreporting over time. A notable example is TANF, which is targeted to single parent families. Although the TANF program has decreased in size in recent decades, the share of total dollars reported in the CPS has also declined over time – from approximately 70% in the 1990s to 50% in the 2010s (Meyer, Mok, and Sullivan 2015). On the other hand, we include administrative SNAP data for 2016 but not 1995, which may have the effect of overstating the decline in single parent poverty over time.

In future work, we plan to bring in administrative data for more income sources as they become available. We also hope to expand the resource measure used in the poverty analyses to capture service flows from asset ownership and the cash-equivalent values of private health insurance and medical in-kind transfers. We will also go beyond single parents to examine changes in poverty over time for the full population and for other demographic subgroups of interest. We further plan to extend our analyses to more Census surveys, like the Survey of Income and Program Participation, and to fill in additional years between 1995 and 2016.

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Tables

Table 1. Aggregate Dollars for Selected Income Sources (real 2016 $ billions) from Survey and Public-Use Administrative Sources, 1995 and 2016

Income Source	1995		2016		Dollar Change in Reporting [(3)–(4)] – [(1)–(2)]	% Point Change in Reporting [(3)/(4)] – [(1)/(2)]
	Survey (1)	Admin (2)	Survey (3)	Admin (4)	(5)	(6)
Earnings	4,865.3	5,108.6	8,425.4	9,149.2	-480.5	-3.1
OASI	333.6	358.4	664.2	725.5	-36.4	-1.5
DI	48.6	49.7	105.1	134.1	-28.0	-19.5
SSI	26.0	35.9	51.5	54.9	6.6	21.6
UI	25.0	29.5	18.7	32.1	-8.9	-26.6
Workers Comp.	15.6	32.2	16.3	30.6	2.4	5.0
AFDC/TANF	20.2	28.7	4.5	7.3	5.7	-8.8
General Assistance	4.2	4.6	2.6	19.8	-16.8	-78.5
SNAP	19.3	30.1	34.1	65.3	-20.4	-11.8
EITC	24.9	34.5	43.4	66.7	-13.7	-7.1
Total	5,382.6	5,712.2	9,366.0	10,285.6	-590.0	-3.2

Sources: 1996 CPS ASEC, 2017 CPS ASEC, NIPA, various program records

Notes: Survey aggregates are dollars (summed over households) reported in the CPS ASEC for a given reference year. Administrative aggregates are dollars according to administrative sources such as NIPA and program records. The administrative aggregates for earnings and General Assistance are created using the methodology in Rothbaum (2015), while the other income sources are created using the methodology in Meyer, Mok, and Sullivan (2015). Where applicable, we remove income received by the institutionalized, those living overseas, military personnel, and decedents from the administrative aggregates. We adjust for inflation using the annual percent change in the CPI-U-RS minus 0.8 percentage points.

Table 2. Poverty and Deep Poverty Rates for those in Single Parent Families, 1995 & 2016

Data Source	Poverty Rates (%)				% Change from 1995 to 2016		
	1995	**2016** CPI-U	**2016** PCE	**2016** Adjusted CPI-U-RS	CPI-U	PCE	Adjusted CPI-U-RS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. POVERTY							
Pre-Tax Money Income							
Survey	47.4	39.9	36.7	34.4	-15.8	-22.5	-27.3
CID	44.9	35.5	32.5	28.4	-21.0	-27.8	-36.7
Post-Tax Money Income							
Survey	43.5	32.3	29.8	27.6	-25.8	-31.5	-36.5
CID	42.5	26.4	23.8	20.9	-37.8	-44.0	-50.8
Post-Tax Income + In-Kind Transfers							
Survey	30.3	21.6	19.6	16.8	-28.9	-35.4	-44.6
CID no admin SNAP	26.1	15.5	13.4	11.4	-40.7	-48.7	-56.2
CID with admin SNAP	--	15.5	11.9	9.8	-40.4	-54.4	-62.2
B. DEEP POVERTY (0.5x Poverty Line)							
Pre-Tax Money Income							
Survey	22.8	21.1	19.5	18.0	-7.6	-14.5	-21.0
CID	18.4	12.7	11.5	10.0	-30.9	-37.6	-45.5
Post-Tax Money Income							
Survey	21.2	18.0	17.1	16.1	-15.2	-19.5	-23.8
CID	16.8	11.0	10.3	8.9	-34.3	-38.6	-47.1
Post-Tax Income + In-Kind Transfers							
Survey	6.5	8.0	7.4	7.0	22.9	14.5	8.6
CID no admin SNAP	4.4	4.8	4.2	3.8	9.9	-4.6	-12.8
CID with admin SNAP	--	4.4	3.8	≤3.5*	-0.4	-14.6	≤-20.3*
N	8,600	9,100	9,100	9,100			
Pop (mil)	20.13	17.99	17.99	17.99			

Sources: 1996 CPS ASEC, 2017 CPS ASEC, Various Administrative Records

Notes: The samples consist of all individuals in SPM single parent units (defined as SPM units with one individual aged 18 or over and at least one individual under age 18) where at least one member is PIKed and no one is whole imputed, and survey weights are adjusted for non-PIKing and whole imputes using inverse probability weighting. The rates in Columns 1 and 2 are calculated by multiplying the official poverty threshold in each year for a 2-adult/2-child family by the SPM equivalence scale, and the rate in Column 3 is calculated using adjusted thresholds that scale the annual growth by the percentage change in the CPI-U-RS minus 0.8 percentage points starting from the 1995 baseline. To obtain poverty rates that incorporate admin SNAP data, we multiply the CID poverty rate prior to bringing in admin SNAP (calculated over the entire nation) by the ratio of the CID poverty rate including admin SNAP to the CID poverty rate excluding admin SNAP (calculated over the 14 states with admin SNAP data). The Census Bureau has reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release, authorization number: CBDRB-FY2022-CES005-005.

Appendix Table A1. Comparisons of Weighted Survey and CID Dollars for Selected Income Sources (real 2016 $ billions), 1995 and 2016

Income Source	1995		2016		Dollar Change in Reporting [(3)–(4)] – [(1)–(2)]	% Point Change in Reporting [(3)/(4)] – [(1)/(2)]
	Survey (1)	CID (2)	Survey (3)	CID (4)	(5)	(6)
A. All Families						
Earnings	4,780.9	5,010.9	8,274.0	8,836.0	-331.9	-1.8
Retirement Income	267.3	560.9	630.4	1,143.0	-219.0	7.5
OASDI	382.3	396.8	773.4	859.8	-71.9	-6.4
SSI	25.0	31.5	50.0	48.4	8.1	24.0
Taxes before Credits	1,264.7	1,202.6	2,240.0	2,217.0	-39.1	-4.1
EITC	24.9	30.9	43.6	61.2	-11.6	-9.2
CTC			44.3	50.0		
Housing Assistance	21.4	48.4	36.3	56.8	6.5	19.6
SNAP	19.5		34.5	58.9		
B. Single Parent Families						
Earnings	149.6	170.8	223.6	217.5	27.2	15.2
Retirement Income	2.5	5.9	2.2	6.8	-1.3	-10.1
OASDI	5.7	6.8	6.1	8.4	-1.2	-13.2
SSI	2.9	3.9	2.4	4.4	-1.1	-19.3
Taxes before Credits	27.4	25.7	45.1	39.0	4.4	9.2
EITC	7.6	6.9	9.8	11.1	-2.0	-20.6
CTC			6.3	6.0		
Housing Assistance	10.0	14.5	9.8	11.0	3.3	20.2
SNAP	7.7		7.7	12.2		

Sources: 1996 CPS ASEC, 2017 CPS ASEC, Various Administrative Records

Notes: This table shows aggregate dollars (nominal, in millions) for major income sources using information from the survey data alone or from the CID. Dollars are calculated over SPM units. The samples for 1995 and 2016 consist of all individuals in SPM units or SPM single parent units (defined as units with one individual aged 18 or over and at least one individual under age 18) where at least one member is PIKed and no one is whole imputed, and we adjust survey weights for non-PIKing and whole imputes using inverse probability weighting. The estimates for all income sources are calculated over all 50 states, with the exception of CID dollars for SNAP in 2016, which are calculated over the 14 states for which we have admin SNAP data and are scaled up by the inverse of the population share in those 14 states. We adjust for inflation using the annual growth in the percentage change of the CPI-U-RS minus 0.8 percentage points starting from the 1995 baseline. The Census Bureau has reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release, authorization number: CBDRB-FY2022-CES005-005.

Appendix Table A2. Characteristics of Single Parent Families, 1995 and 2016

	% of Families with Characteristic	
Characteristic	**1995** **(1)**	**2016** **(2)**
Female Head	85.4	83.7
Head Aged 18-24	11.1	6.7
Head Aged 25-34	37.3	33.6
Head Aged 35-44	37.2	34.5
Head Aged 45-54	12.2	20.7
Head Aged 55-64	2.2	4.6
Sample Size (Individuals)	8,600	9,100
Population (Individuals)	20,130,000	17,990,000
Population (Adults)	7,154,000	6,403,000
Sample Size (Families)	3,000	3,300
Population (Families)	7,154,000	6,403,000

Sources: 1996 CPS ASEC, 2017 CPS ASEC

Notes: This table shows various summary statistics for the sample of single parent SPM units that we base our main poverty estimates on for 1995 and 2016. The samples for 1995 and 2016 consist of all SPM single parent units (defined as units with one individual aged 18 or over and at least one individual under age 18) where at least one member is PIKed and no one is whole imputed, and we adjust survey weights for non-PIKing and whole imputes using inverse probability weighting.

Appendix Table A3. Poverty and Deep Poverty Rates for those in Single Parent Families, Full Survey Sample, Survey-Reported Pre-Tax Money Income, 1995 & 2016

Data Source	Poverty Rates (%)				% Change from 1995 to 2016		
	1995	**2016** CPI-U	**2016** PCE	**2016** Adjusted CPI-U-RS	CPI-U	PCE	Adjusted CPI-U-RS
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Poverty	47.0	39.9	36.8	34.4	-15.1	-21.7	-26.8
Deep Poverty	22.4	21.2	19.7	18.1	-5.5	-12.3	-19.4

Sources: 1996 CPS ASEC, 2017 CPS ASEC

Notes: This table shows near, regular, and deep poverty rates for the 1995 and 2016 reference years using survey data only. The sharing unit is the SPM unit. The samples for 1995 and 2016 consist of all individuals in SPM single parent units (defined as units with one individual aged 18 or over and at least one individual under age 18) in the full survey sample. We use original survey weights. The 1995 rates in Column 1 are calculated using official 1995 poverty thresholds for a 2-adult/2-child family multiplied by the SPM equivalence scale, the 2016 rates in Column 2 are calculated using official 2016 poverty thresholds for a 2-adult/2-child family multiplied by the SPM equivalence scale, the 2016 rates in Column 3 are calculated using adjusted thresholds that scale the annual growth by the percentage change in the PCE starting from the 1995 baseline, and the 2016 rates in Column 4 are calculated using adjusted thresholds that scale the annual growth by the percentage change in the CPI-U-RS minus 0.8 percentage points starting from the 1995 baseline.

Appendix Table A4. Near Poverty Rates for those in Single Parent Families, 1995 & 2016

Data Source	Poverty Rates (%)				% Change from 1995 to 2016		
	1995	**2016** CPI-U	**2016** PCE	**2016** Adjusted CPI-U-RS	CPI-U	PCE	Adjusted CPI-U-RS
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	Pre-Tax Money Income						
Survey	63.2	56.1	52.5	49.0	-11.2	-16.9	-22.5
CID	60.9	53.7	50.2	46.2	-11.8	-17.7	-24.1
	Post-Tax Money Income						
Survey	63.7	51.9	47.1	41.3	-18.5	-26.1	-35.1
CID	62.3	50.1	44.3	39.3	-19.6	-28.8	-36.9
	Post-Tax Income + In-Kind Transfers						
Survey	58.0	42.5	36.8	31.3	-26.8	-36.5	-46.1
CID no admin SNAP	52.7	39.0	32.1	26.2	-26.0	-39.2	-50.4
CID with admin SNAP	--	35.9	32.4	25.0	-31.9	-38.6	-52.7
N	8,600	9,100	9,100	9,100			
Pop (mil)	20.13	17.99	17.99	17.99			

Sources: 1996 CPS ASEC, 2017 CPS ASEC, Various Administrative Records

Notes: The samples consist of all individuals in SPM single parent units (defined as SPM units with one individual aged 18 or over and at least one individual under age 18) where at least one member is PIKed and no one is whole imputed, and survey weights are adjusted for non-PIKing and whole imputes using inverse probability weighting. The rates in Columns 1 and 2 are calculated by multiplying the near poverty threshold in each year (which is the official poverty threshold multiplied by 1.5) for a 2-adult/2-child family by the SPM equivalence scale, and the rate in Column 3 is calculated using adjusted thresholds that scale the annual growth by the percentage change in the CPI-U-RS minus 0.8 percentage points starting from the 1995 baseline. To obtain near poverty rates that incorporate admin SNAP data, we multiply the CID poverty rate prior to bringing in admin SNAP (calculated over the entire nation) by the ratio of the CID poverty rate including admin SNAP to the CID poverty rate excluding admin SNAP (calculated over the 14 states with admin SNAP data). The Census Bureau has reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release, authorization number: CBDRB-FY2022-CES005-005.

Appendix A: Allocating Tax Benefits Among Complex Families

In order to determine a family's poverty status, we need a measure of the income available to all members of the family. For cases in which a tax filer claims a child outside of her family (what we call a "complex family"), it is not clear whether tax benefits accrued as a result of claiming the child are ultimately made available to the tax filer's family or the child's family. It is helpful to first provide two options for guiding principles. We then indicate how these principles would be applied to the survey and tax data.

Option 1: Tax benefits are made available to the tax filer's family

We would link 1040s to surveyed tax filers and use the 1040 information to simulate their net tax liabilities. For any survey families with no primary or secondary filers that link to a 1040, we would simulate taxes based on the survey information of the family.

Under this option, there is a potential (but addressable) double-counting issue. The issue arises because we simulate taxes for survey families (based on survey information) in which no survey adult is linked to a 1040. Thus, whenever a child in a complex family is observed in the survey, the child will potentially be counted in two tax units: (i) the tax unit of the adult claiming the child on an observed 1040, and (ii) the simulated tax unit comprised of all members of the survey child's family (which occurs when no adult in the survey child's family is the primary or secondary filer on an observed 1040).

This double-counting issue is likely uncommon. It will only occur if the surveyed child in a complex family can be claimed by another adult in that survey family who doesn't appear on a 1040. For example, if that child appears in his/her own survey household with no other members (e.g., they are in college and living alone in an off-campus apartment), then our existing methodology would run this child through TAXSIM as a single filer. And since a primary filer cannot claim him/herself as a dependent, the child in this setting would not be double-counted as a dependent under our existing methodology.

The double-counting issue can be addressed as follows: Before simulating taxes for survey families without a primary or secondary filer linked to a 1040, we would remove from a survey-only tax unit any surveyed child linked to a 1040. However, we would not remove the surveyed child if there is there is at least one adult in the child's survey family who is un-PIKed. In such cases, we expect that the surveyed un-PIKed adult is actually the adult who claims the surveyed child on a 1040 and therefore group them together in a survey-only tax unit.

Option 2: Tax benefits are made available to the child

We would simulate taxes for each 1040 on which a survey individual (adult or child) appears. Net tax liability with the exception of child tax benefits would be assigned to the surveyed tax filer's family. Child tax benefits from a 1040 would be pro-rated to a survey family based on the share (and ages) of children in the survey family who appear on the 1040. For any survey individuals not linked to a 1040, we would place them in a tax unit with all non-linked members of the survey family and simulate taxes.

Assigning the correct amount of child tax benefits to each surveyed family requires the following: (i) determine the tax provisions that depend on claimed children, (ii) calculate each tax unit's total benefit from each tax provision, and (iii) pro-rate the total benefit from these tax provisions based on the number and ages of children in a given survey family who appear on a 1040. Relevant tax provisions would include personal exemptions for children, the Child Tax Credit (CTC), the Earned Income Tax Credit (EITC), and the Child and Dependent Care Tax Credit (CDCTC). Calculating the total benefit from each provision may not be straightforward due to interactions in the tax code. For example, children may reduce tax liability through the personal exemption for dependents (prior to the Tax Cuts and Jobs Act, TCJA), but absent the ability to claim this exemption a tax unit could potentially qualify for larger non-refundable tax credits since their tax liability would be higher. When pro-rating the total benefit from each program, it may be important to account for the ages of the children, since for example, the CDCTC is limited to care for children under the age of 13.

What we did in previous papers and why

Corinth et al. (2021):

What we did.
We used Option 2 for assigning CTC benefits and Option 1 for all other child tax benefits including the EITC and the CDCTC. We did not address the double counting issue when using Option 1.

Why we did it.
We used Option 2 for assigning CTC benefits because our focus was simulating the anti-poverty effect of the American Families Plan CTC, which would increase CTC benefits dramatically—especially for children in low-income families. Not assigning the American Families Plan CTC to the 6.1 million surveyed children claimed by adults outside of their survey family (and instead assigning the benefits to the tax filers who claimed the children in complex families) could have substantially changed the anti-poverty effect of the policy change. Since it was not clear whether assigning the CTC benefits to the tax filer or the child in the case of complex families was more accurate, we assigned CTC benefits to the child to be consistent with survey only simulations that assign CTC benefits to the family of the surveyed child (since survey only simulations are forced to assume that the tax filer is always a surveyed adult in the child's surveyed family). Because of this paper's focus on child poverty and the frequent comparisons between survey-only and CID estimates, we wanted to make sure that both sets of estimates were calculated using the same frame of children.

We used Option 1 for assigning all non-CTC child tax benefits because we expected this decision to have less impact on our simulations of the American Families Plan CTC, and because doing so would be complicated. In particular, it would require knowing the specific children on a tax form on whose behalf the EITC or CDCTC was claimed. The disadvantage of this decision is the inconsistency in how we treated the CTC and other child tax benefits.
We did not consider the double counting issue when using Option 1.

Meyer et al. (2021):

What we did.
We used Option 1 for assigning all child tax benefits. We did not address the uncommon double counting issue.

Why we did it.
It was not clear whether assigning child tax benefits to the tax filer or the child in the case of complex families was more accurate, but assigning child tax benefits to the filer was simpler.
We did not consider the uncommon double counting issue.

What we do in this paper

We use Option 1 (and address double-counting) for all child tax benefits because it is simpler to implement, and assuming income from child tax benefits is available for the tax filer's family seems slightly more plausible in the absence of direct evidence on how tax benefits are shared than the assumption in Option 2 that the income is available for the child's family.

An advantage of Option 2 is that it deviates less from survey-only analyses of income and poverty, which form tax units based on the survey family and thus assign child tax benefits based on the children in the survey family. The combined survey and administrative data would be used to calculate the credits generated by the same children, though potentially not received by those same children. This was the rationale for assigning Child Tax Credit benefits (under TCJA and the American Families Plan) according to Option 2 in Corinth et al. (2021).

References

Corinth, Kevin, Bruce Meyer, Matthew Stadnicki, and Derek Wu. 2021. "The Anti-Poverty, Targeting, and Labor Supply Effects of the Proposed Child Tax Credit Expansion." w29366. Cambridge, MA: National Bureau of Economic Research.

Meyer, Bruce D., Derek Wu, Grace Finley, Patrick Langetieg, Carla Medalia, Mark Payne, and Alan Plumley. 2020. "The Accuracy of Tax Imputations: Estimating Tax Liabilities and Credits Using Linked Survey and Administrative Data." w28229. Cambridge, MA: National Bureau of Economic Research.

Appendix B: Decomposing Differences Between Single Parent Families (Census Definition) and Single Parent SPM Units

Counts and Definitions

In the 2017 CPS ASEC, using our linked sample, we estimate that there are 6.41mm non-elderly single-parent SPM units. In the public-use data, we estimate that there are 6.37mm such units. We define non-elderly single-parent SPM units as SPM units with exactly one individual aged 18 to 64, at least one individual younger than 18, and no individuals 65 or older.

The Census Bureau estimates that there are 10.64mm single-parent families with own children under 18 in the 2017 CPS ASEC.[11] We estimate that there are 10.69mm such families. The Census Bureau defines single-parent families as families where the reference person is not married with a spouse present and at least one of their own children under the age of 18 is present. Following the Census Bureau, we exclude unrelated subfamilies from this count. If we include unrelated subfamilies (as separate families), the single-parent family count rises to 11.10mm. Following the Census Bureau, we count foster children of the householder as part of the family of the householder.

Differences Between Single Parent Families and Single Parent SPM Units

In this section, we decompose the difference in counts from our SPM unit and family definitions of single-parent units. We restrict our sample to the family or SPM unit that contains the householder, as the survey provides each household member's relationship to the householder. We use this relationship to identify what family structures account for the difference between the two counts. This restriction reduces our 11.10mm single-parent families to 10.69mm; this final count is the same as our estimate for our comparison to the Census because unrelated subfamilies comprise the only case where a multi-person family will *not* contain the householder. The restriction reduces our count of non-elderly single-parent SPM units by 1.9% to 6.25mm.

Below, we tally the number of units switching single-parent status when making definitional and unit changes. We begin with the family-based definition and move to our SPM unit-based definition in 6 steps:*
1. Exclude family reference persons older than 64 (-)
2. Exclude family reference persons younger than 18 (-)
3. Account for non-parents older than 17 in the family (-)
4. Account for non-children younger than 18 in the family (+)
5. Account for individuals older than 17 in the SPM unit but not the family (-)
6. Account for individuals younger than 18 in the SPM unit but not the family (+)

* A '-' indicates that the step reduces our single-parent count, while a '+' indicates that the step increases the count

Figure B1 details the impact of each of these steps. Steps 3-6 are detailed in Figures B2-B5. We discuss steps 3-6 in greater detail as we present each figure.

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[11] See table FM-1 at https://www.census.gov/newsroom/stories/single-parent-day.html.

In Figure B1, we see that accounting for non-parents older than 17 in the family (step 3) and accounting for individuals older than 17 in the SPM unit but not family (step 5) drive almost all the decrease between the family- and SPM unit-based definitions. Step 3 yields a slightly larger decrease than step 5.

Figure B1. Crosswalk from Single Parent Families to Single Parent SPM Units
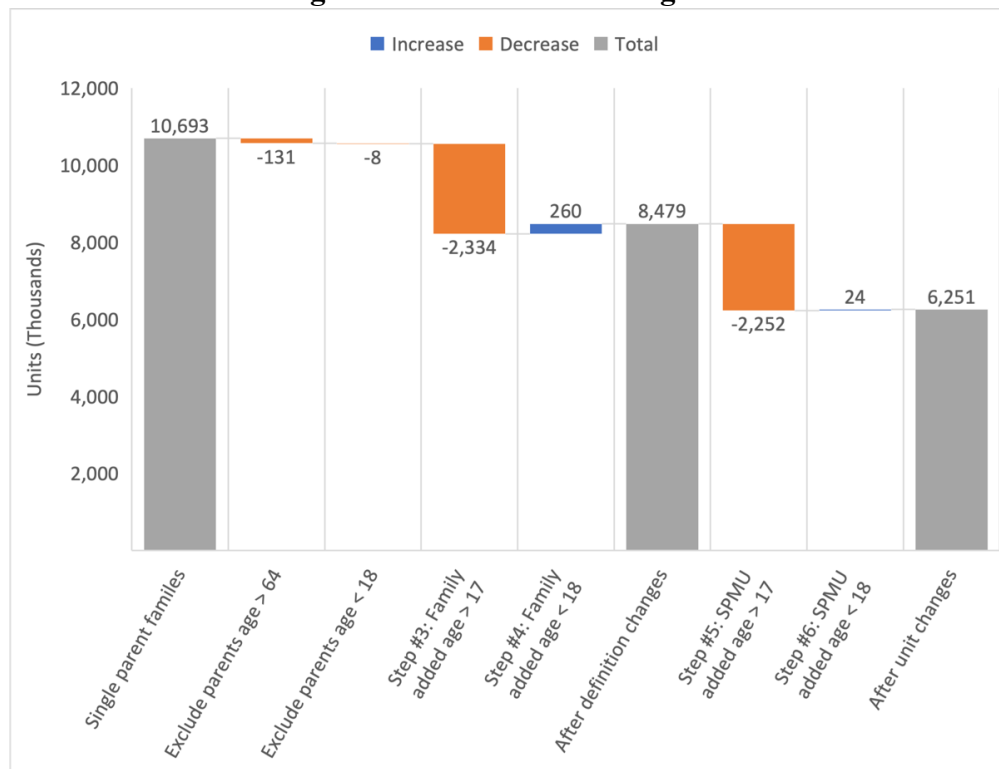

In Figure B2, we decompose the impact to our single parent count that results from accounting for non-parents older than 17 in the family. Since our SPM unit-based count simply tallies the number of units with only one individual between 18 and 64 (inclusive), we exclude from single-parent status families with at least one non-family reference person older than 17 in the family. We classify these individuals by their relationship to the family reference person. As a note, we assign switching families or SPM units to mutually exclusive categories. For each family or SPM unit, we search an ordered list of potential relationships, corresponding to the ordering in figure 2. As soon as a match is found, we assign that family or SPM unit to the relationship category that produced the match and move to the next family or SPM unit.

The addition of at least one child or at least one parent account for 64% and 23% of the decrease, respectively.

**Figure B2. Impact of Including Non-Parents Older than 17 in the Family**
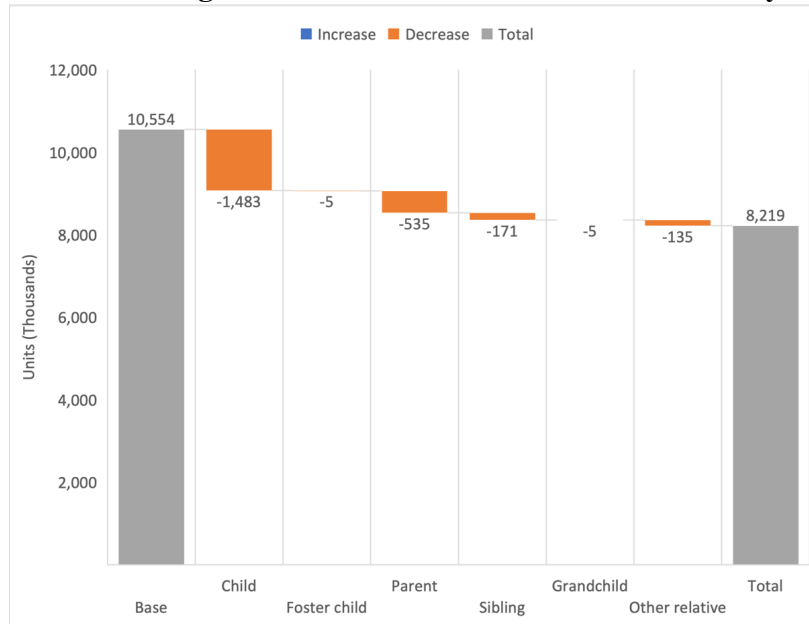
In Figure B3, we turn to the addition on non-children younger than 18 in the family to our definition. Previously, we limited "children" (for the purposes of identifying single parents) to own children of the family reference person. Now, we expand "children" to include any family member less than 18. Here, 69% of the increase owes to the inclusion of grandchildren as "children" for the purposes of identifying single parents. This step produces some undesirable edge cases, namely the classification of a family consisting only of a reference person older than 17 and their spouse younger than 18 as a single-parent unit.

**Figure B3. Impact of Including Non-Children Younger than 18 in the Family**
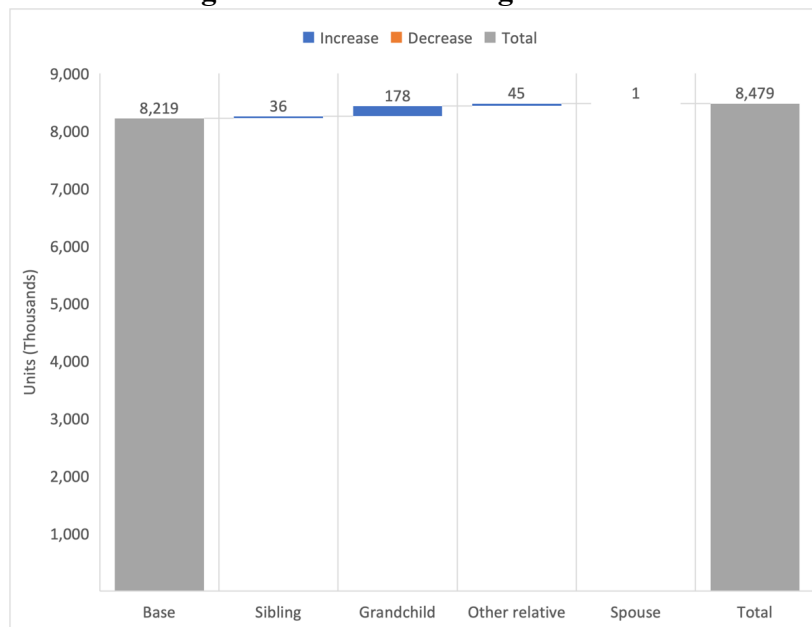
In Figures B4 and B5, we assess the impact of including individuals who are in the SPM unit but not the family. Here, the addition of an individual older than 17 will exclude a unit from the single-parent count, while the addition of an individual younger than 18 can switch a unit into single-parent status. The decrease in our single-parent count from adding individuals older than 17 (Figure B4) owes almost entirely (98%) to the inclusion of unmarried partners. The increase from adding individuals younger than 18 is trivial.

Figure B4. Impact of Including Individuals Older than 17 in the SPM Unit
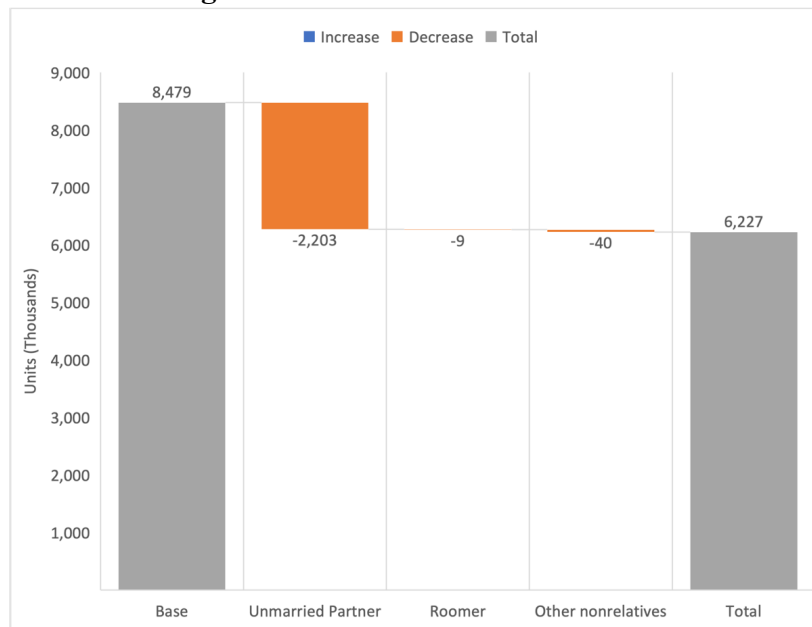
Figure B5. Impact of Including Individuals Younger than 18 in the SPM Unit
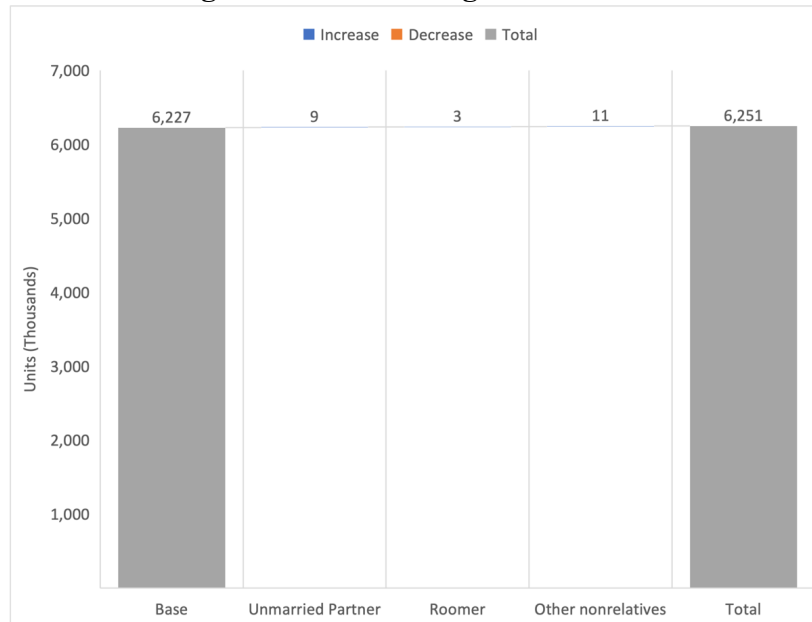
Alternative Order of Decomposition

We now demonstrate the sensitivity of our results to the arbitrary order in which we apply the changes to definition and unit. For reference, we list our original ordering scheme:

1. Exclude family reference persons older than 64 (-)
2. Exclude family reference persons younger than 18 (-)
3. **Account for non-parents older than 17 in the family (-)**
4. **Account for non-children younger than 18 in the family (+)**
5. **Account for individuals older than 17 in the SPM unit but not the family (-)**
6. **Account for individuals younger than 18 in the SPM unit but not the family (+)**

First, we switch steps 3 and 4. By increasing the count of single parents before in step 4 before applying step 3, we will increase the pool of single parents to exclude. As a note, we previously dropped the marital status condition as part of step 3. Now, we separately drop the marital status condition after steps 4 and 3. This pertains to cases where a family reference person is older than 17 and their spouse is younger than 18; these cases have the same (miniscule) impact to the count of single parents under both ordering schemes. Second, we switch steps 5 and 6. Again, we increase the pool of single parents to exclude by switching these steps.

In Figure B6, we show the number of individuals changing single parent status under each step in this new sequence. Step 4 substantially increases the pool of single parents to subsequently exclude, while step 6 does not. Accordingly, exclusions made in step 3 increase their contribution to the gross *decrease* relative to exclusions made in step 5; previously, step 3 accounted for 49% of the gross decrease in the count of single parents while step 5 accounted for 48%. In the new scheme, the contributions are 59% and 39%, respectively. The new leading contributions to the gross *decrease*—together comprising 93%—are:

- 38%: The addition of cohabiting partners to the unit (unit change)
- 34%: The presence of the family reference person's own children over 17 years old in the family (definition change)
- 17%: The presence of the family reference person's parent (definition change)
- 5%: The presence of the family reference person's sibling over 17 years old in the family (definition change)

We could employ other ordering schemes. Notably, we could further advantage step 3 by moving it ahead of step 1 and 2 (which both reduce the pool of single parents for exclusion). For purposes of brevity, we do not conduct this analysis. Additionally, within a given step, we could change the contribution of relationship types by altering the order of the list of potential relationships. We do not show results under any such alternative orders.

Figure B6. Crosswalk from Single Parent Families to Single Parent SPM Units