Poverty in the United States

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Motivation

- Census Bureau's Official Poverty Measure (OPM) is one of the most important statistics published by the federal government – but it suffers from several shortcomings:
  - Resource measure is pre-tax money income, which ignores tax credits and in-kind transfers
  - Sharing unit doesn't include unmarried cohabitors
  - Odd equivalence scale
- In 2011, Census Bureau began reporting the Supplemental Poverty Measure (SPM), which addresses many disadvantages of the OPM
  - However, both OPM and SPM are based on survey reports, which miss a large and rising share of some income sources (Meyer, Mok, & Sullivan 2015, Bee & Mitchell 2017, Meyer & Mittag 2019)
  - Administrative sources of income can play an important role in correcting for survey misreporting

This Paper

- Uses linked survey and administrative data that are part of the Comprehensive Income Dataset (CID) to calculate how the bottom of the income distribution changes after:
  - Correcting for misreporting
  - Accurately incorporating taxes and non-medical in-kind transfers
- Explores three applications using CID relative to survey alone:
  - [Primary] How many individuals have incomes below absolute thresholds after corrections and adjustments?
  - [Secondary] How much would poverty thresholds have to change to keep absolute poverty rates constant?
  - [Secondary] How would relative poverty rates change?
- Focuses on which corrections/adjustments have largest effects, and how demographic makeup of those in poverty changes
- Analyzes the extent to which the poverty reduction effects of government programs change after using CID

Data Sources

Survey Data

- Focus on reference year 2016, which is the most recent year with complete set of administrative records
- Link 2017 CPS ASEC to various admin tax/program records by PIK
  - CPS is the source of official poverty statistics
  - See next slide for list of admin data sources
- Keep families with at least one PIKed member and no whole imputed members
  - Adjust survey weights for incomplete PIKing and whole imputes using inverse probability weighting at family level
  - Approach minimizes selection by using largest sample
- Caveat: miss admin dollars for un-PIKed individuals in PIKed families
  - (Imperfect) solution for CID: For un-PIKed individuals, continue to use survey values for income sources (e.g., earnings, OASDI, SSI) where admin data are at the individual level

Administrative Data Sources

Income Source	Administrative Source	Income Unit	Income Frequency	States Covered
Earnings	DER (SSA), W-2 (IRS), Form 1040 (IRS)	Individual & Tax Unit	Annual	All
Asset Income	Form 1040 (IRS)	Tax Unit	Annual	All
Retirement Income	Form 1099-R (IRS)	Individual	Annual	All
Social Security	PHUS & MBR (SSA)	Individual	Monthly	All
SSI	SSR (SSA)	Individual	Monthly	All
AGI & Other Cash	Form 1040 (IRS)	Tax Unit	Annual	All
Taxes (simulated)	Form 1040 (IRS)	Tax Unit	Annual	All
SNAP	State Agencies	Household	Monthly	23 States
Housing Assistance	PIC & TRACS (HUD)	Household	Monthly	All
TANF	HHS, State Agencies	Family	Monthly	36 States

Methods

Income Concepts, Sharing Unit, and Equivalence Scale

- Three separate income concepts using survey and CID:
  - Pre-tax money income
  - Money income after taxes and certain expenses (namely child support paid and work expenses)
  - Money income after taxes, expenses, and non-medical in-kind transfers (housing assistance, SNAP, WIC, school lunch, energy assistance)
- Sharing unit is SPM family, which includes:
  - Related individuals (OPM family) + cohabitating unmarried couples + unrelated children age<15 + foster children age<22
- Equivalence scale is SPM three-parameter scale that accounts for family size and composition
- In some of our subsequent results, we show the effects of these decisions starting from the OPM

Going from Survey to CID Pre-Tax Money Income

- Start with survey pre-tax money income
- For majority of pre-tax money income sources, replace survey values with admin values when PIKed
  - I.e., asset income, retirement income, OASI, DI, SSI
- For earnings, we have multiple (incomplete) admin sources
- We combine all of these admin sources and continue to use survey values when they reflect amounts that are plausibly missed in the admin records (see next section for more detail)
- Use admin AGI (which includes Unemployment Insurance, alimony, etc.) as lower bound for CID pre-tax money income
  - If AGI exceeds taxable portion of CID pre-tax money income, include difference in CID income measure
  - Correction is conservative because AGI is after deductions

Accurately Incorporating Taxes, Expenses, and In-Kind Transfers in Income Concept

- Subtract tax liabilities (federal/state income, payroll) and add tax credits (EITC & CTC) to pre-tax money income
  - Survey values obtained from CPS tax calculator
  - CID values simulated using TAXSIM with inputs from admin tax records and Numident (see Meyer et al. 2022 for methods)
- Subtract certain survey expenses
  - Child support paid, work expenses
  - Do not subtract other expenses like MOOP that do not validate well against well-being measures (Meyer and Sullivan 2012)
- Add values of certain non-medical in-kind transfers: SNAP, housing assistance, WIC, school lunch, energy assistance
  - For survey values, use SPM amounts (see Fox 2017 for methods)
  - For CID values, replace survey SNAP and housing assistance values with admin values; proportionately adjust for admin SNAP at the end (which we have for only 23 states)

Additional Methods: Comparing and Combining Multiple Earnings Sources

Earnings Data Sources are Incomplete

- Earnings constitute the single largest income component
  - We have earnings data from multiple survey and administrative sources
  - Yet, each of these sources are incomplete
- Multiple admin earnings sources
  - Wage/salary amounts from DER, W-2s, and 1040s and self-employment amounts from DER (derived from 1040 Schedule SE)
  - DER wages are from W-2s but only available for those with SSNs, while IRS W-2s include wages for those with ITINs
  - DER includes allocated tips, which are missed in IRS W-2s
  - 1040s include some earnings not in W-2s or DER (unreported tips, scholarships, etc.), but filers may also forget a W-2 in 1040 wages
- Moreover, even collectively, admin sources miss informal ("off-the-books") earnings that are not reported to tax authorities

Empirical Evidence on Conflicting Administrative Earnings

Unit	Comparison	Magnitudes	Characteristics
Individuals	W-2 > DER	0.26% of all persons 15+ 0.37% of poor persons 15+	61% are ITINs known to us (i.e., filing 1040); Among remainder, 38% have no DER wages and 62% have more W-2 employers
Individuals	DER > W-2	0.70% of all persons 15+ 0.49% of poor persons 15+	86% have more DER employers and 79% of those linking to non-joint 1040s have DER (not W-2) wages matching Box 7 of 1040
Tax Units	1040 > W-2	4.43% of all tax units 7.04% of poor tax units	9% are ITINs; among non-ITINs, 47% have characteristics consistent with conceptual differences between 1040/W-2 wages or misclassification of SE earnings as wages (vs. 33% of all tax units)
Tax Units	W-2 > 1040	5.32% of all tax units 10.75% of poor tax units	6% have zero wages on 1040; 65% have difference equal to wages on a single W-2, and 71% have difference equal to wages on one or two W-2s

Source: 2017 CPS ASEC linked to administrative tax records
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Combining Earnings Sources

- Higher of taxable wages in DER/W-2/1040 (in most cases) + deferred compensation from DER/W-2 + self-employment income from DER
  - Add allocated tips from DER to higher of DER/W-2 taxable wages before combining with 1040 wages
  - Take higher of non-taxable deferred compensation amounts from DER and W-2
  - Do not bring in 1040 wages for non-elderly individuals with 1099-R or individuals with survey-reported scholarship income (to avoid double-counting)
  - Divide DER self-employment amounts by 92.35%, since original amounts reflect only Medicare-taxable amounts
- Continue to use survey earnings when 1) not imputed, 2) many employment characteristics (hours/weeks worked, industry, occupation, # employers) not imputed, and 3) one of following conditions holds:
  - Administrative earnings are missing
  - Number of survey employers exceeds number of admin employers
  - Respondent reports being self-employed in survey
  - Respondent reports working for a small employer in survey

The Use of Survey Earnings in Our Combined Earnings Measure

Reason	All Persons Aged 15+ (1)	OPM Poor Persons Aged 15+ (2)
Share with Any Survey Earnings > Admin Earnings	33.71%	10.66%
Missing Admin Earnings [1]	1.97%	2.07%
More Survey Employers than Admin Employers [2]	3.08%	2.54%
Report Being Self-Employed in Survey	3.38%	1.16%
Report Working for Small Employer in Survey [3]	5.79%	2.94%
Any of the Above Reasons	7.33%	3.96%
Sample Size	112,000	12,500
Population (Weighted)	258,800,000	29,420,000

[1] Defined as having no wage/salary or self-employment earnings in the DER, W-2 or 1040
[2] Capped at 3 employers, which is the maximum reported in CPS; count self-employment as a single employer
[3] Defined as working for company with less than ten employees

Source: 2017 CPS ASEC linked to SSA DER and IRS Forms 1040 and W-2
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Aggregate Survey-Only, Admin-Only, & CID Earnings as Shares of NIPA Totals

Source: 2017 CPS ASEC linked to administrative tax records
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Summary of Key Results

- Empirical comparisons of multiple admin sources suggest that the source with the higher wage amount tends to be more reliable
- When combining survey and admin earnings, we continue to use survey earnings for only 22% (7.33/33.71) of all individuals whose survey earnings exceed their admin earnings
  - Reflect earnings that are plausibly missed in tax records
  - Estimate that 7% of combined earnings come exclusively from survey
- In the end, our combined earnings measure falls 3% short of NIPA totals. May still understate earnings for various reasons, including:
  - Informal earnings, especially SE, likely to be understated in surveys (Hurst, Li, & Pugsley 2014, Abraham and Amaya 2019)
  - Still missing lots of admin earnings data (e.g., from 1099-MISC, 1099-K, Schedule SE for ITINs)

Outline of Main Analyses

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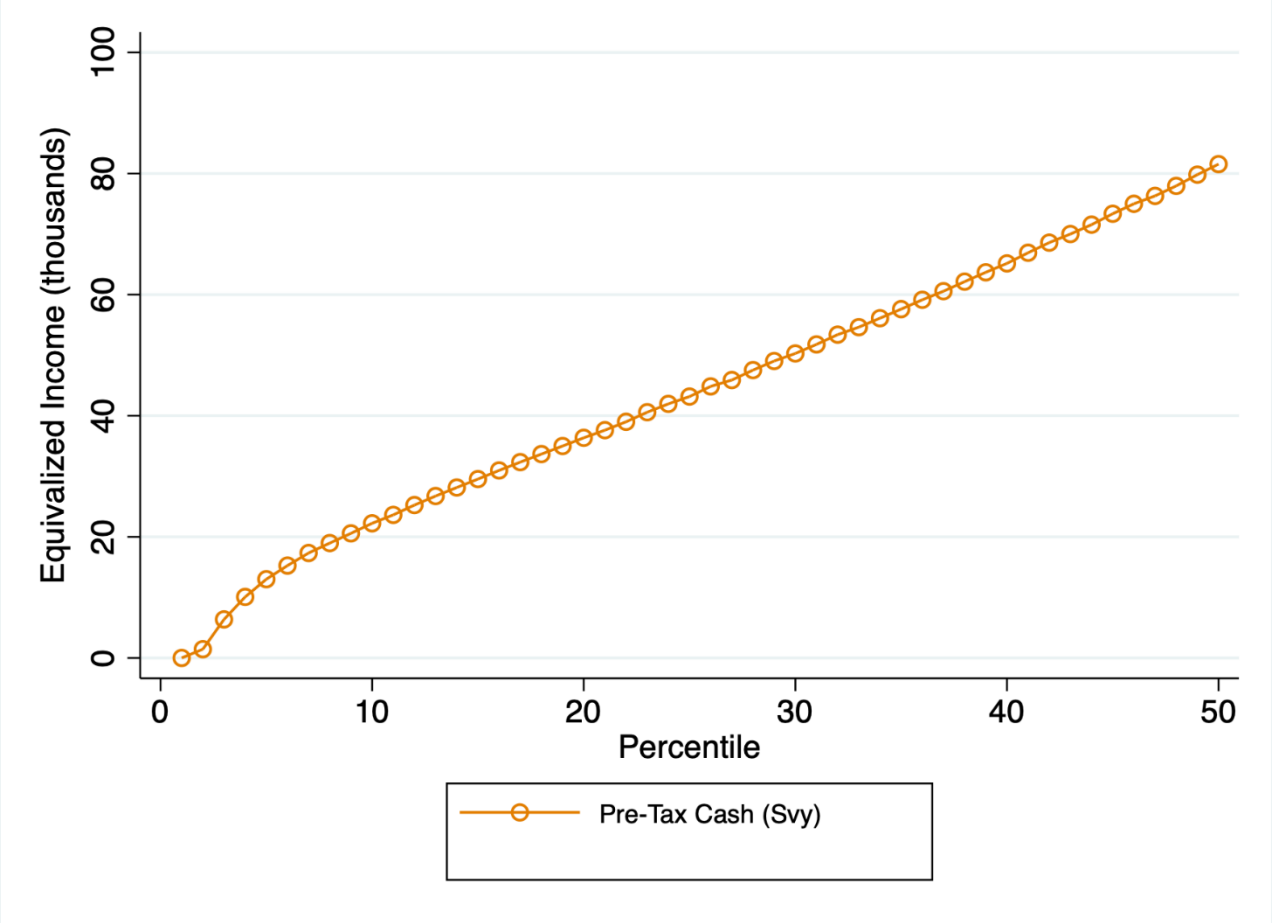
1. Start by showing bottom half of income distribution under various income concepts using survey only and CID
2. Explore three separate applications of income distributions to prototypical poverty analyses
   - How many individuals have incomes below absolute thresholds after corrections and adjustments?
   - How much would poverty thresholds have to change to keep absolute poverty rates constant?
   - How would relative poverty rates change?
3. Examine effects of corrections and adjustments on rates and characteristics of those in poverty across various subgroups
4. Calculate how much poverty rates would increase if government programs were eliminated (using survey vs CID)

1. Results: Income Distribution

Roadmap for Section

- Show bottom half of income distribution under various income concepts using survey only and CID
  - Show percentiles for bottom 50% (i.e., inverse CDFs) of income distribution; re-rank distribution for every income concept
- Start with pre-tax money income using survey only; then show survey vs CID versions
  - Then incorporate tax liabilities/credits and expenses
  - Finally add non-medical in-kind transfers
- Show fractional change in income distribution due to income concept changes vs. income concept + data changes
- Use SPM sharing unit and 3-parameter equivalence scale
  - Scale incomes so representative of family with 2 adults, 2 children

Pre-Tax Money Income Distribution (Survey Only)



Source: 2017 CPS ASEC linked to various administrative records
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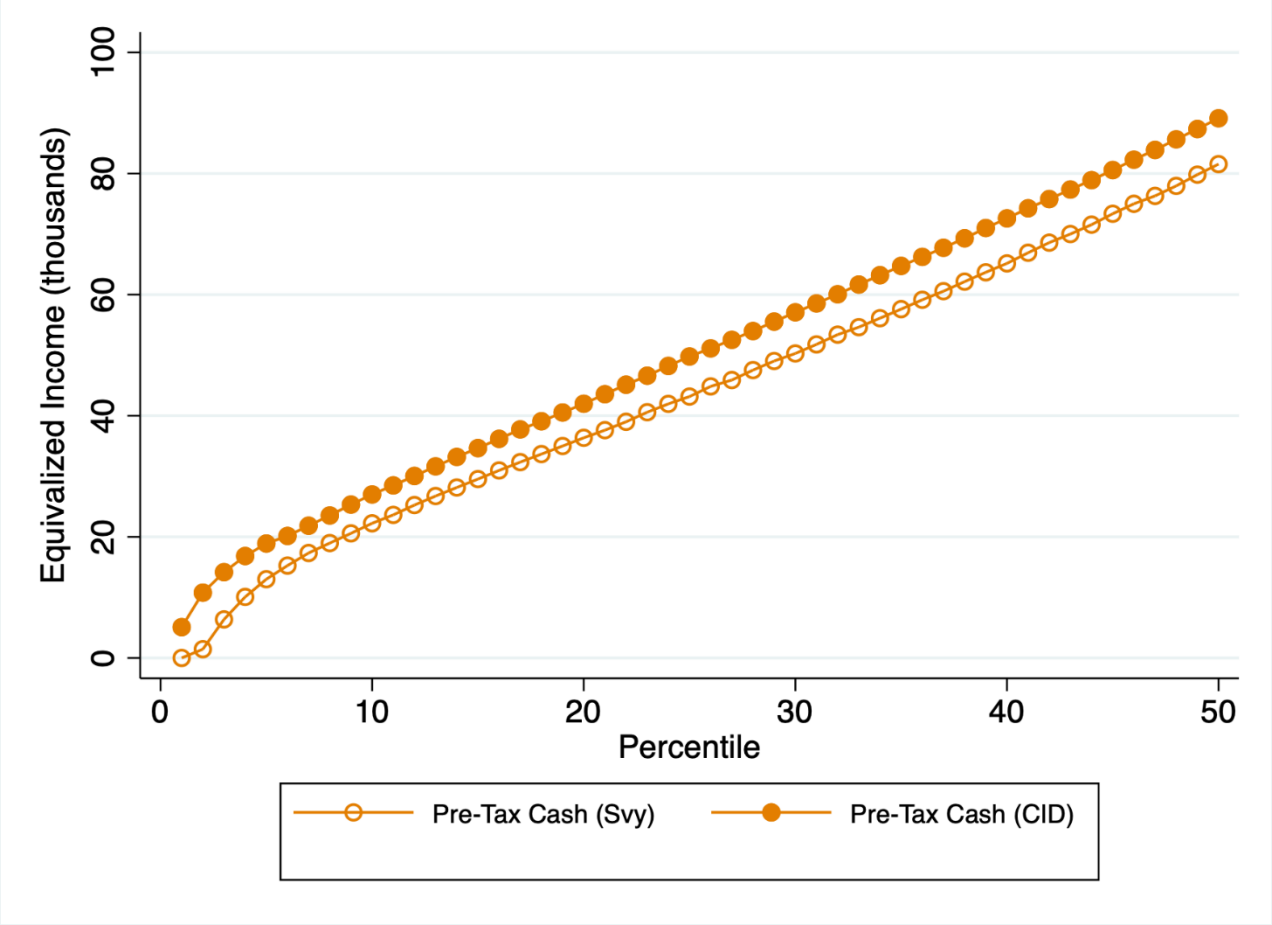
Pre-Tax Money Income Distribution (Survey vs CID)



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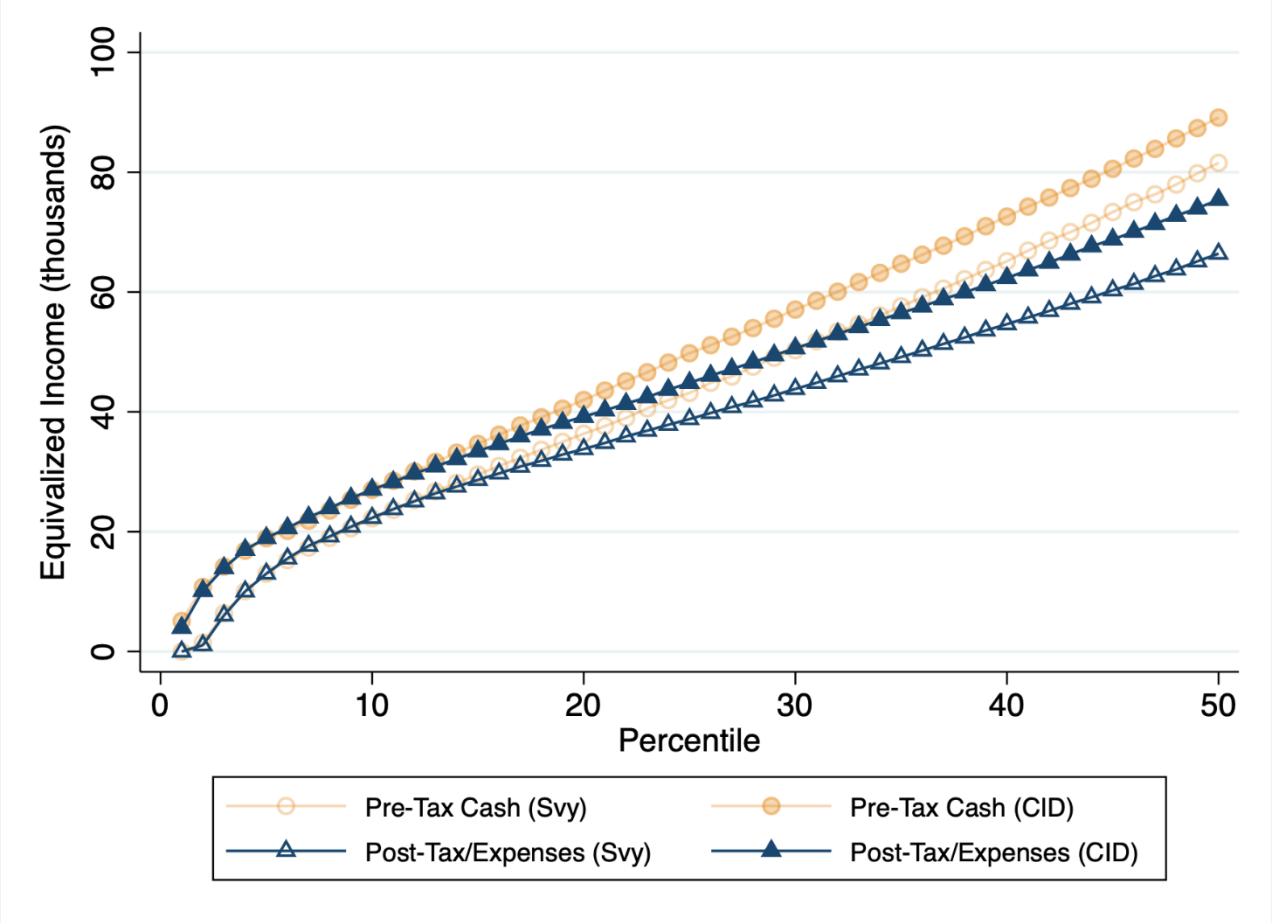
Distribution After Accounting for Taxes and Expenses (Survey vs CID)



Source: 2017 CPS ASEC linked to various administrative records
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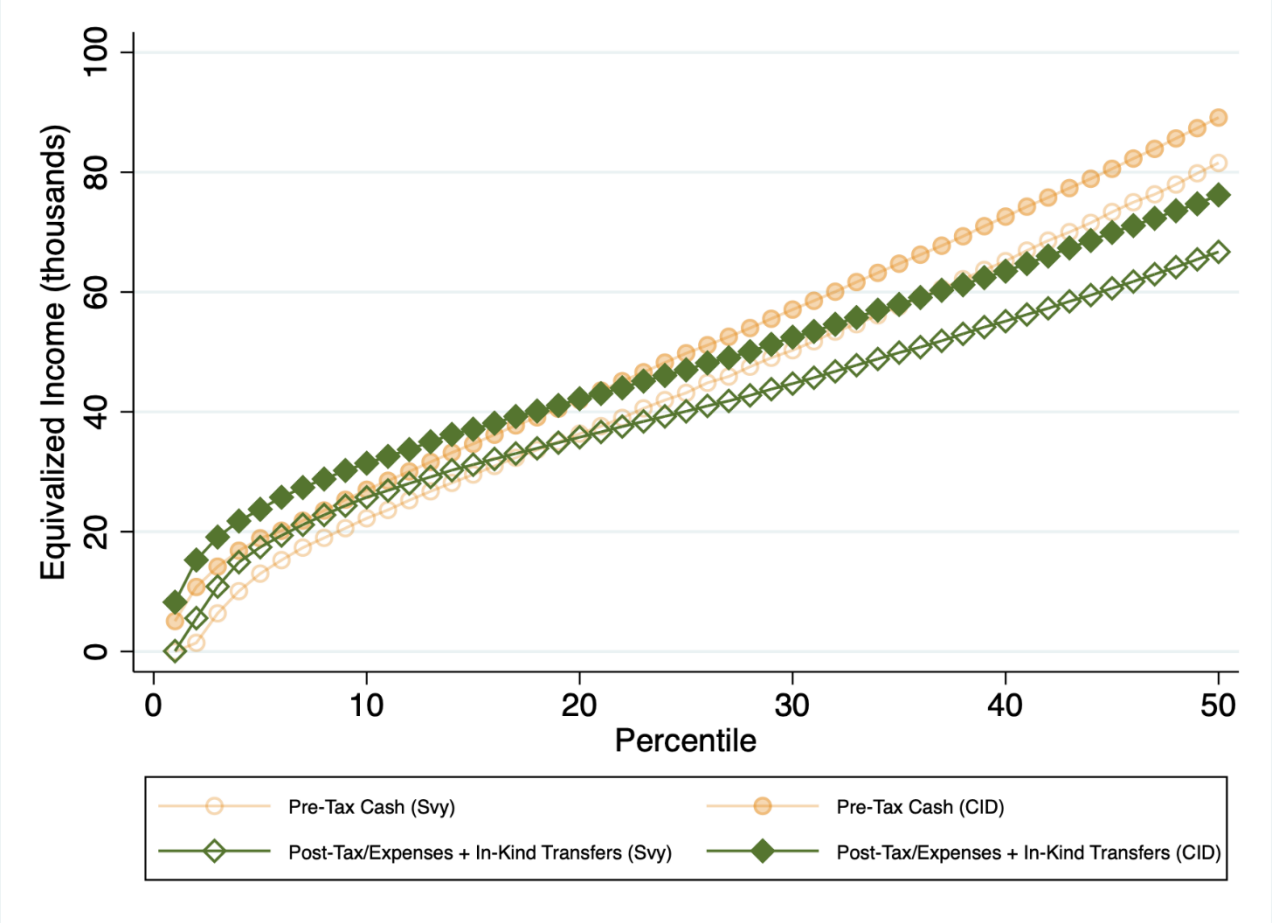
Distribution After Further Accounting for In-Kind Transfers (Survey vs CID)



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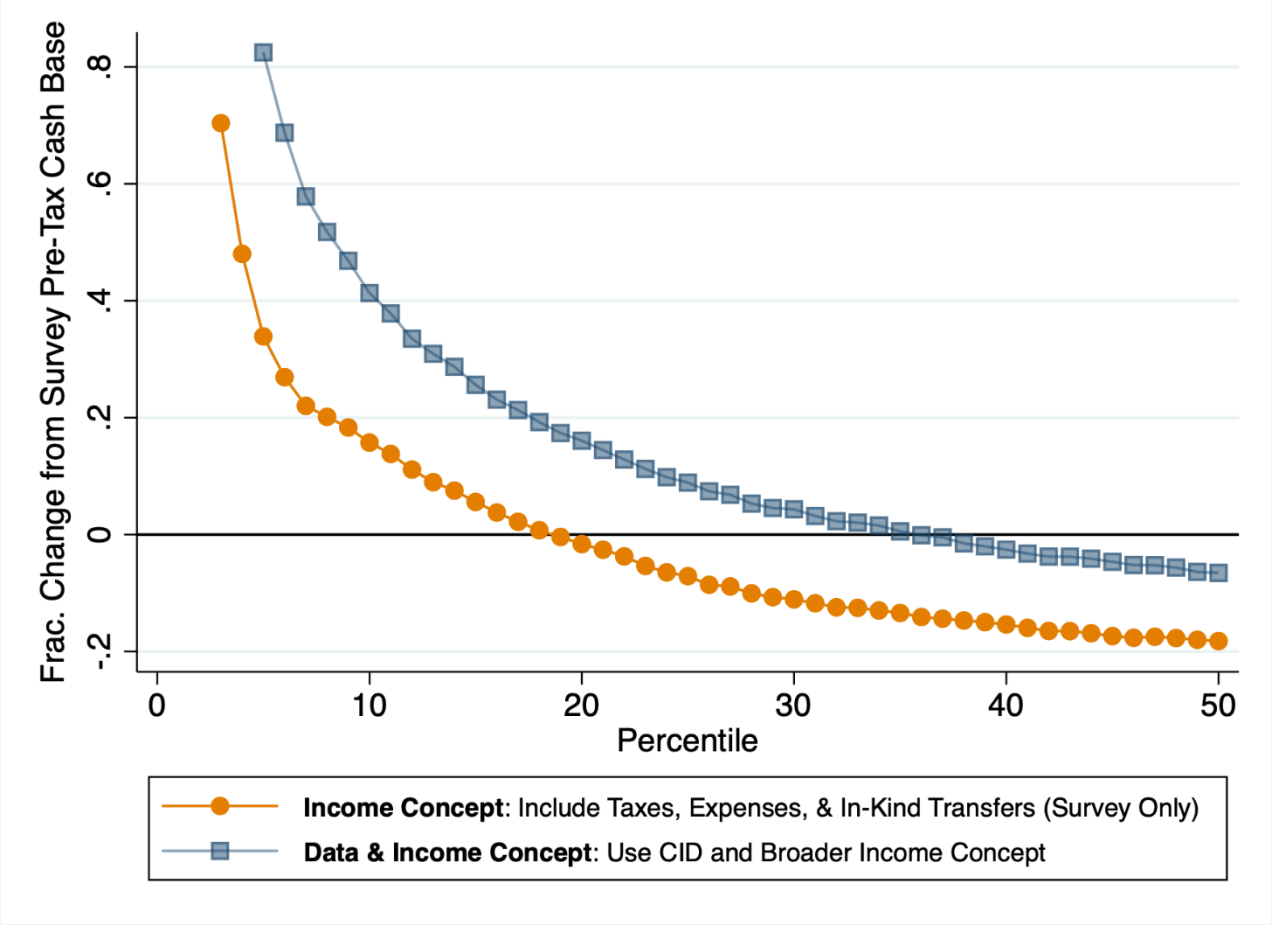
Fractional Change in Income Distribution Due to Income Concept & Data



Note: Estimates reflecting 100%+ percent change (at bottom of distribution) are dropped due to scale issues
Source: 2017 CPS ASEC linked to various administrative records
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Summary of Key Results

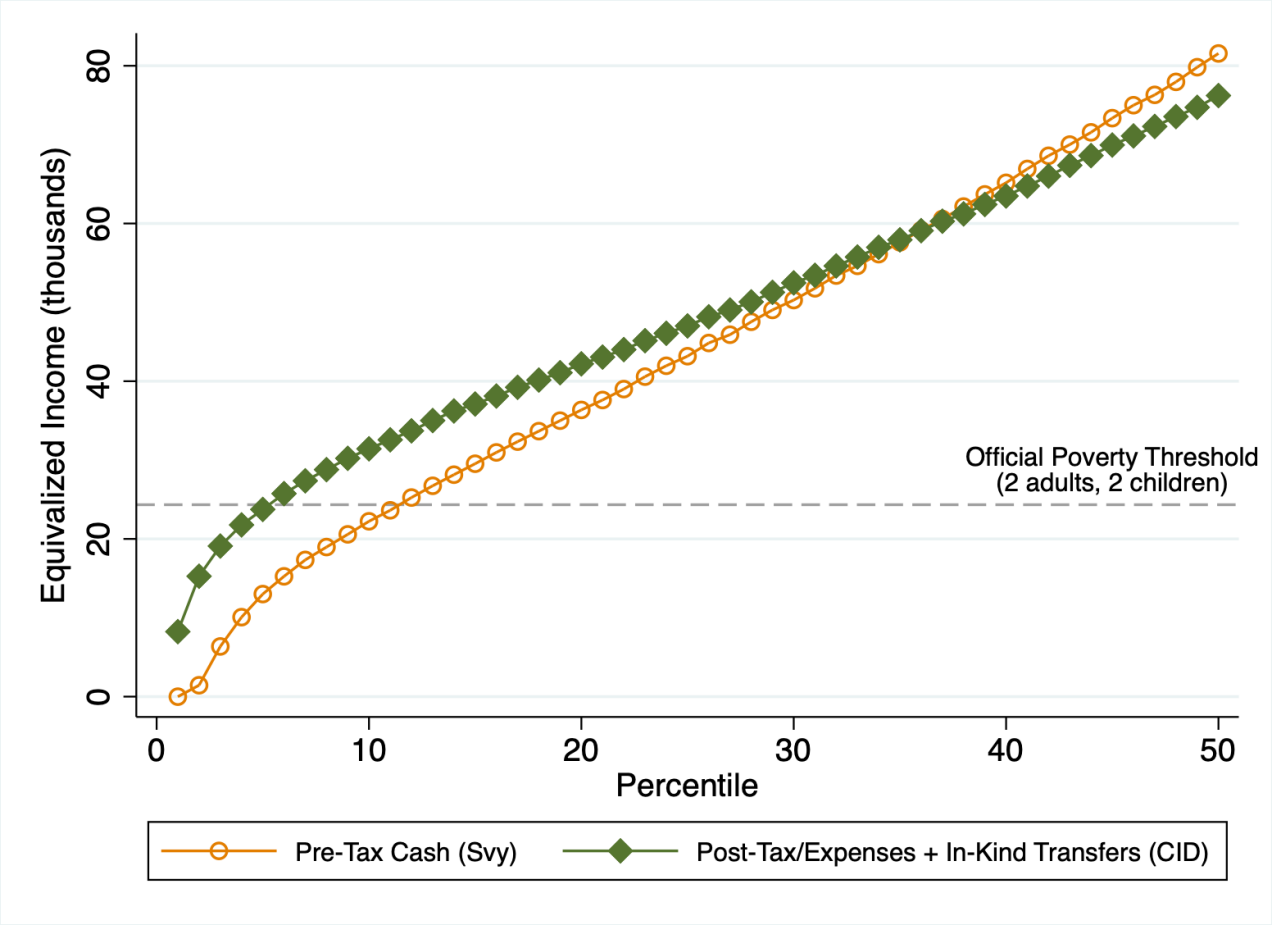
- Using CID shifts up income distribution at every percentile in bottom half, relative to survey only
  - True for every income concept (i.e., pre-tax cash, post-tax/expenses, post-tax/expenses + in-kind transfers)
  - As share of survey baseline, increases in income percentiles due to CID are largest at very bottom of income distribution
- Changing income concept using survey only leads to higher (lower) incomes below (above) 19th percentile
  - At lower percentiles, increases in income due to tax credits/in-kind transfers outweigh decreases due to tax liabilities/expenses
- At lower percentiles, increases in incomes due to CID play larger role than increases due to income concept (despite CID brought in 2nd)
  - Even between percentiles 19 and 36, increases in income due to CID are large enough to outweigh *decreases* due to income concept changes

2. Results: Applications to Prototypical Poverty Analyses

Roadmap for Section

- Show three separate applications of income distributions to prototypical poverty analyses
- Application 1 (primary): Share of population with incomes below absolute thresholds (and multiples of thresholds)
  - Use OPM threshold for 2-adult, 2-child family and SPM 3-parameter equivalence scale to calculate thresholds for other families
  - For step-by-step adjustments, show starting from OPM
- Application 2 (secondary): Scalings of thresholds needed to maintain absolute poverty rates at baseline levels
  - Mirror image of Application 1
  - For full population, base rate using survey pre-tax cash is 11.42%
- Application 3 (secondary): Share of population with incomes below some share of median income (i.e., relative poverty)
  - Use 29.8% of median income, which corresponds to the threshold for the baseline poverty rate using survey pre-tax money income (11.42%)

Application 1: Share with Incomes Below Absolute Thresholds



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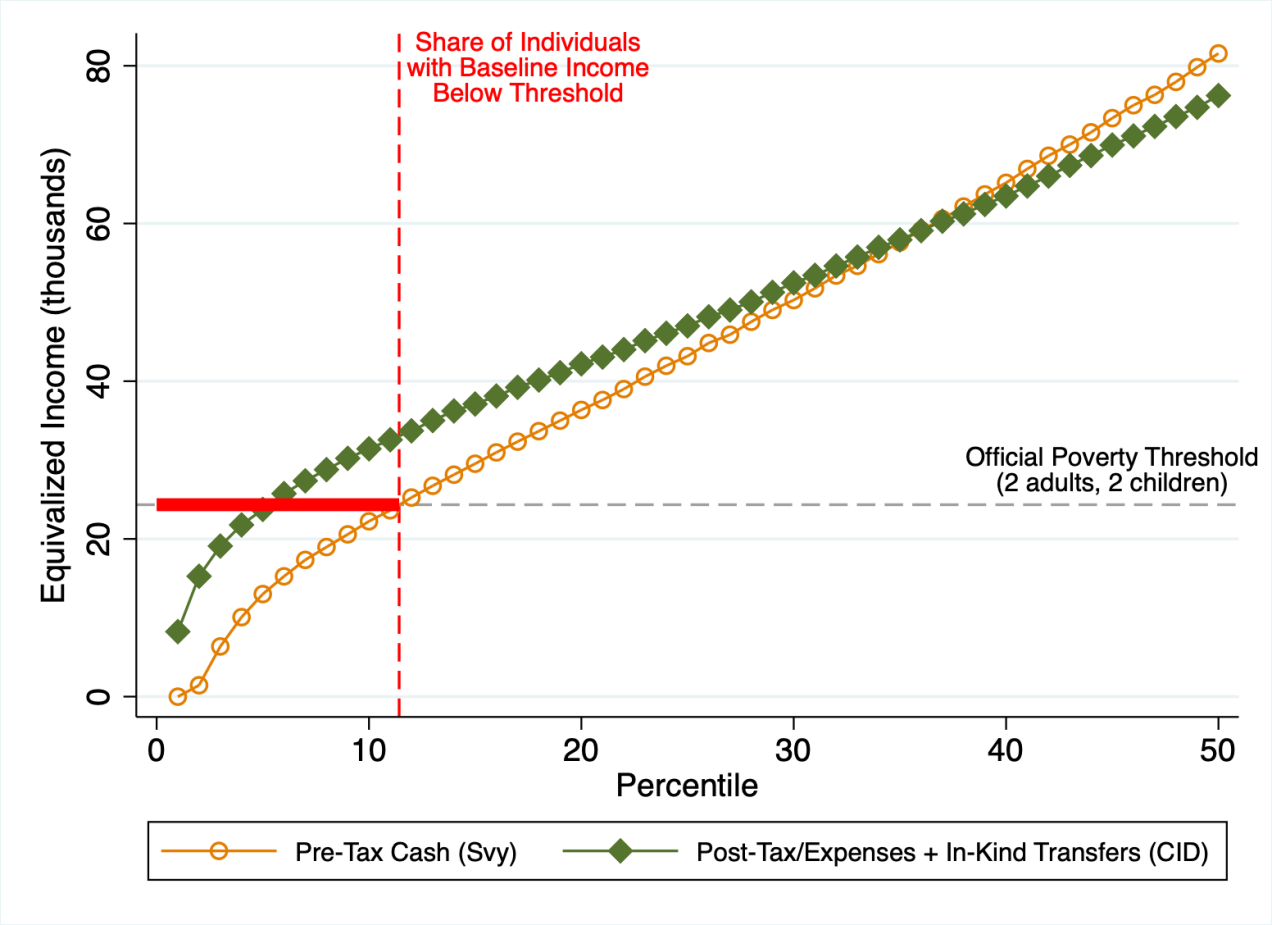

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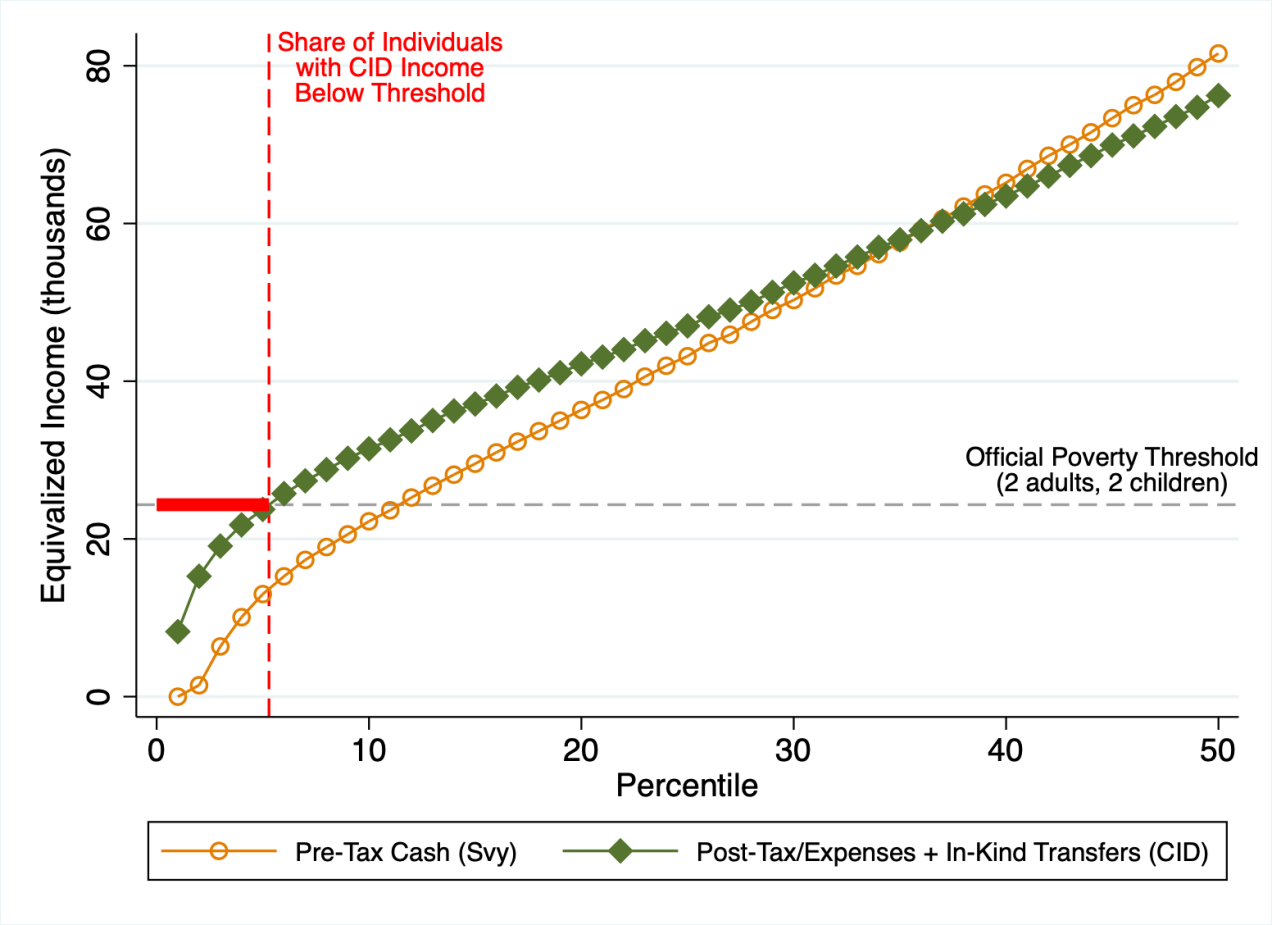

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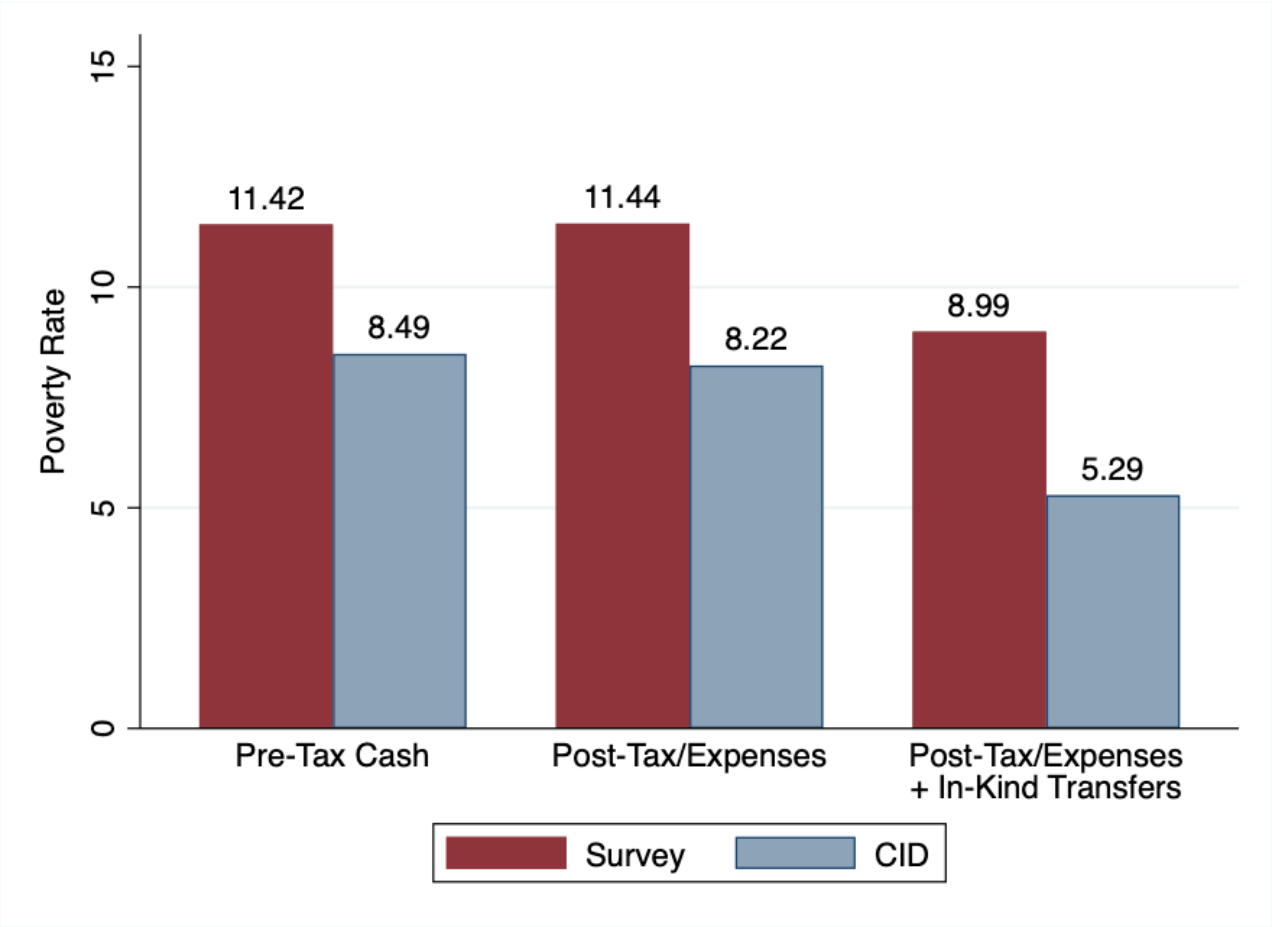
Shares of Individuals Below Poverty Line (by Income Concept)



Source: 2017 CPS ASEC linked to various administrative records
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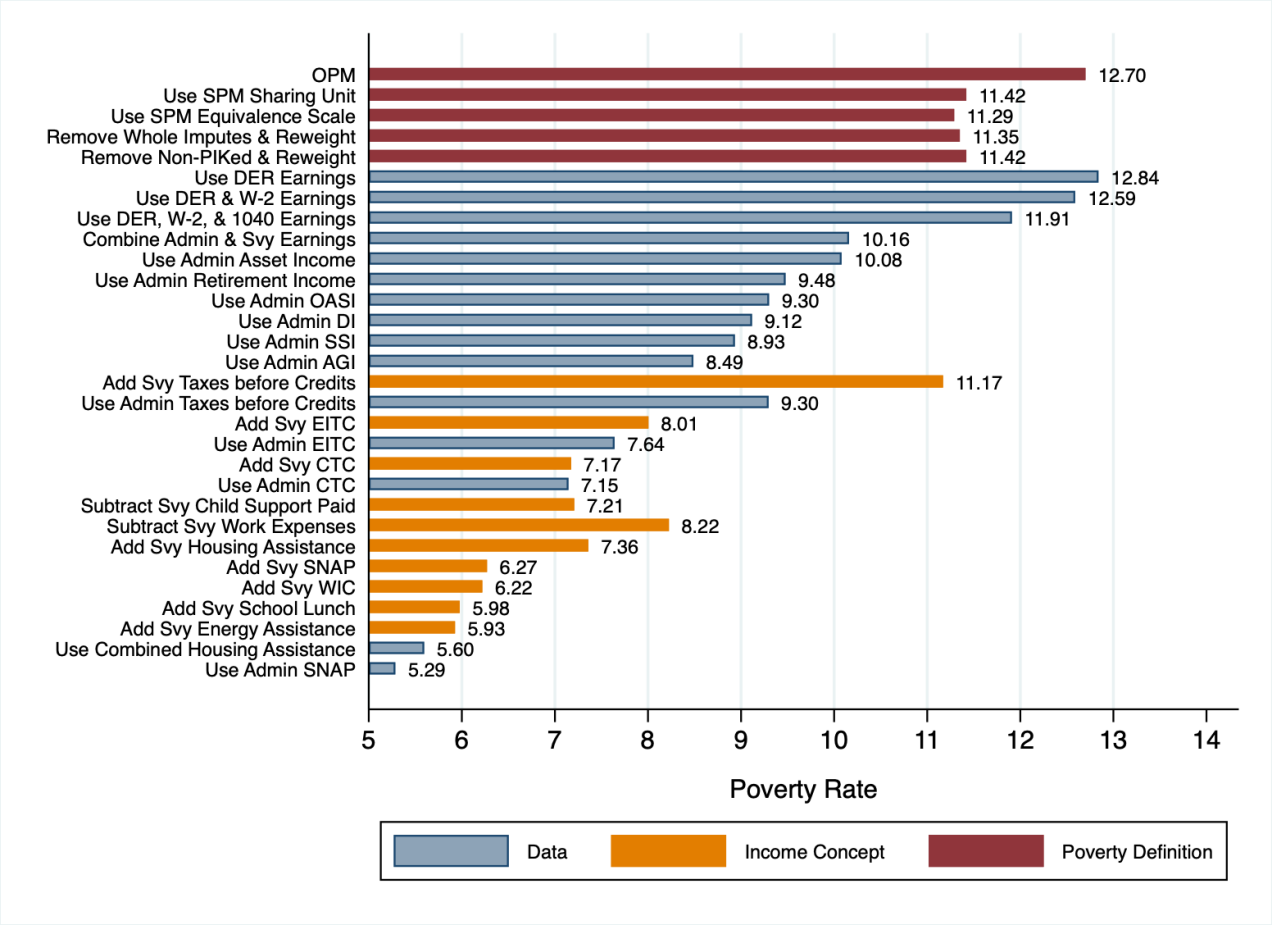
Share of Individuals Below Poverty Line After Step-by-Step Adjustments from OPM



Source: 2017 CPS ASEC linked to various administrative records
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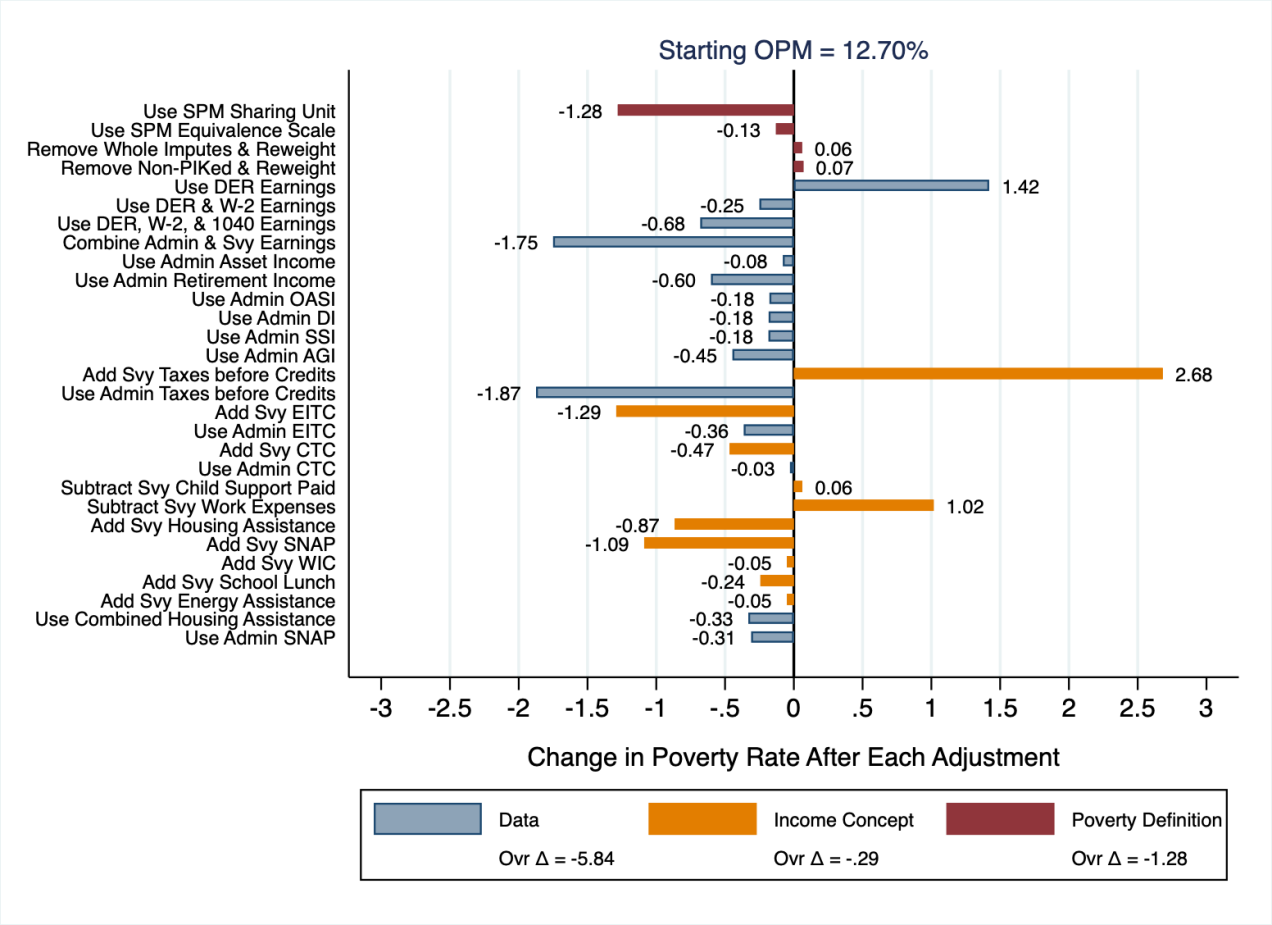
Changes to Poverty Rates After Step-by-Step Adjustments from OPM



Source: 2017 CPS ASEC linked to various administrative records
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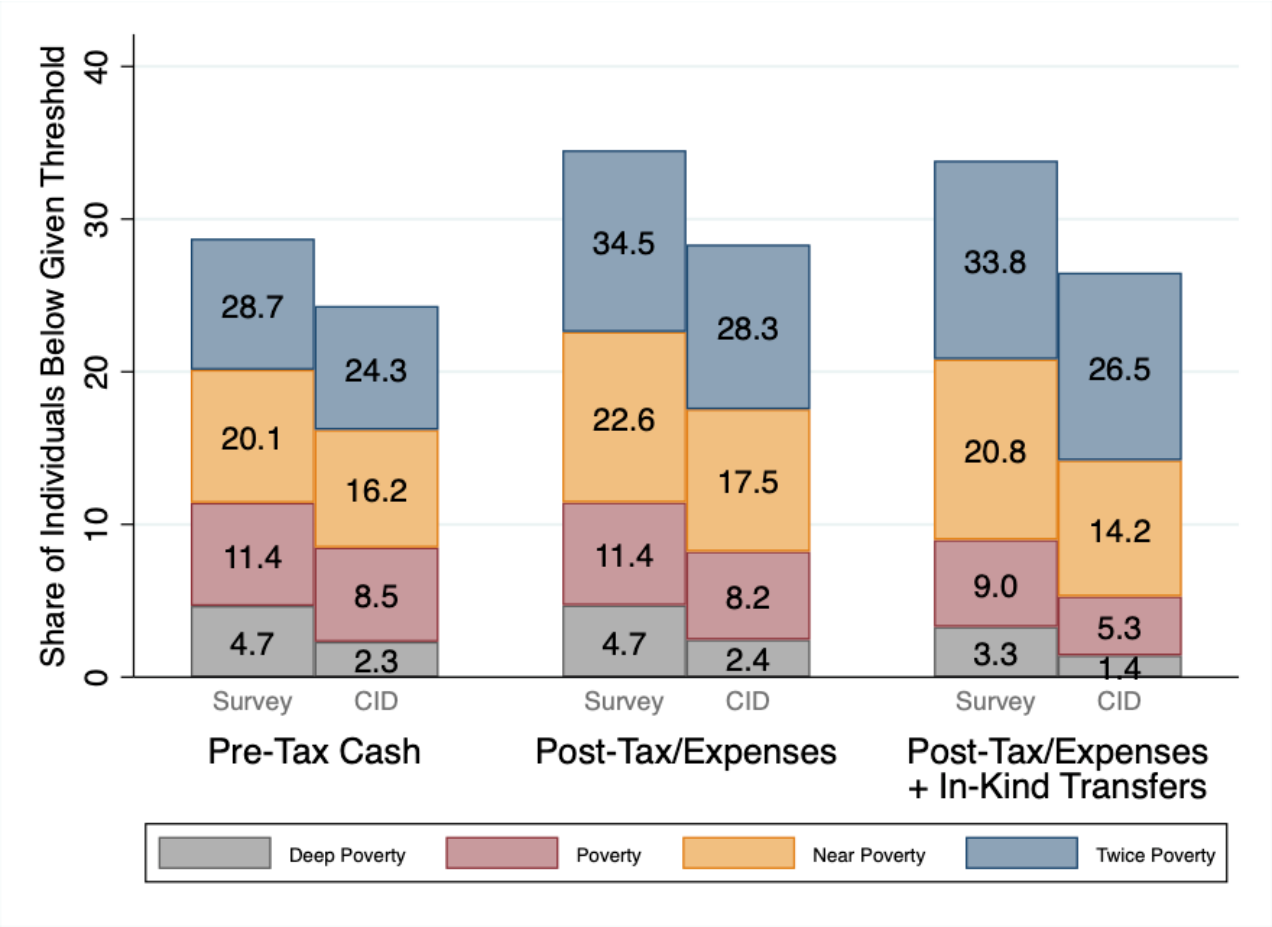
Shares of Individuals Below Multiples of Poverty Line (by Income Concept)



Source: 2017 CPS ASEC linked to various administrative records
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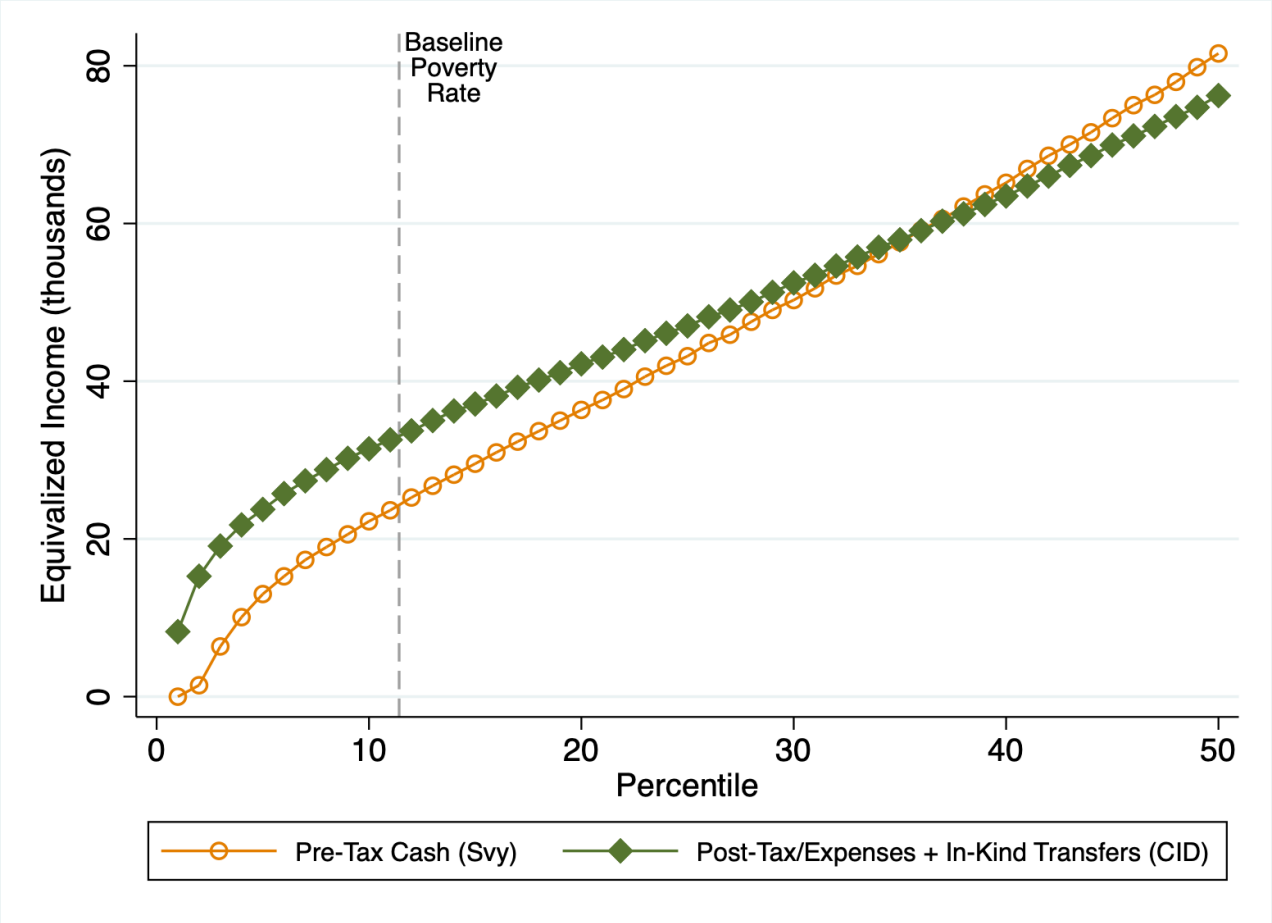
Application 1: Summary of Key Results

- Baseline share of individuals in absolute poverty is 11.42%
  - To go from OPM (12.7%), use SPM sharing unit/equivalence scale and reweight sample to account for non-PIKing and whole imputes
- Share of individuals with incomes below thresholds falls to 5.29% after using more complete income concept and CID
  - When bringing in changes to income concept first (giving them max weight), better data (CID) account for 60% of decline
  - Using step-by-step adjustments, better data (CID) account for 95% of decline
  - Combining survey and admin earnings is one of the single most important steps; conversely, replacing survey earnings with admin earnings would lead to increase in poverty
- Decline in poverty rate less pronounced at higher thresholds
  - Mainly due to smaller role of income concept in reducing poverty

Application 2: Thresholds Needed to Keep Poverty Rate Constant



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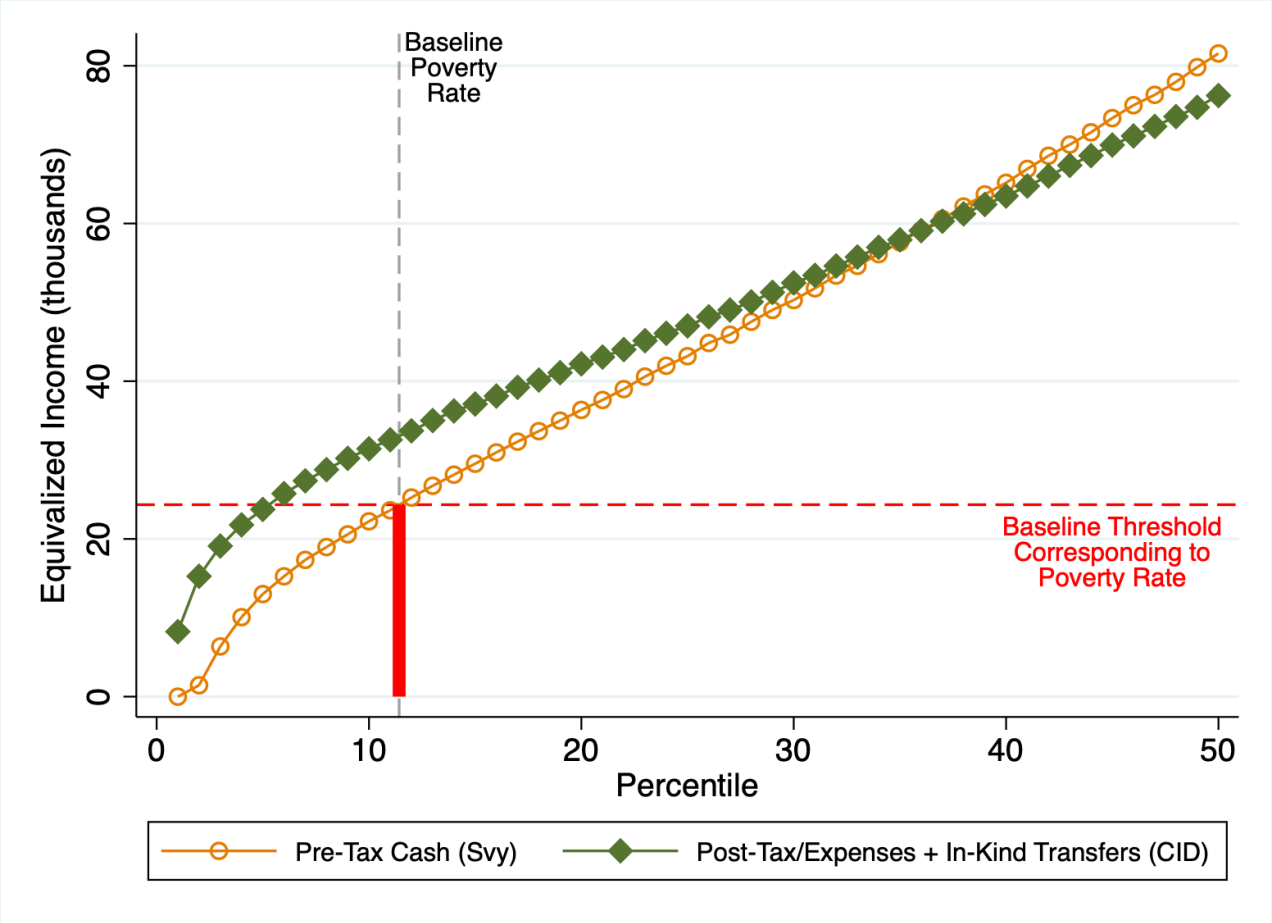

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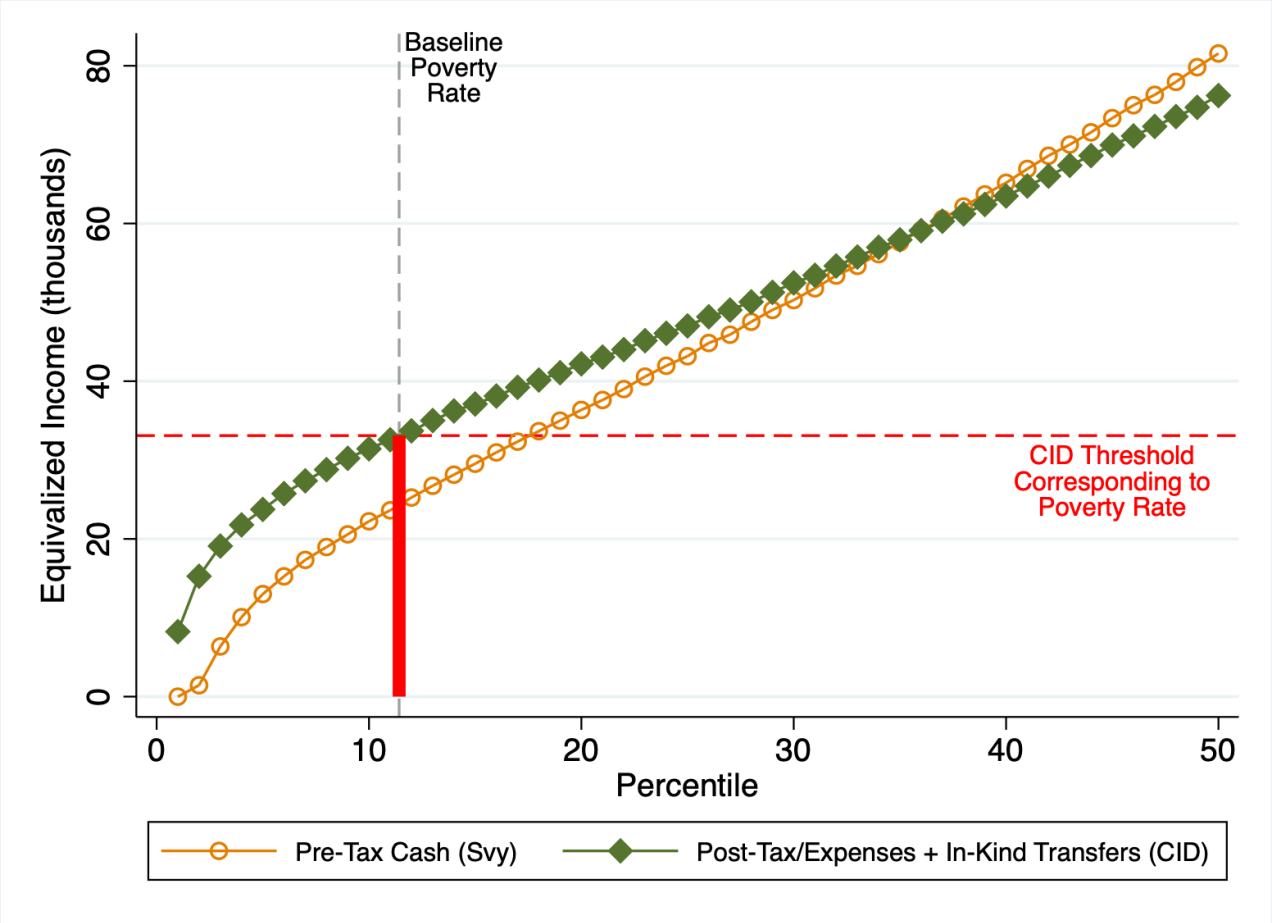

Source: 2017 CPS ASEC linked to various administrative records
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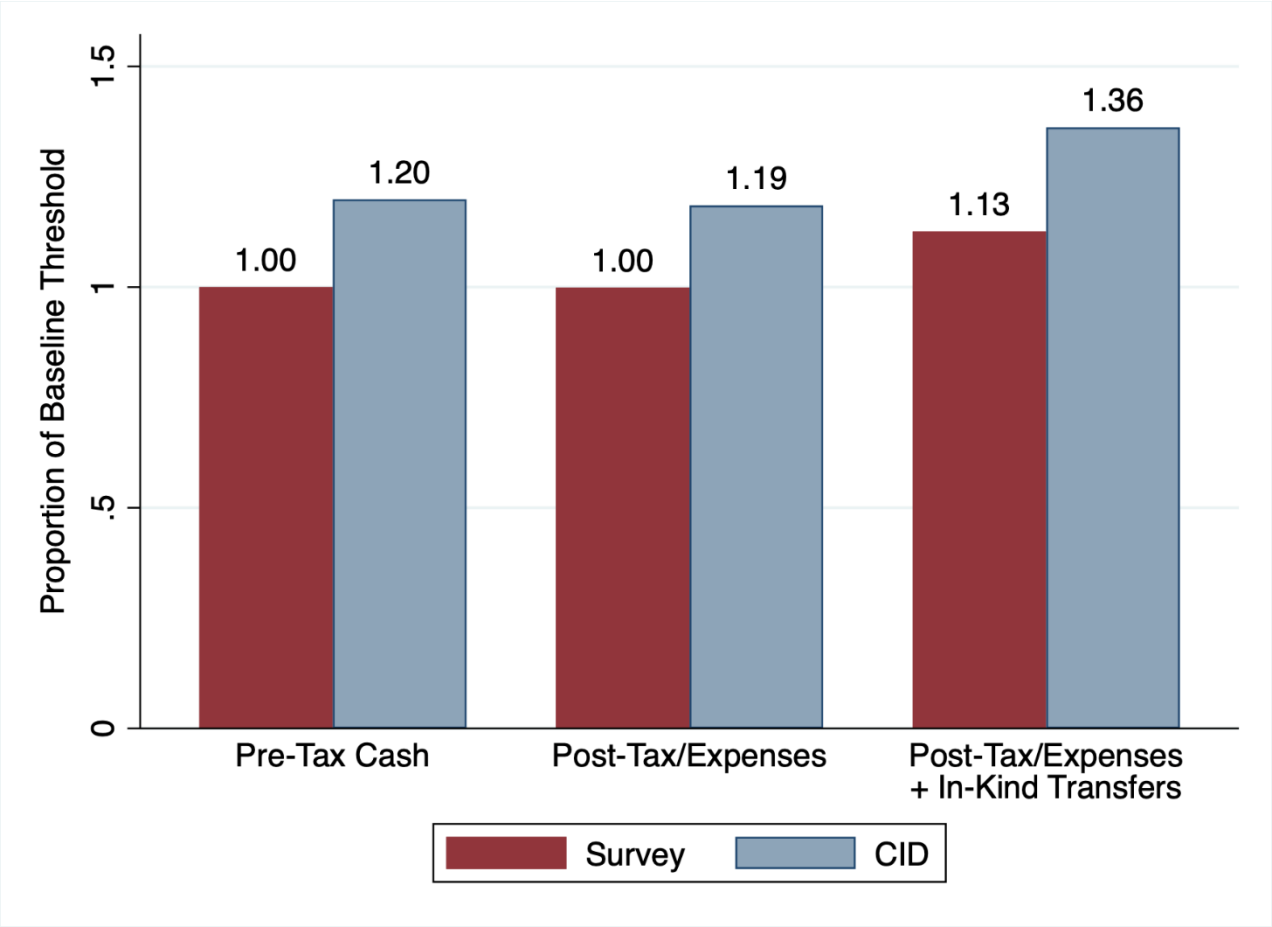
Multipliers Applied to Thresholds to Keep Poverty Rate Constant (by Income Concept)



Source: 2017 CPS ASEC linked to various administrative records
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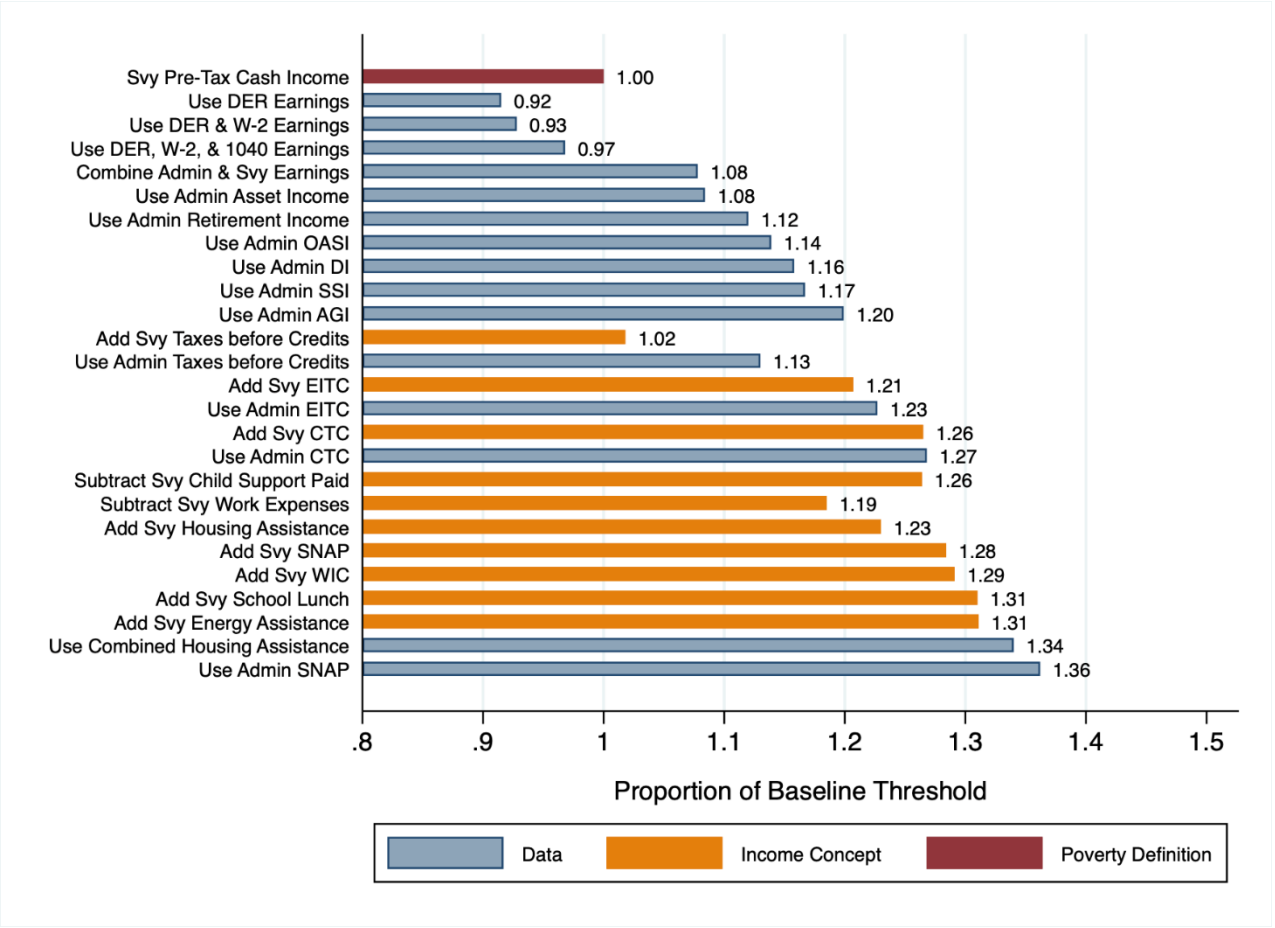
Multipliers Applied to Thresholds to Keep Poverty Rate Constant After Step-by-Step Adjustments



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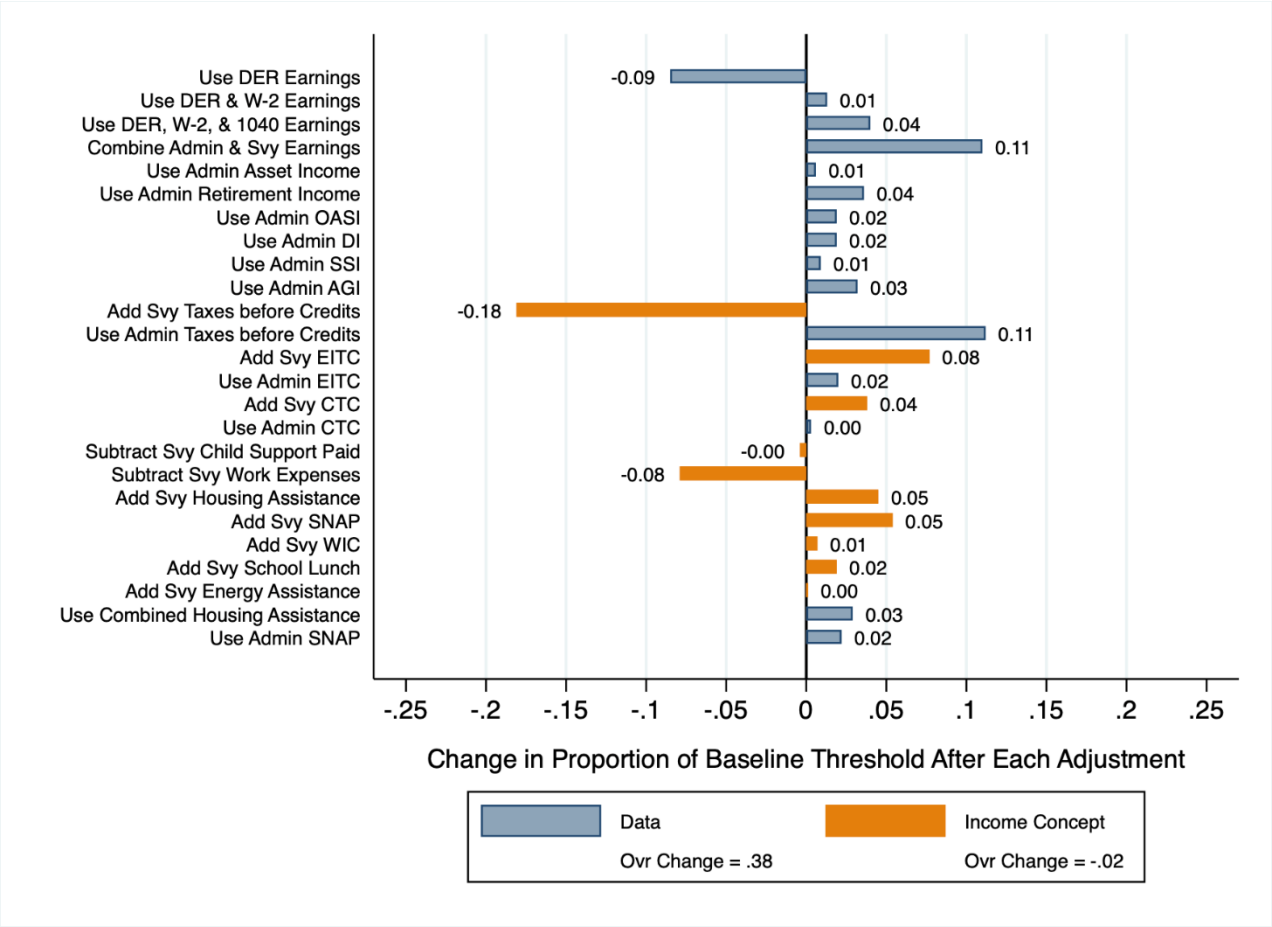
Changes to Threshold Multipliers After Step-by-Step Adjustments



Source: 2017 CPS ASEC linked to various administrative records
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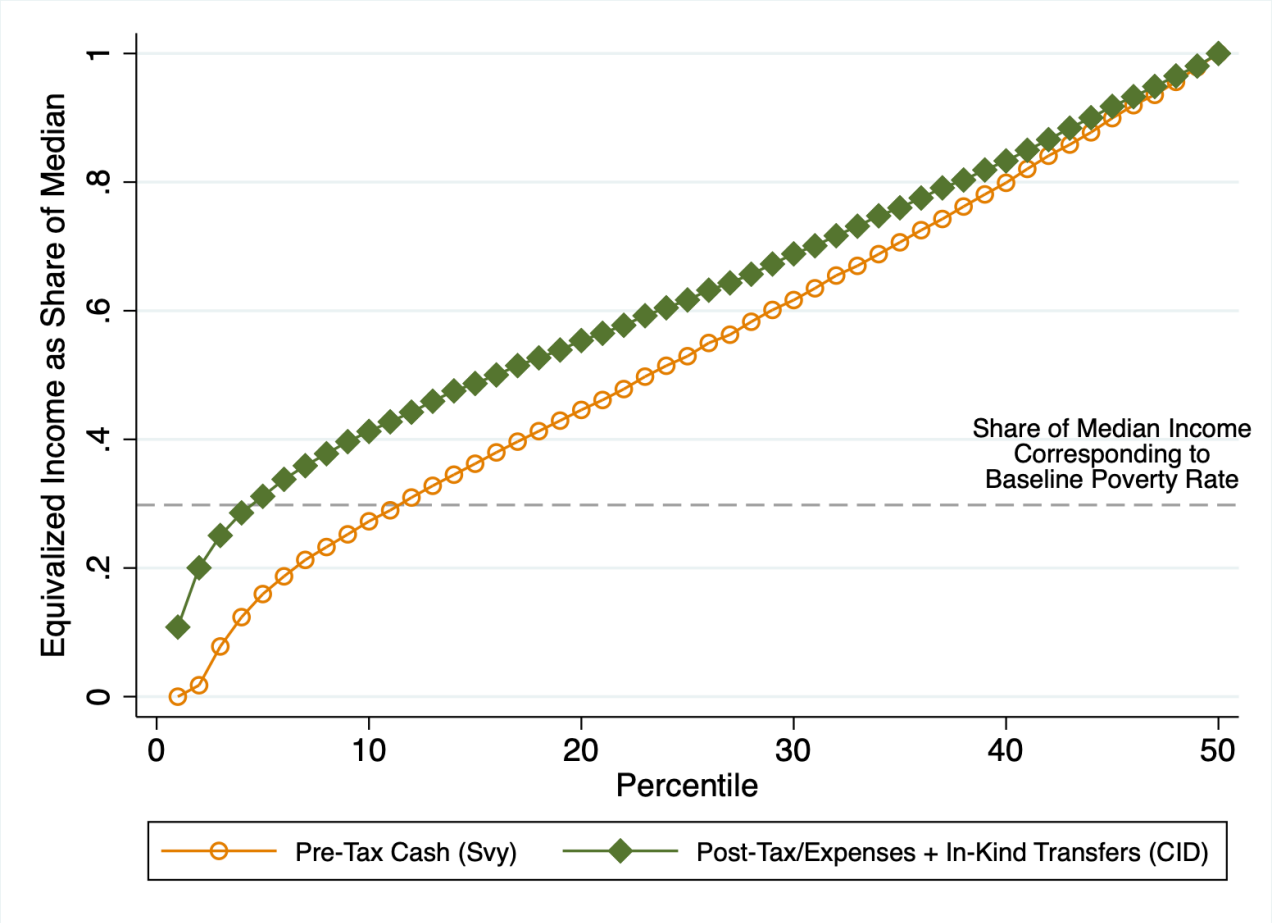
Application 2: Summary of Key Results

- After using better data and changing income concept, poverty thresholds would have to increase by 36% to keep poverty rates unchanged at 11.42% baseline
- Better data drives majority of changes:
  - Bringing in changes to income concept first (giving them max weight), better data account for 64% of increase
  - Using step-by-step adjustments, better data account for 100% of increase

Application 3: Percentiles of Income Distribution (as Share of Median Income)



Source: 2017 CPS ASEC linked to various administrative records
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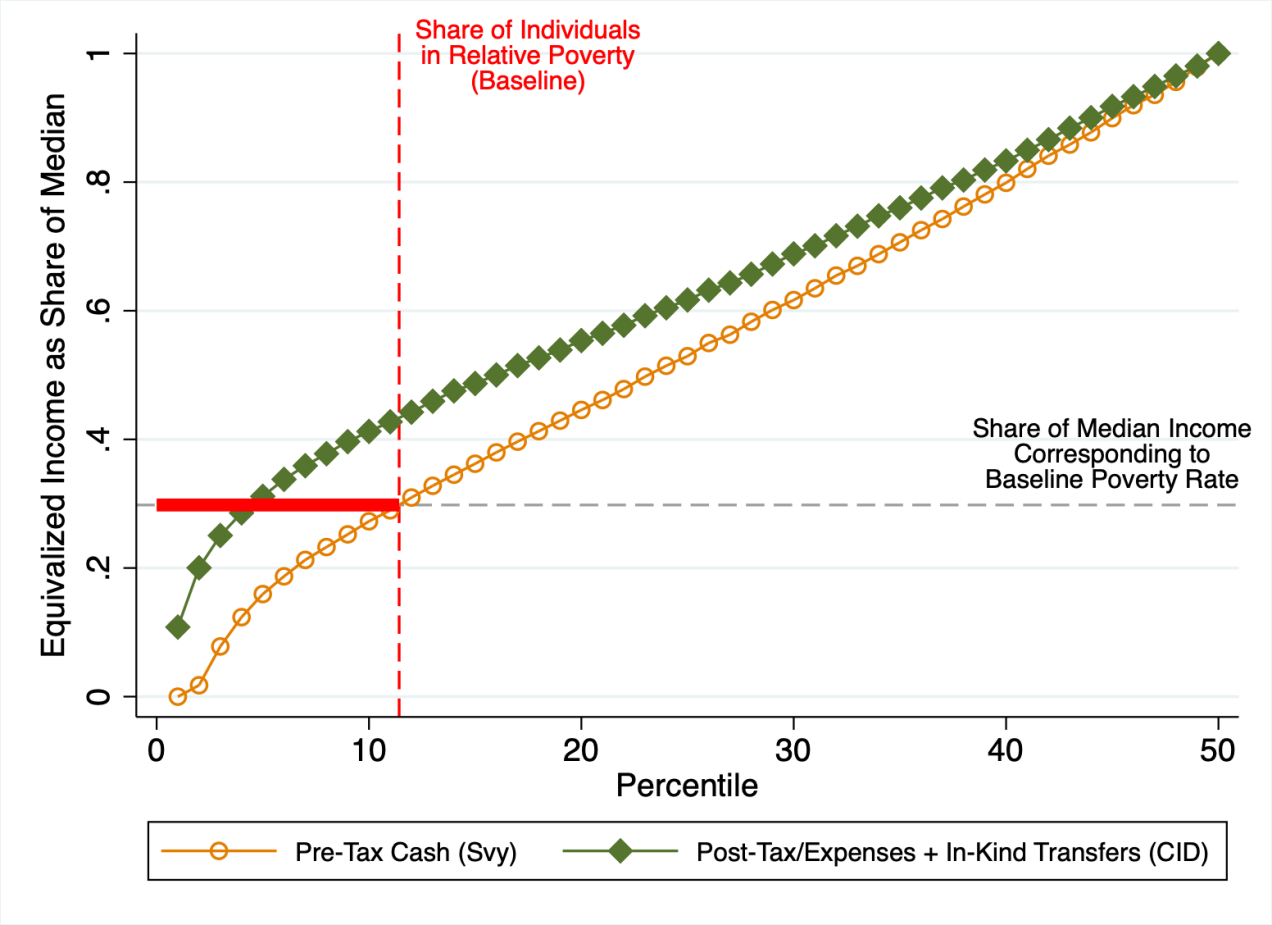
Application 3: Share with Incomes Below Some Fraction of Median



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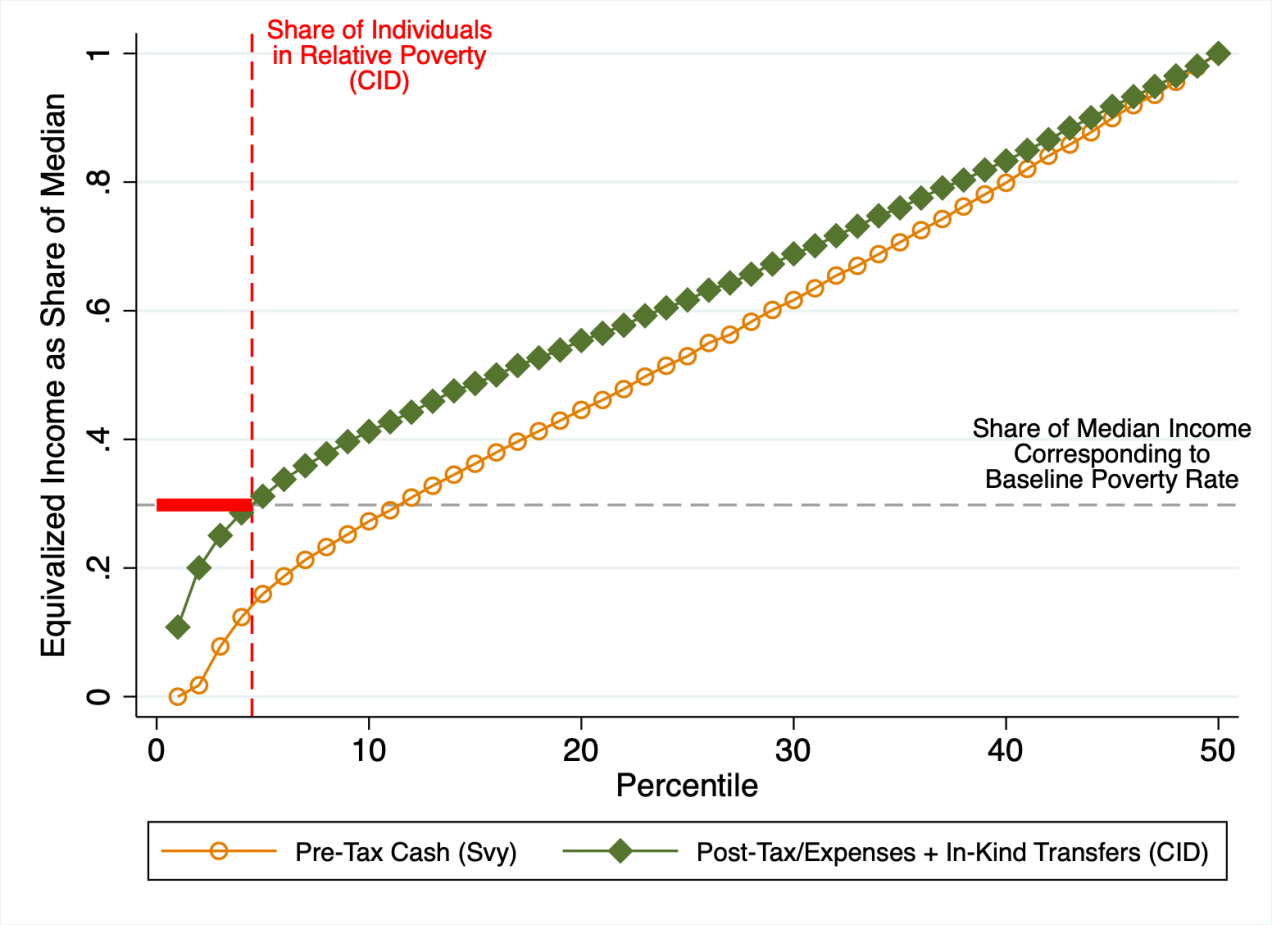

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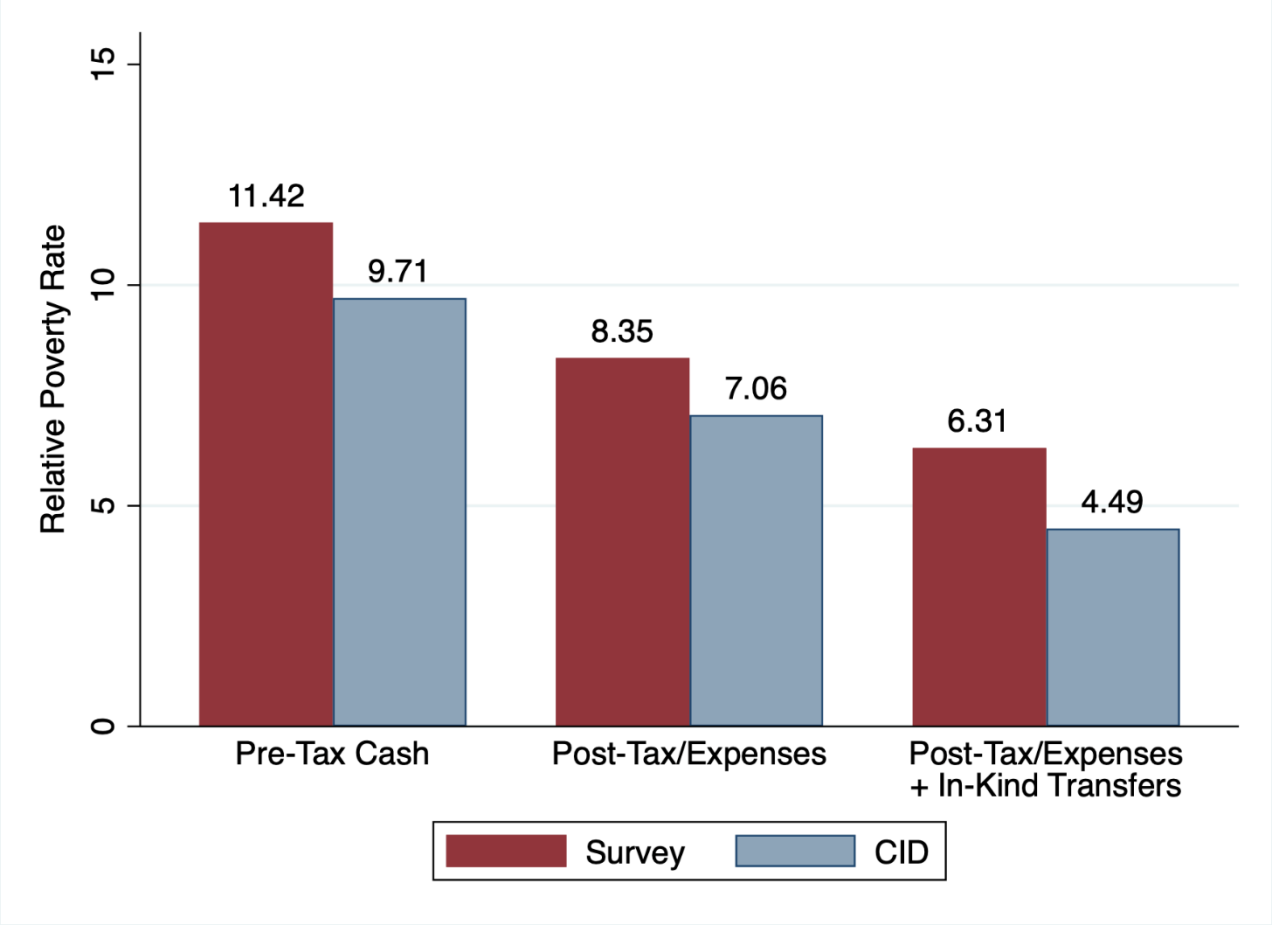
Shares of Individuals in Relative Poverty (by Income Concept)



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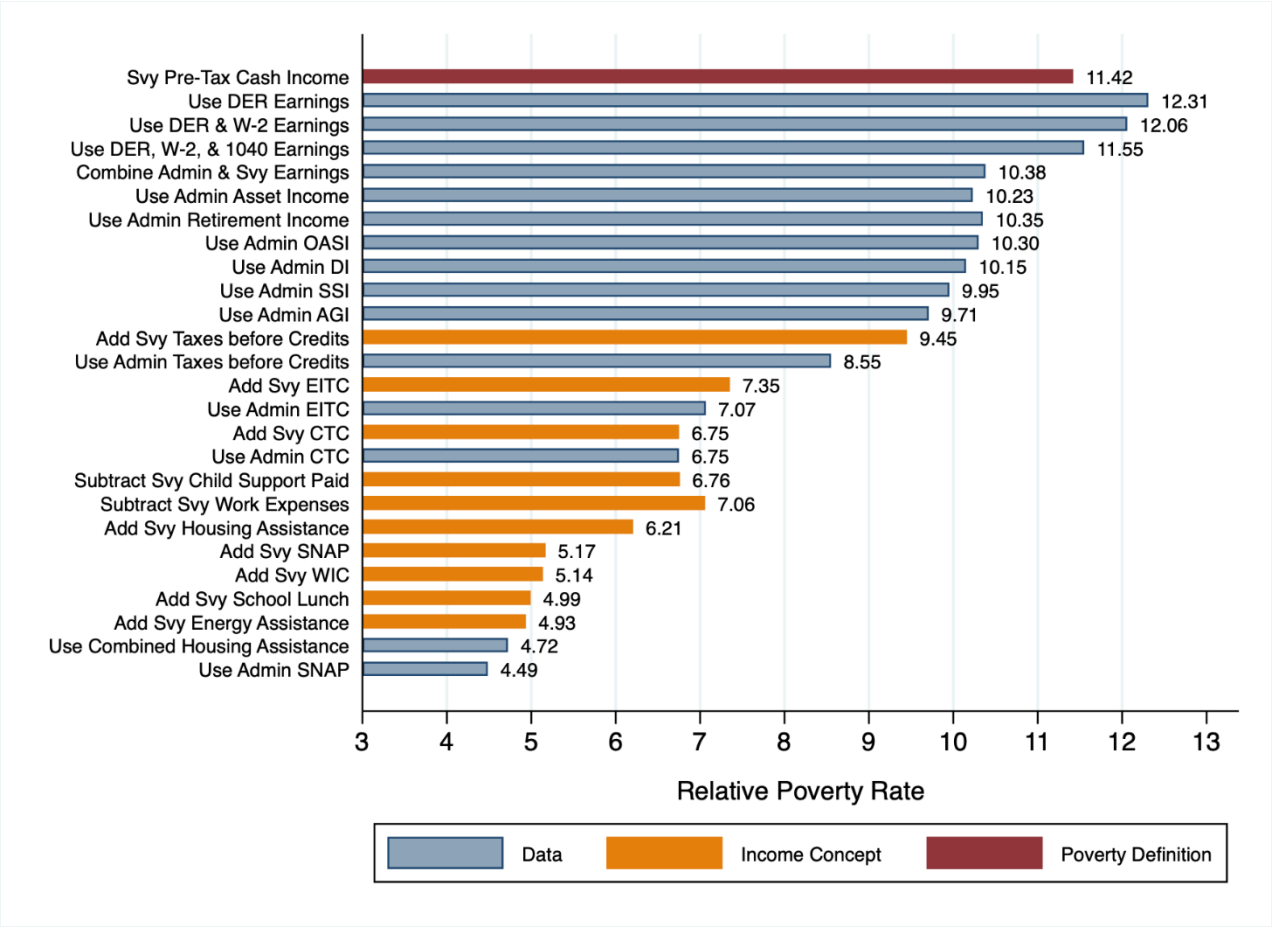
Shares of Individuals in Relative Poverty After Step-by-Step Adjustments



Source: 2017 CPS ASEC linked to various administrative records
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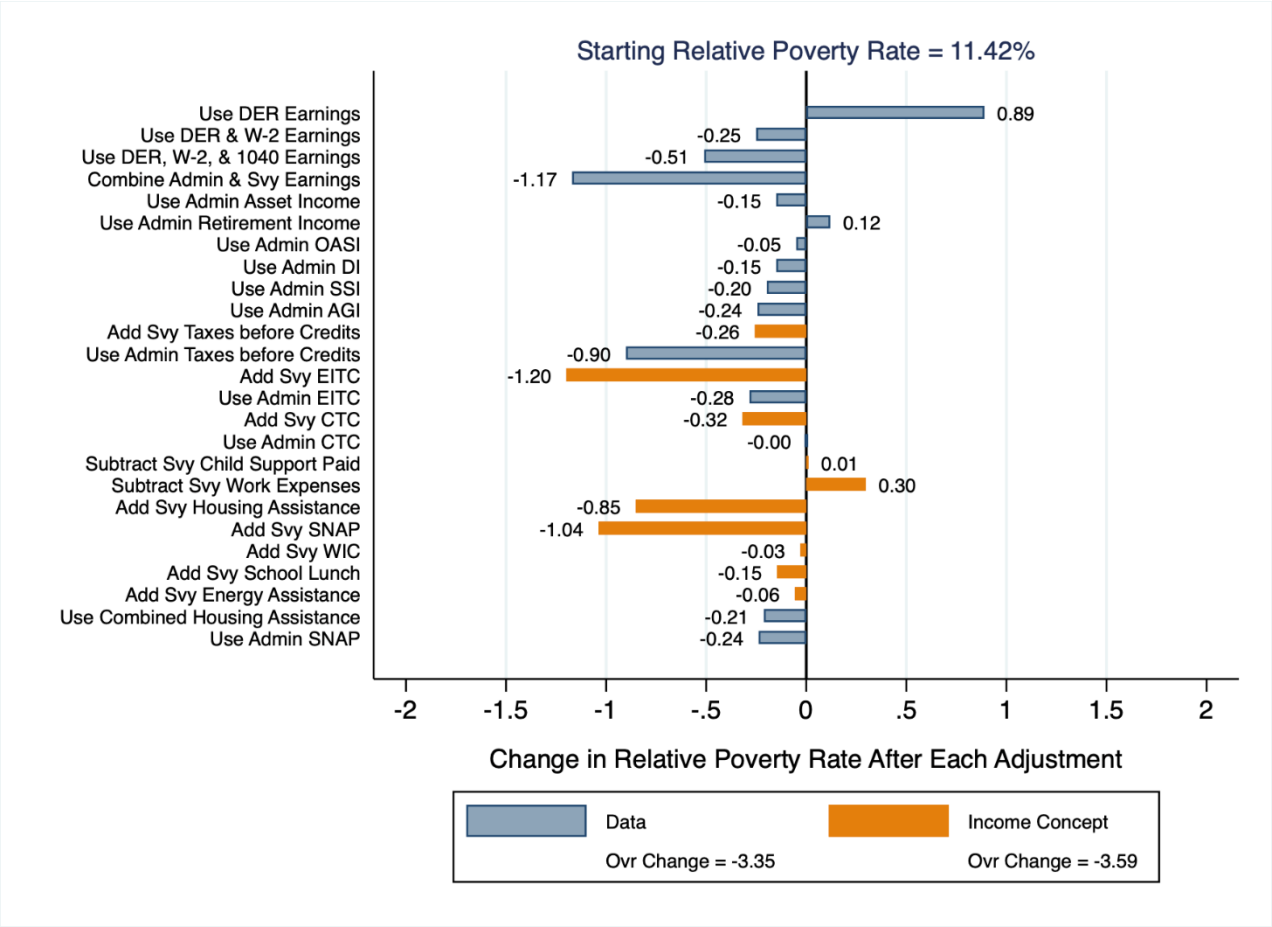
Changes to Relative Poverty Rates After Step-by-Step Adjustments



Source: 2017 CPS ASEC linked to various administrative records
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Application 3: Summary of Key Results

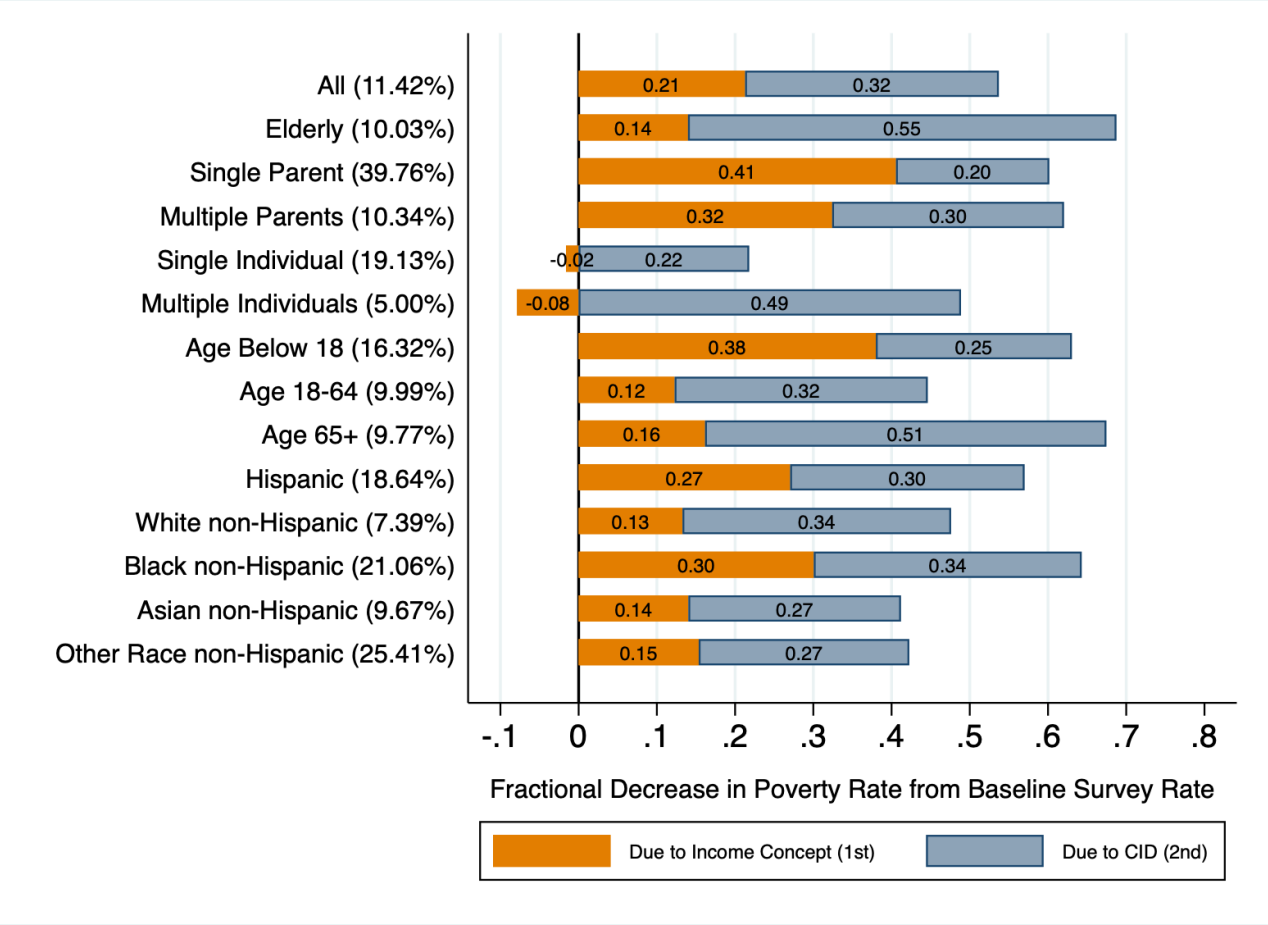
- Relative poverty would fall from 11.42% to 4.49% after using better data and more complete income concept
- Better data plays a smaller, albeit still substantial, role:
  - Bringing in changes to income concept first (giving them max weight), better data account for 26% of decline
  - Using step-by-step adjustments, better data account for 48% of decline

3. Results: Who is Poor? (Demographics)

Roadmap for Section

- Examine how the effects of corrections and adjustments on poverty rates vary across population subgroups
  - Focus on Application 1 (out of the set of prototypical applications)
- For each subgroup, disaggregate overall decrease in poverty into change due to income concept and change due to better data (CID)
  - Main estimates incorporate income concept changes before data changes (will give more weight to income concept changes)
  - For family type subgroups, also show estimates aggregating step-by-step adjustments (which give more weight to data changes)
- Describe characteristics of those remaining in poverty after corrections and adjustments

Fractional Decline in Poverty Rate After Corrections and Adjustments (by Subgroup)



Source: 2017 CPS ASEC linked to various administrative records
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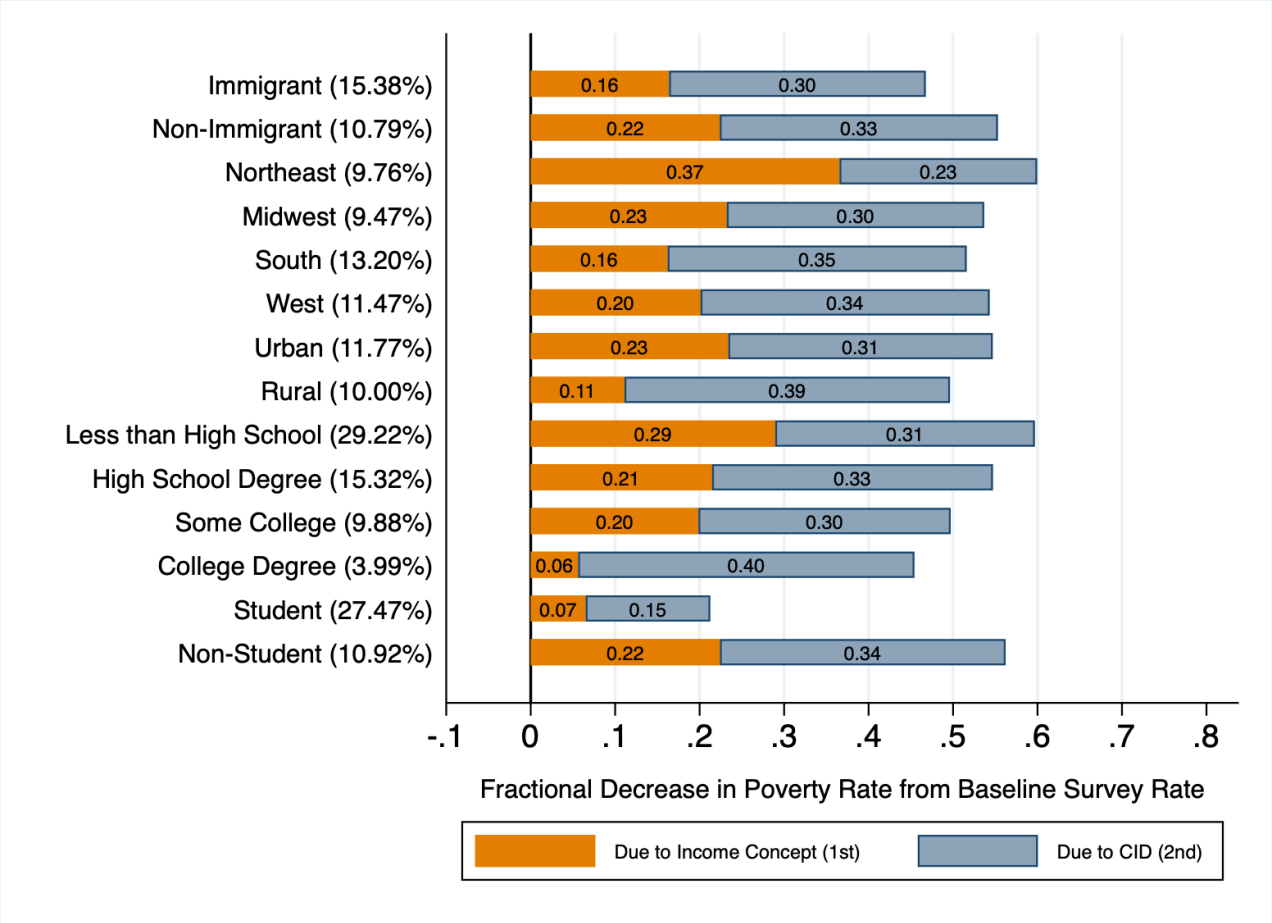
Fractional Decline in Poverty Rate After Corrections and Adjustments (by Subgroup), cont.



Source: 2017 CPS ASEC linked to various administrative records
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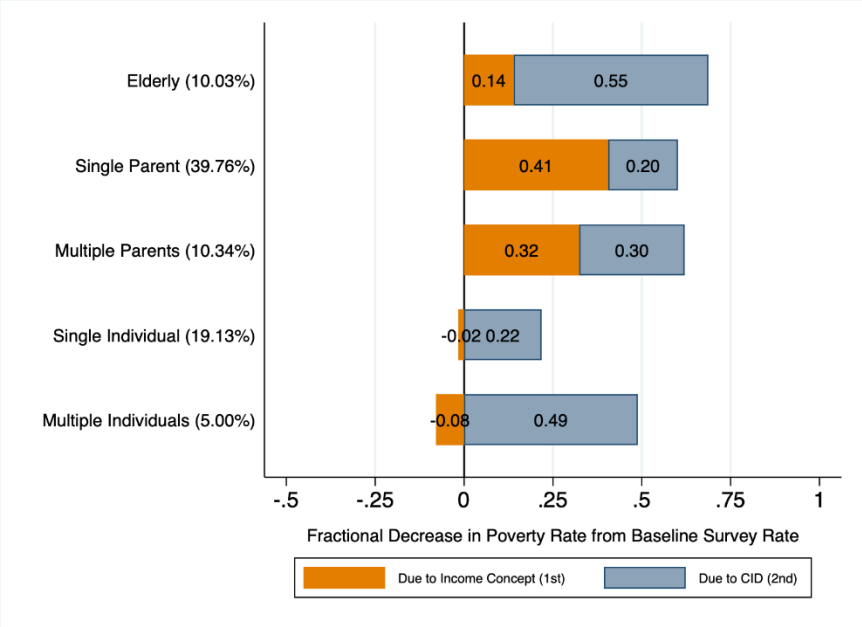
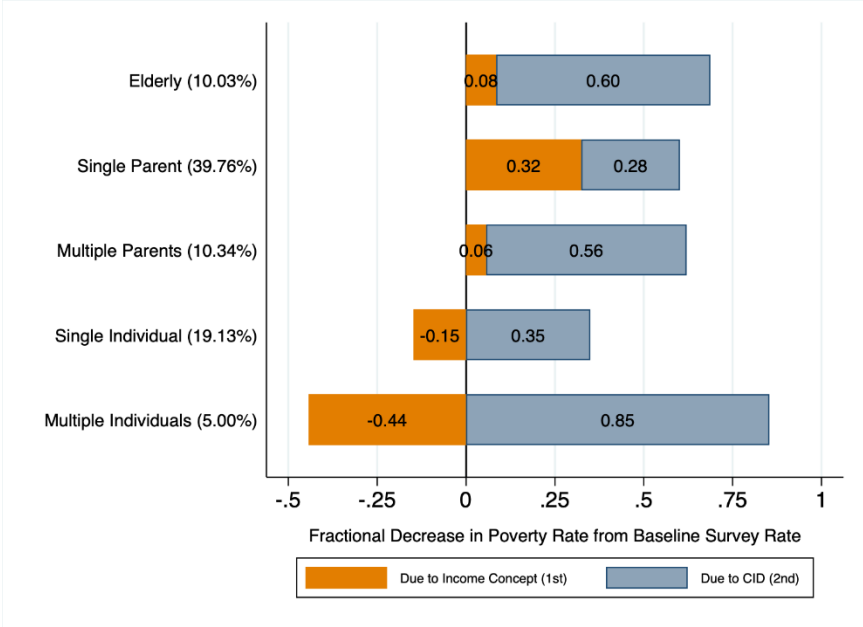
Fractional Decline in Poverty Rate by Family Type: Changing Income Concept First vs. Step-by-Step Adjustments



a) Change Income Concept First



b) Step-by-Step Adjustments

Source: 2017 CPS ASEC linked to various administrative records
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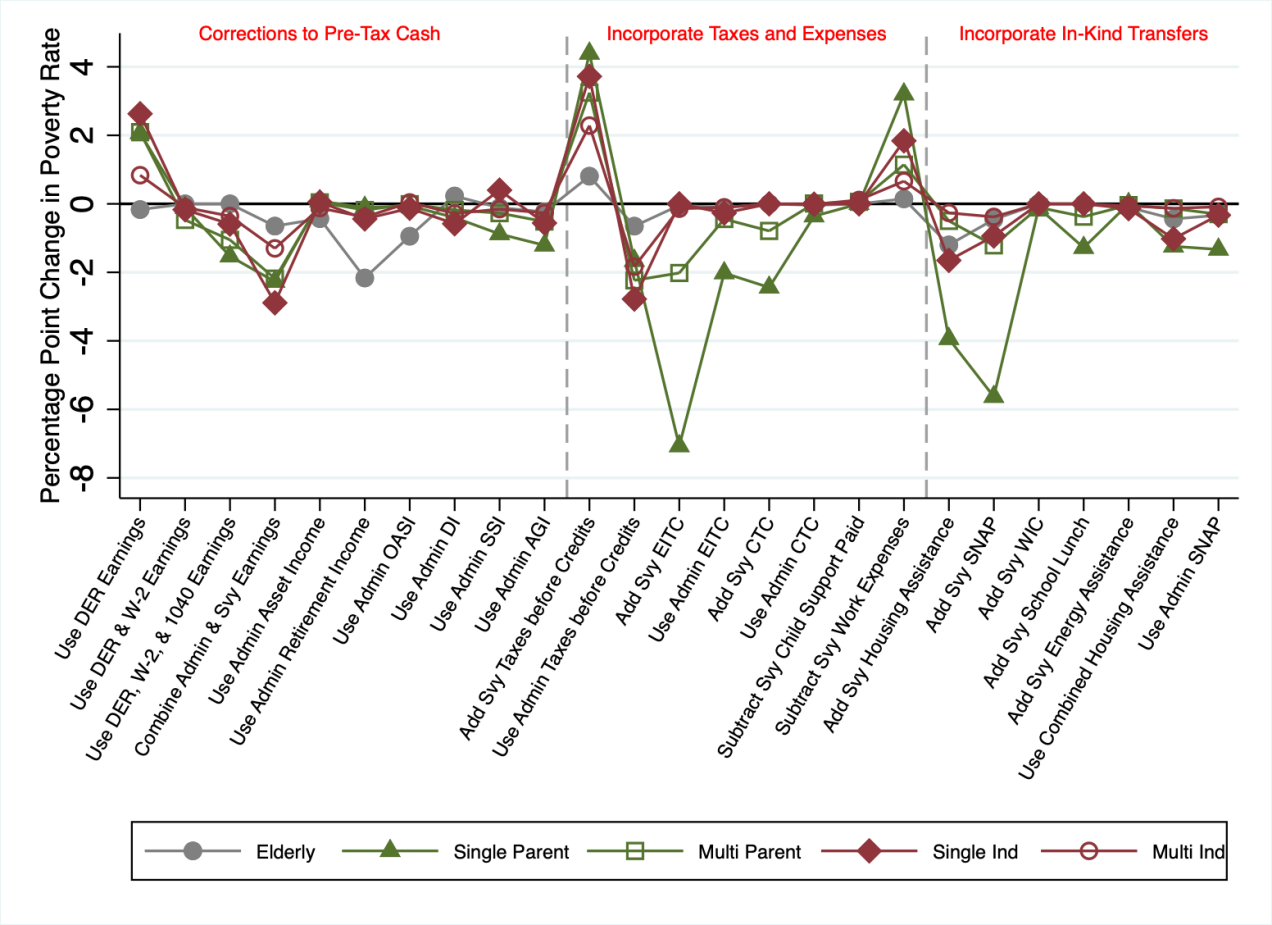
Changes to Poverty Rates After Step-by-Step Adjustments (by Family Type)



Source: 2017 CPS ASEC linked to various administrative records
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Characteristics of Those Remaining in Poverty

Characteristic	Pre-Tax Cash	Post-Tax/Expenses + In-Kind Transfers		
	Survey	Survey	CID	CID (rate fixed)
	(1)	(2)	(3)	(4)
Elderly	0.16	0.17	0.11	0.13
Single Parent	0.20	0.15	0.17	0.16
Multiple Parent	0.38	0.33	0.31	0.38
Single Individuals	0.16	0.21	0.27	0.20
Multiple Individuals	0.11	0.15	0.14	0.14
Hispanic	0.30	0.28	0.28	0.30
White, non-Hispanic	0.40	0.44	0.45	0.46
Black, non-Hispanic	0.23	0.20	0.17	0.17
Asian, non-Hispanic	0.06	0.06	0.07	0.06
Immigrant	0.18	0.20	0.21	0.20
Northeast	0.14	0.11	0.12	0.12
South	0.44	0.47	0.46	0.45
West	0.24	0.25	0.24	0.24
Age <18	0.33	0.26	0.26	0.30
Age 65+	0.13	0.14	0.09	0.11
Rural	0.17	0.20	0.19	0.20
Less than High School	0.28	0.25	0.24	0.26
BA or More	0.12	0.14	0.14	0.12
Student	0.07	0.09	0.12	0.08

Note: Column 4 holds the overall poverty rate fixed at 11.42% using CID income, which is the overall poverty rate corresponding to the measure in Column 1.
Source: 2017 CPS ASEC linked to various administrative records
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Summary of Key Findings

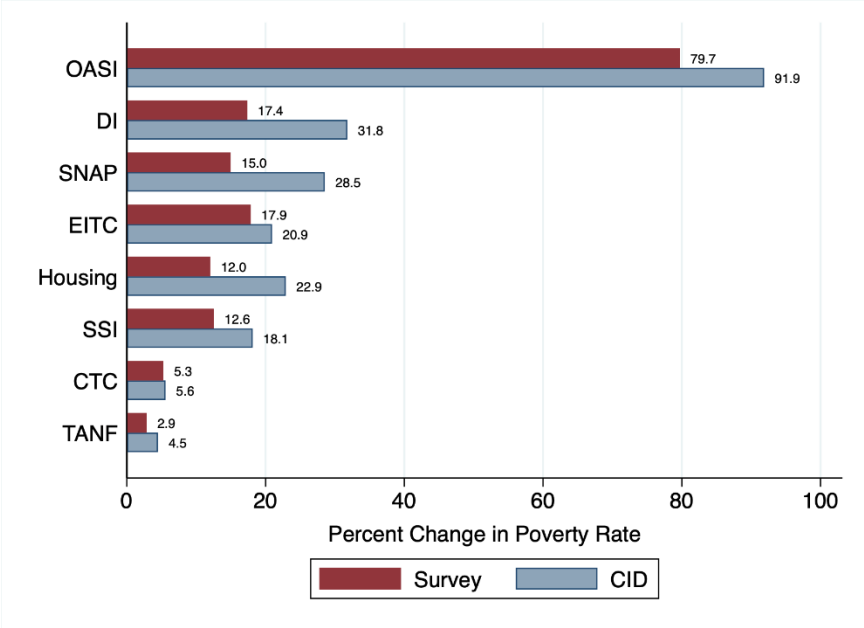
- Relative to baseline using survey pre-tax cash, decline in poverty rate after all adjustments tends to be:
  - Largest for elderly (69%), black non-Hispanic (64%), children (63%), and those with less than a high school degree (60%)
  - Smallest for single individuals (20%) and students (22%)
- Subgroups with larger overall declines tend to benefit more from income concept changes (i.e., taxes and in-kind transfers net of expenses)
  - For most subgroups (with exception of children), role of CID still outweighs role of income concept changes despite latter brought first
- Role of CID even more pronounced after step-by-step adjustments
  - Only group for which CID doesn't explain 90+% of poverty decline is single parents (explains 47% of decline)
  - Certain corrections more important for certain subgroups – e.g., correcting retirement income for elderly, combining survey and admin earnings for single individuals, etc.
- Relative to survey pre-tax cash baseline, those remaining in poverty after corrections and adjustments have higher shares of having no children, white non-Hispanic, rural, etc.
  - Patterns largely persist even holding overall poverty rate fixed at 11.42%

4. Results: Poverty Reduction of Government Programs

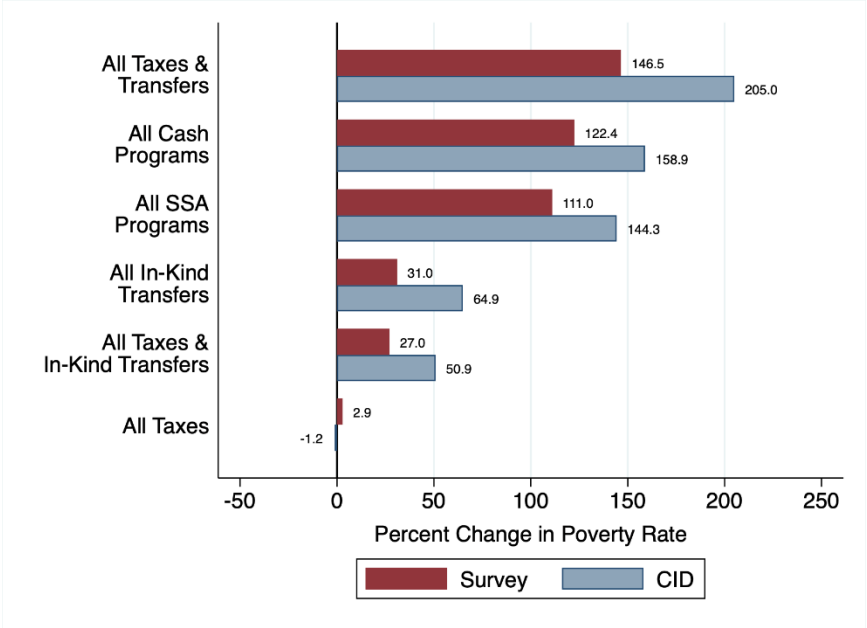
Roadmap for Section

- In final set of analyses, we calculate how much poverty rates would increase (from post-tax/in-kind transfer baseline) if a program or set of programs were eliminated
- We do calculations in two ways:
  - Using survey data only: Estimate percent change in poverty rate using survey reports of program receipt and survey-reported baseline income
  - Using CID: Estimate percent change in poverty rate using admin data on program receipt and CID baseline income
- For nearly all programs and sets of programs, effects are calculated using the 23 states for which we have admin SNAP data in 2016
  - Baseline poverty rate is 8.16% using survey and 4.71% using CID
- For TANF, effects are calculated using the 18 states for which we have both admin SNAP and TANF data in 2016

Percent Increase in Poverty Rate in Absence of Government Programs

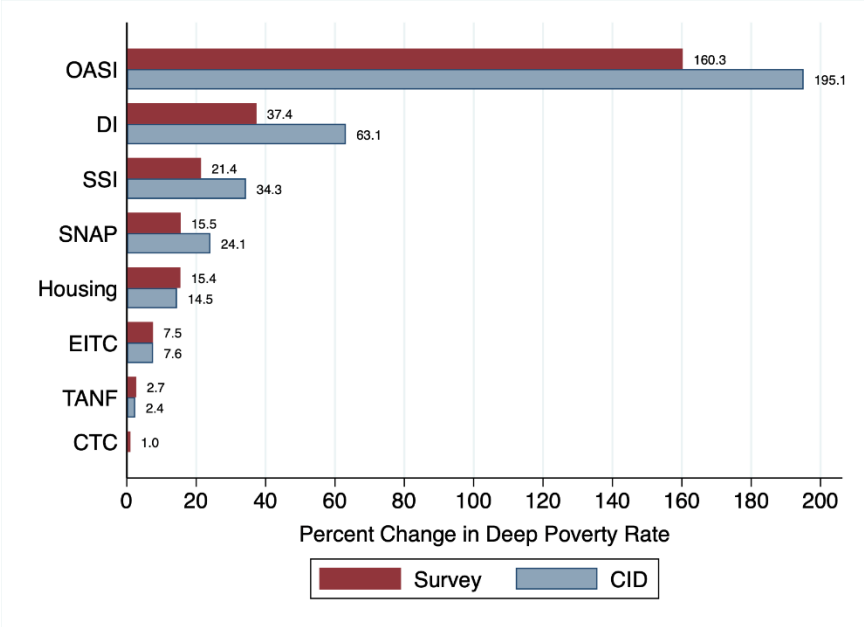


a) Individual Programs

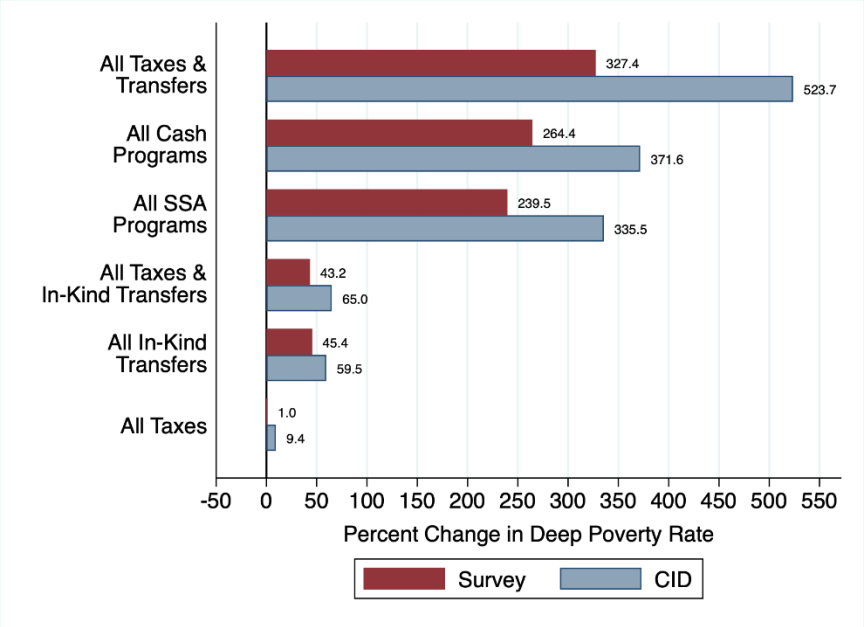


b) Combinations of Programs

Percent Increase in Deep Poverty Rate in Absence of Government Programs

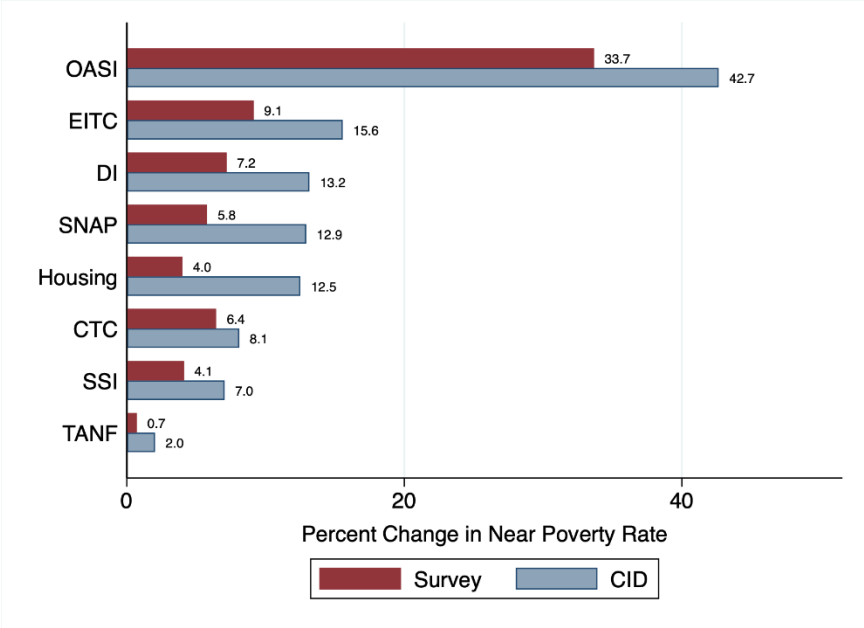


a) Individual Programs

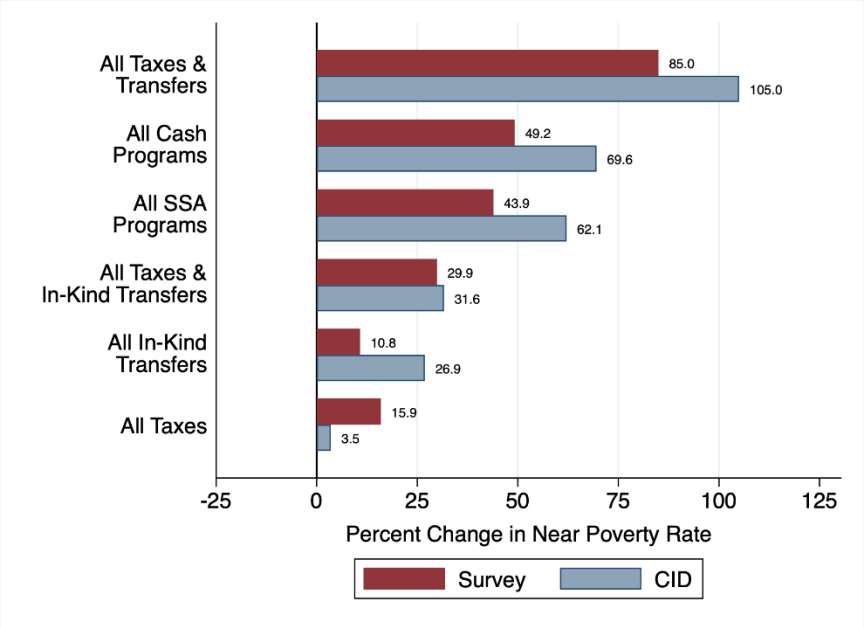


b) Combinations of Programs

Percent Increase in Near Poverty Rate in Absence of Government Programs



a) Individual Programs



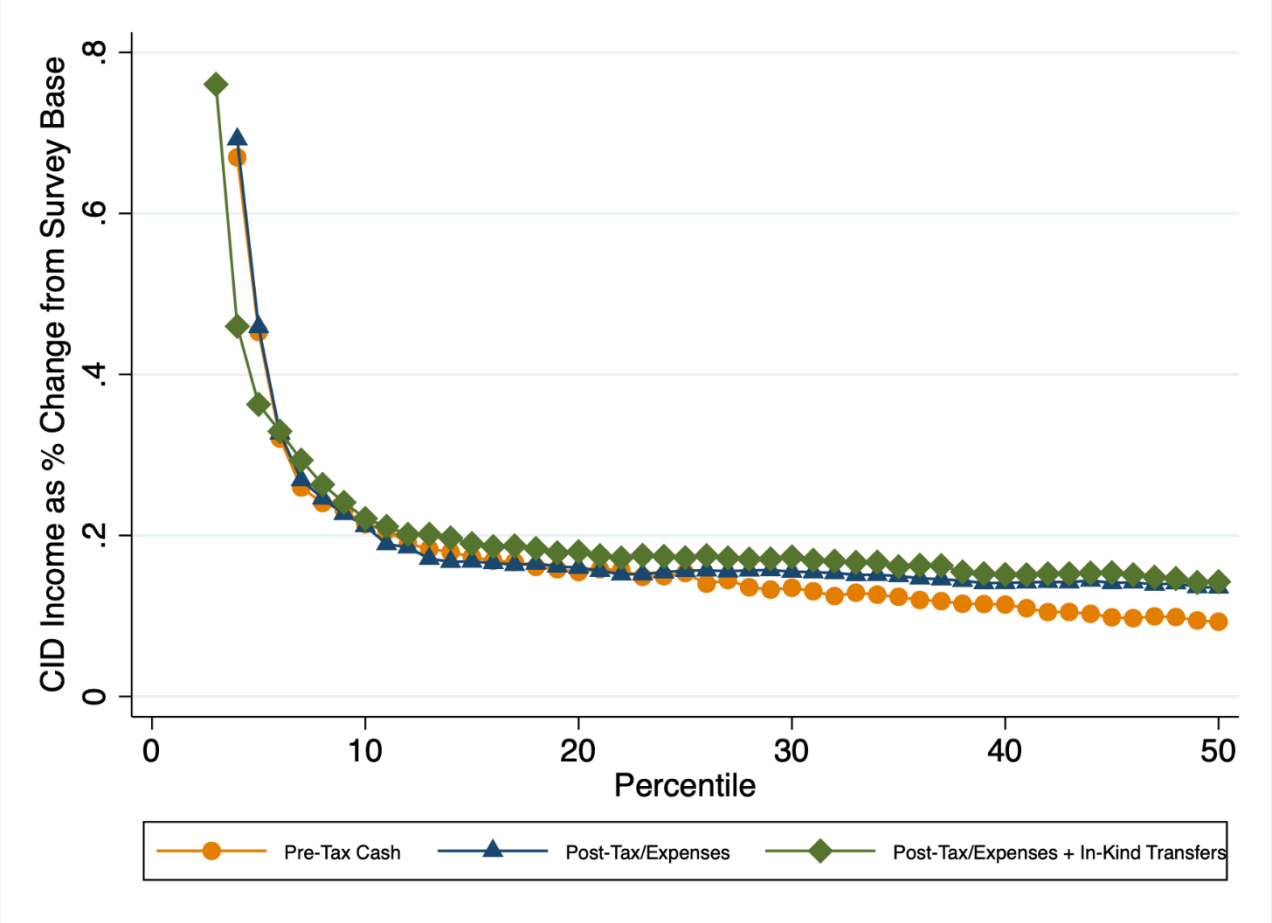
b) Combinations of Programs

Summary of Key Findings

- For all programs and sets of programs, poverty reduction effects using CID are always larger than those using survey only
  - Eliminating all taxes and transfers would increase poverty by 205% using CID vs 147% using survey only (a 40% increase)
  - Differences are dramatic for certain programs; poverty reduction effects using CID are each 80-90% larger for DI, SNAP, and housing assistance than those using survey only
- Focusing on half the poverty line, eliminating all taxes and transfers would increase deep poverty by 524% using CID and 327% using survey only (a 60% increase)
  - SSI tends to be more important for deep poverty than other thresholds
- Focusing on 1.5x poverty line, eliminating all taxes and transfers would increase near poverty by 105% using CID and 85% using survey only (a 25% increase)
  - Differences between survey and CID effects are especially notable for a few programs
  - Near poverty reduction effects using CID are more than twice as large for SNAP, housing assistance, and TANF, and 70-80% larger for EITC, DI, and SSI

Appendix Slides

Change in Income Distribution After Using CID (Relative to Survey Only)



Source: 2017 CPS ASEC linked to various administrative records
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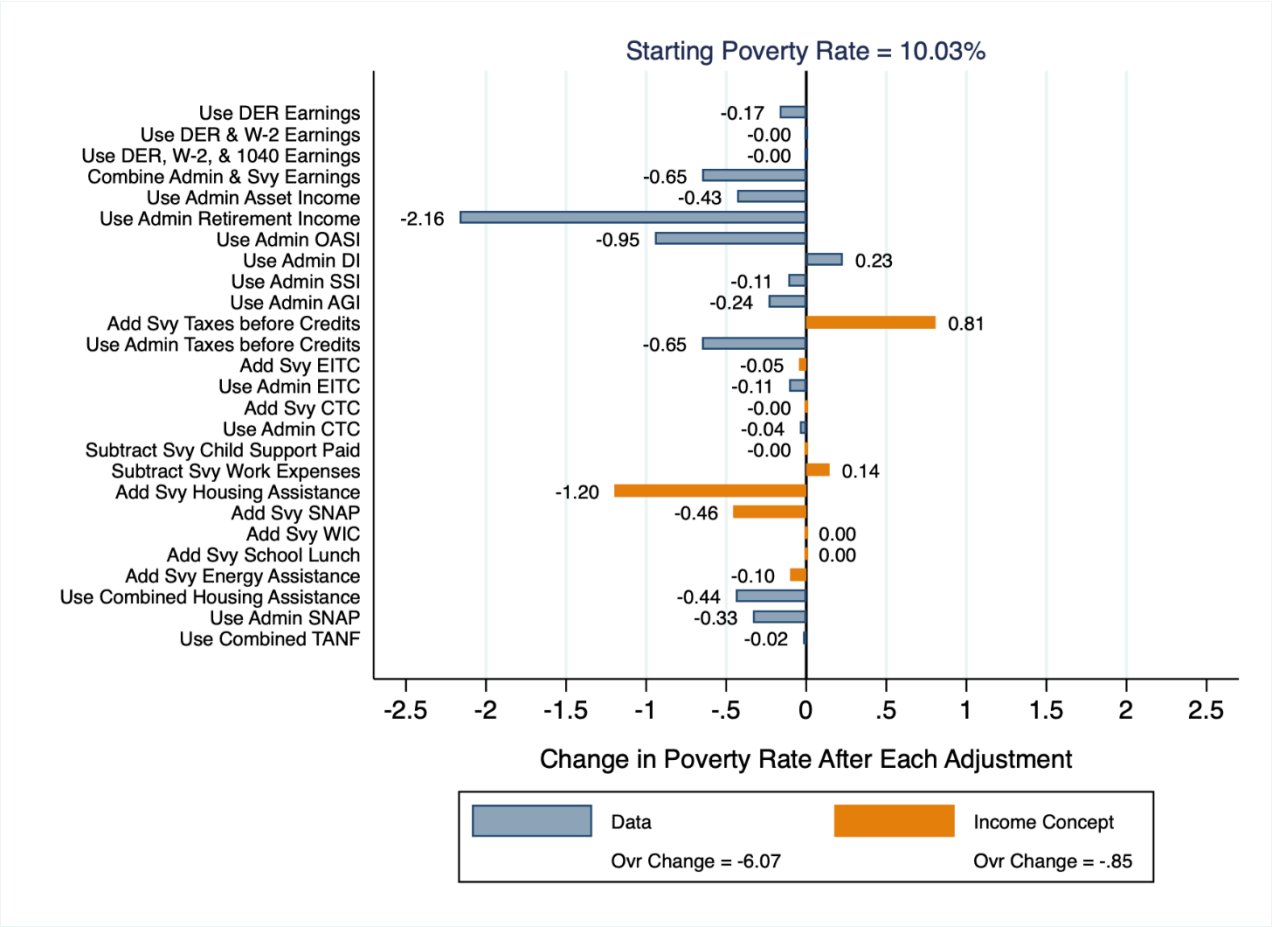
Changes to Elderly Poverty Rates After Step-by-Step Adjustments



Source: 2017 CPS ASEC linked to various administrative records
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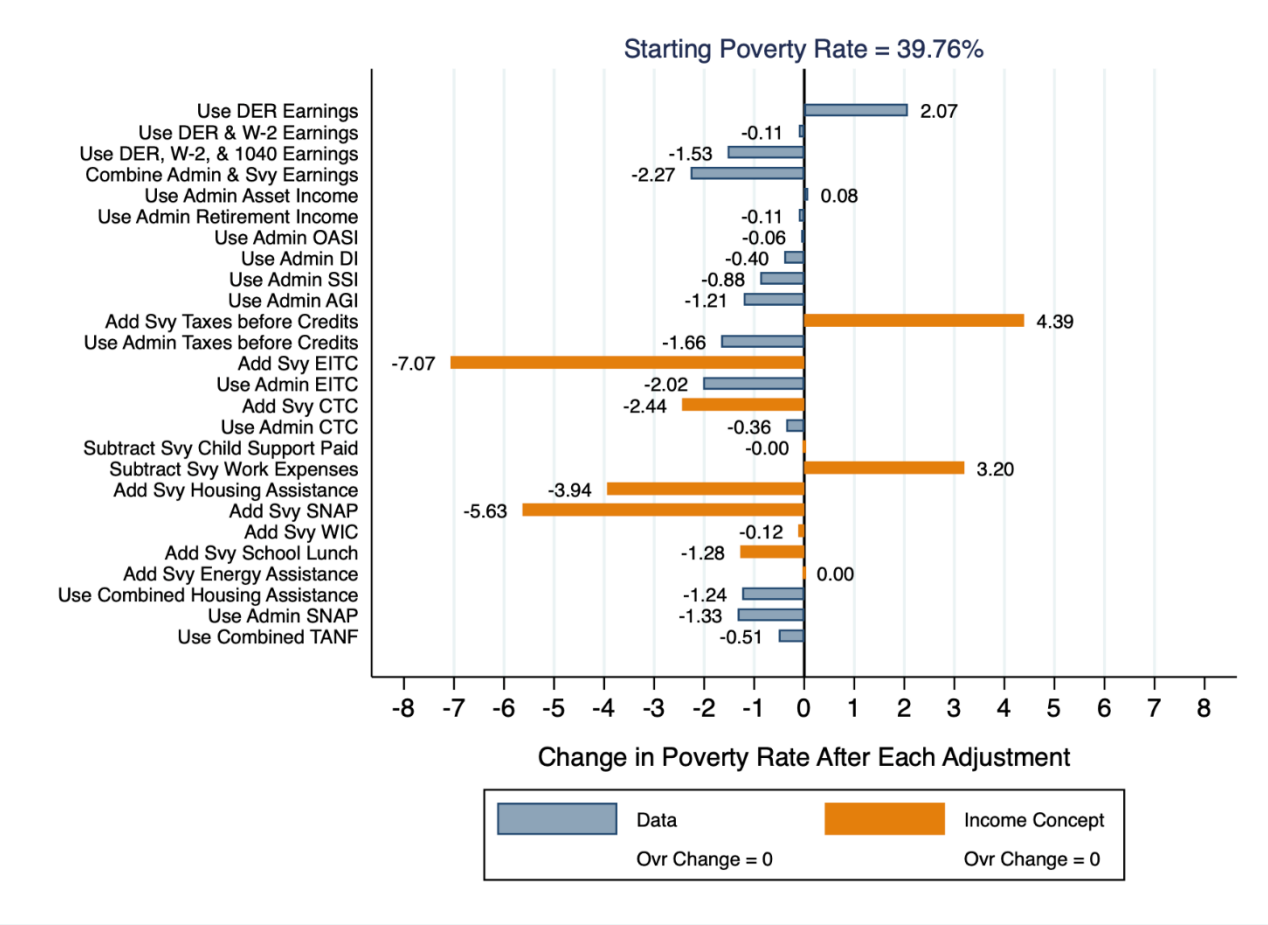
Changes to Single Parent Poverty Rates After Step-by-Step Adjustments



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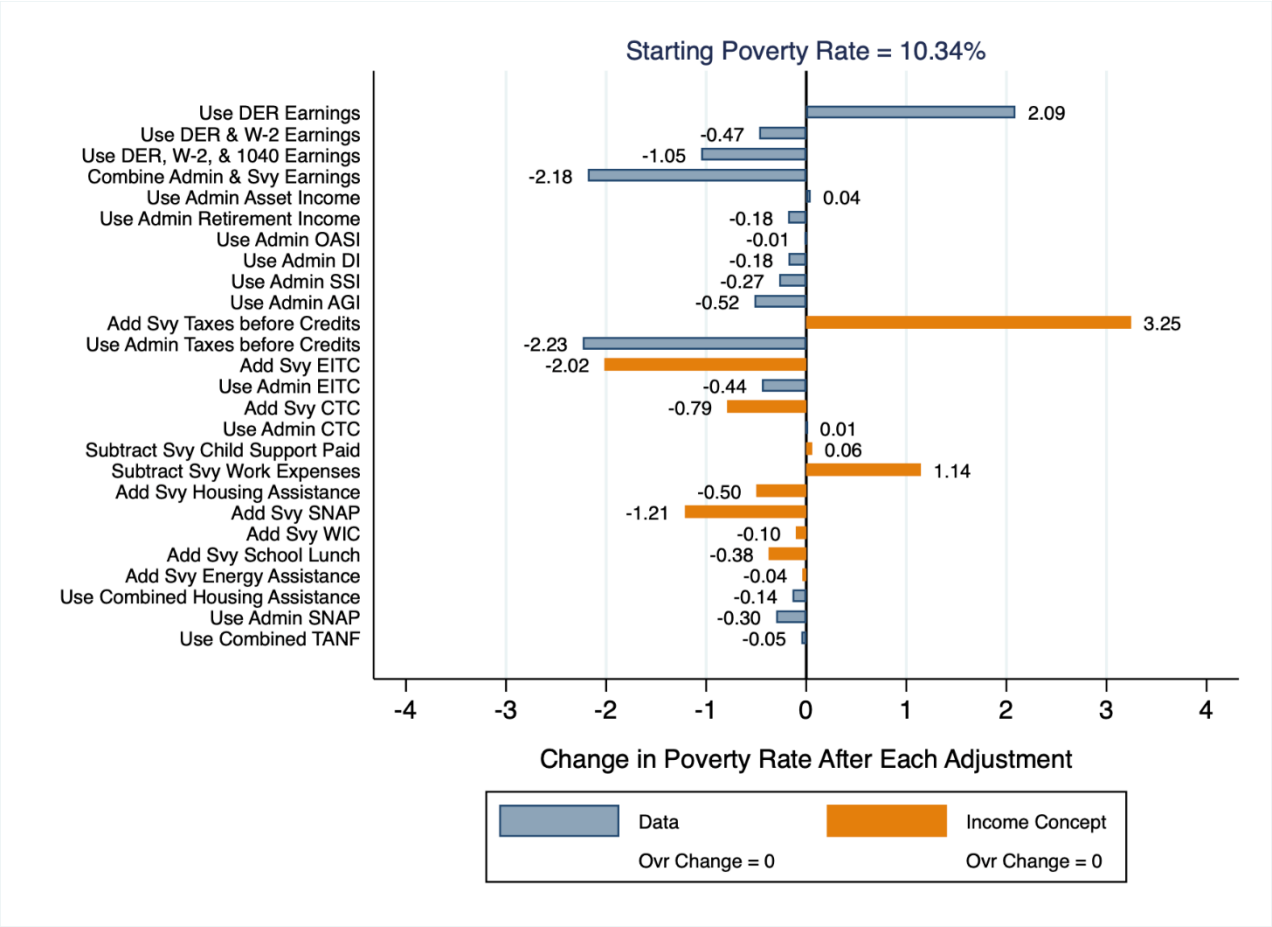
Changes to Multiple Parent Poverty Rates After Step-by-Step Adjustments



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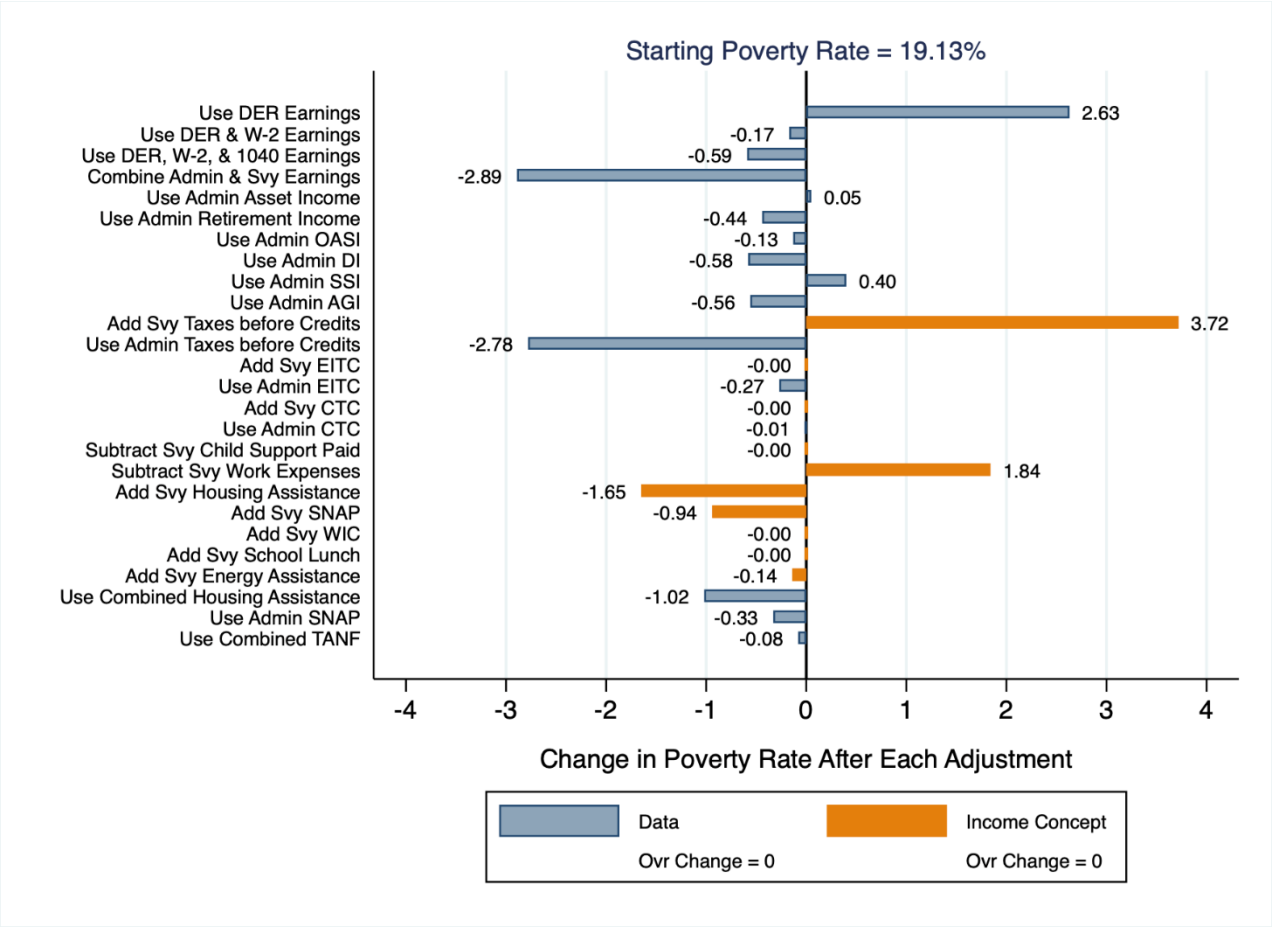
Changes to Single Individual Poverty Rates After Step-by-Step Adjustments



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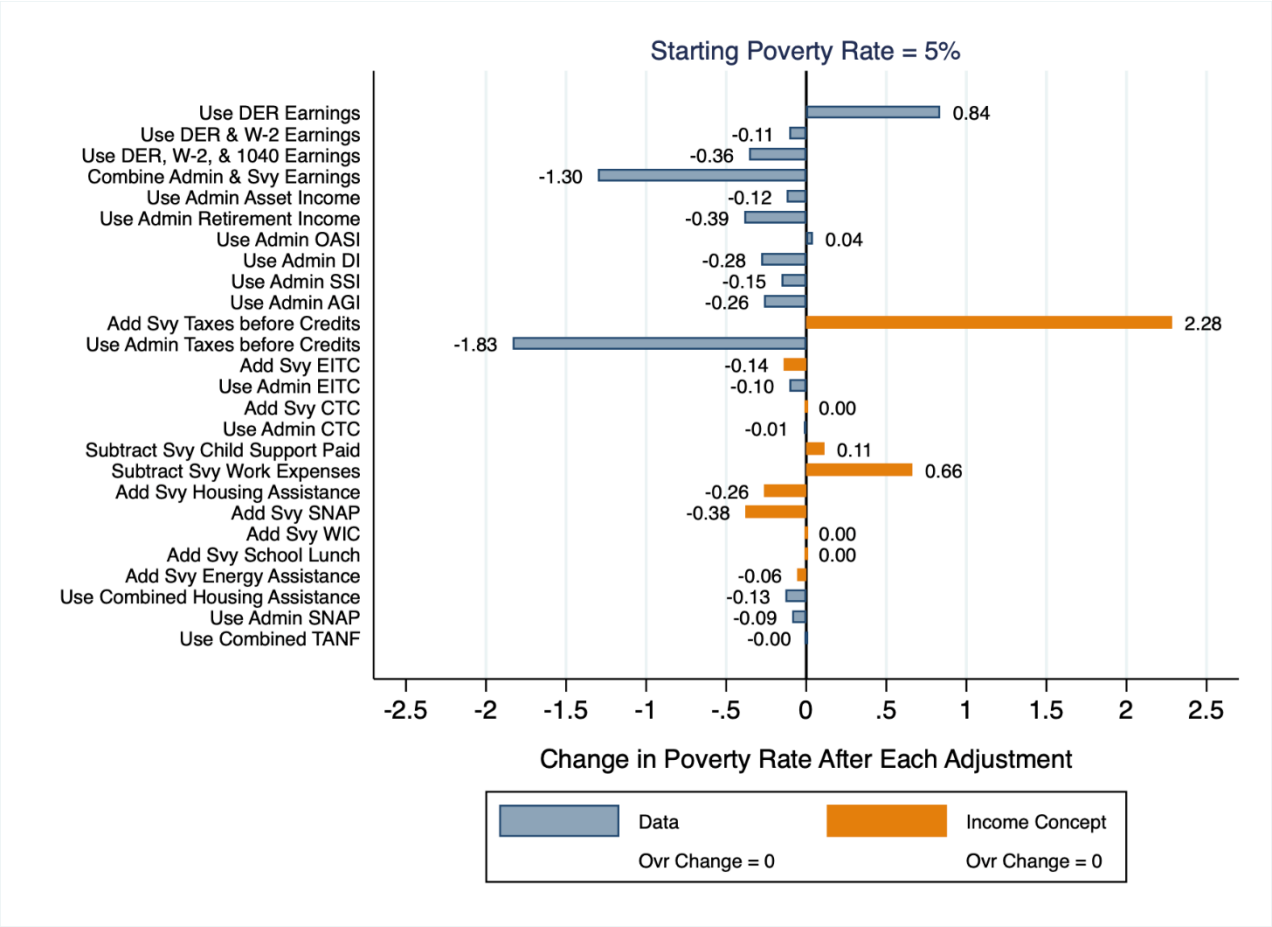
Changes to Multiple Individual Poverty Rates After Step-by-Step Adjustments



Source: 2017 CPS ASEC linked to various administrative records
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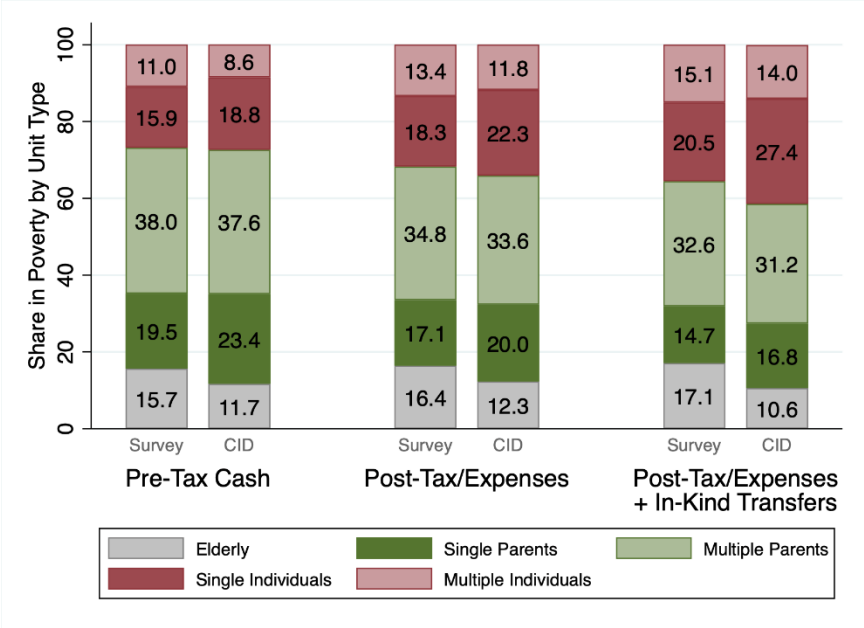
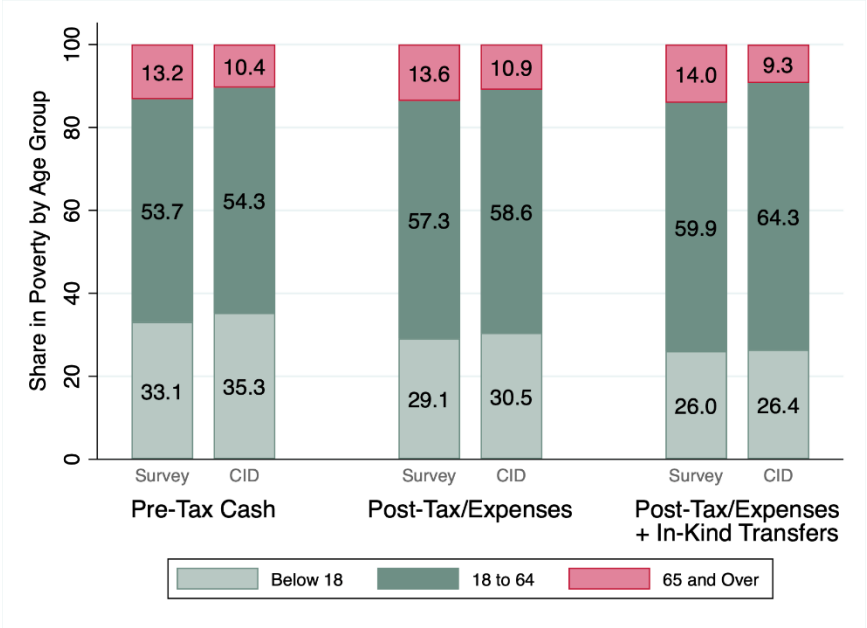
Distribution of Poor by Family Type or Age



a) By Family Type



b) By Age

Source: 2017 CPS ASEC linked to various administrative records
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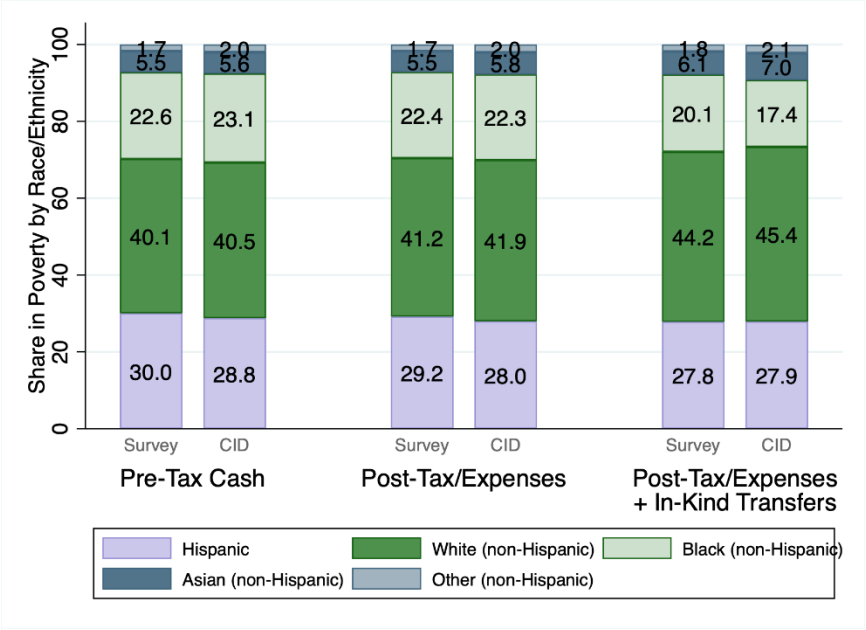
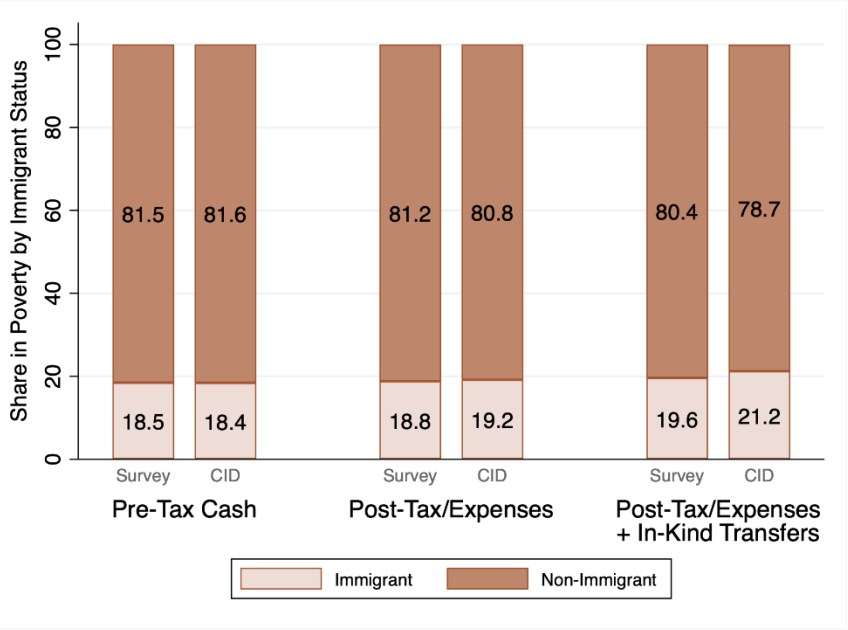
Distribution of Poor by Race/Ethnicity or Immigrant Status



a) By Race/Ethnicity



b) By Immigrant Status

Source: 2017 CPS ASEC linked to various administrative records
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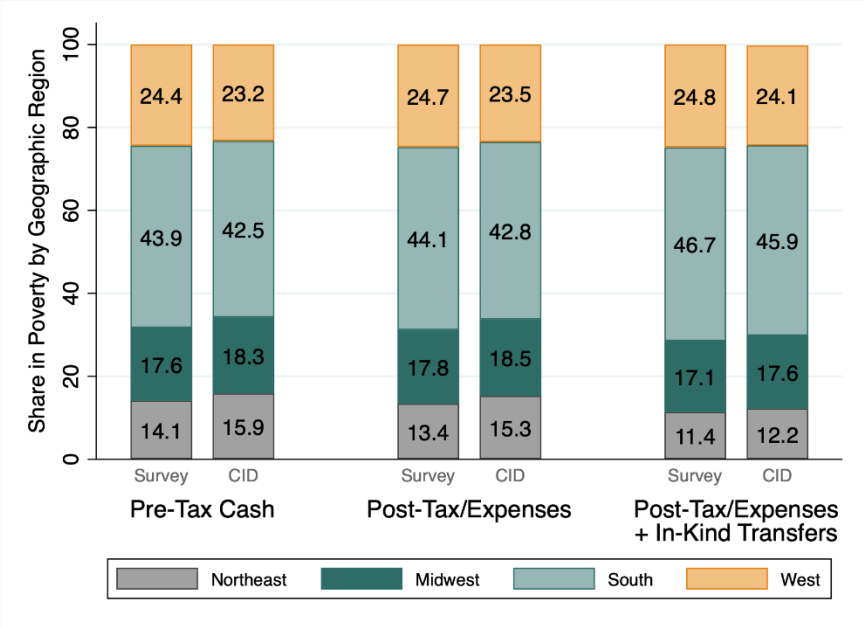
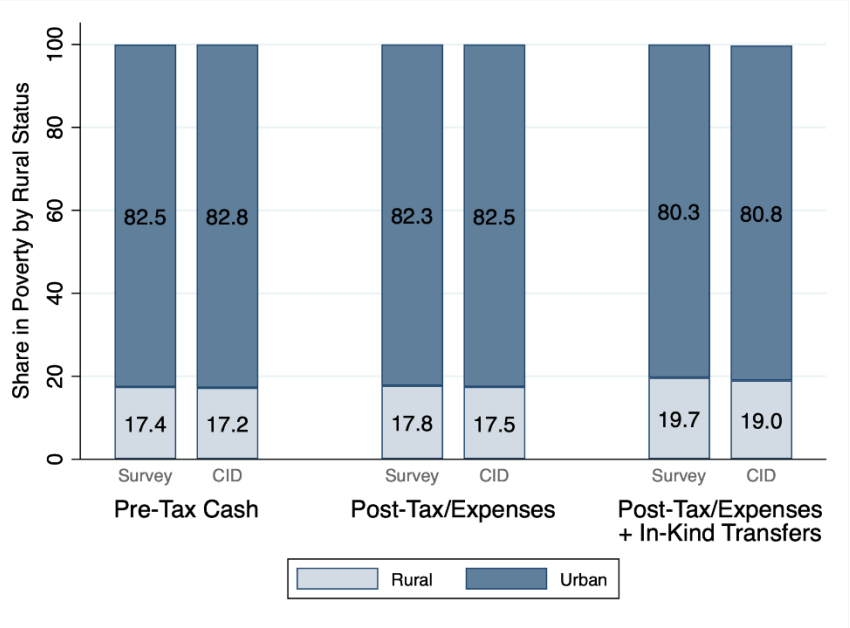
Distribution of Poor by Geographic Region or Urban/Rural Status



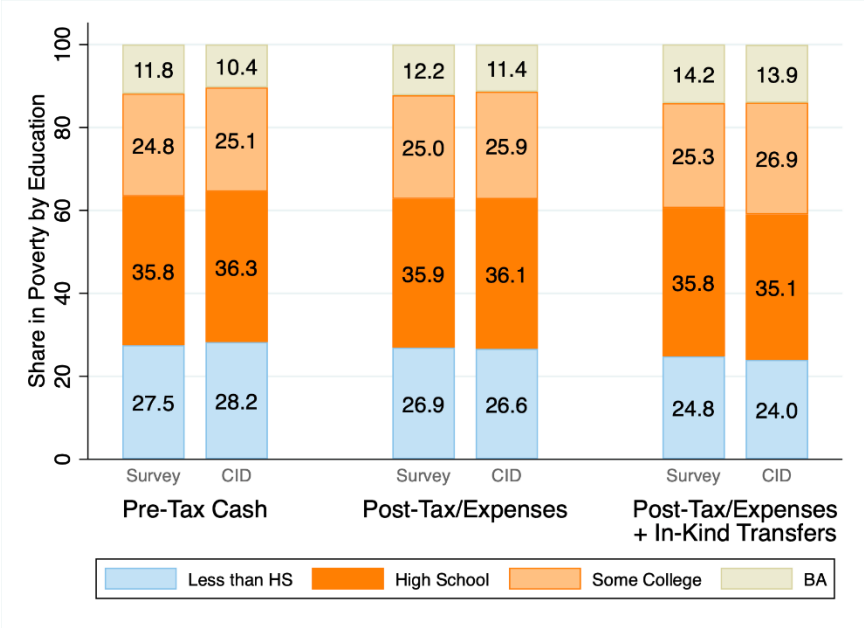
a) By Geographic Region



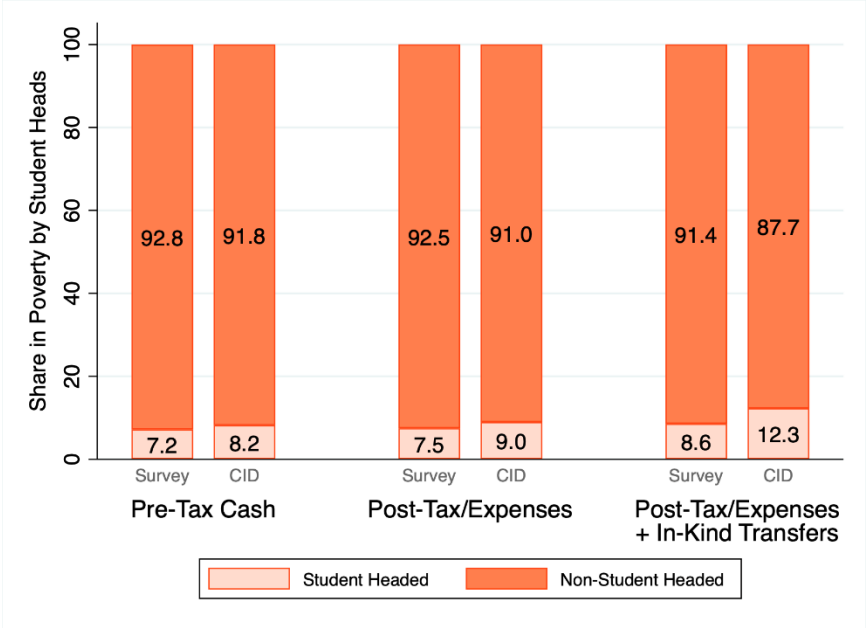
b) By Urban/Rural Status

Source: 2017 CPS ASEC linked to various administrative records
Approved for release by the Census Bureau's Disclosure Review Board, authorization number CBDRB-FY2022-CES005-016

Distribution of Poor by Highest Education or Current Student Status



a) By Highest Education of Head



b) By Current Student Status

Source: 2017 CPS ASEC linked to various administrative records
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