Measuring Economic Security Using Linked Consumer Expenditure and Administrative Data

Aaron Hong, Bruce D. Meyer, Connor Murphy (University of Chicago),
James X. Sullivan (University of Notre Dame),
and Derek Wu (University of Virginia)

Social Security Administration Retirement and Disability Research Consortium Meeting

August 4, 2023

Disclaimer: Any conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results were approved for release by the Census Bureau's Disclosure Review Board, authorization numbers CBDRB-FY23-0184 and CBDRB-FY2023-CES005-016

Motivation

- Obtaining an accurate picture of the economic security of the elderly is a critical issue for both researchers and policymakers
- Much of the past work on economic security relies on survey income sources which are prone to income underreporting
  - About half of private pension recipients and those receiving SNAP do not report it in surveys and a substantial share of SSI recipients do not report
- Recent studies that link administrative data to major Census Surveys have found that incomes of the elderly are often much higher than reported in the survey data alone, while the impact of SSA programs is often different as well
- Another approach to improving income measurement through linkage is to examine consumption as it may be a better indicator of economic well-being than income.

Our Contributions

- We provide the most accurate examination to date of post-tax and in-kind transfer income of the elderly using the Comprehensive Income Dataset (CID).
  - Link the Consumer Expenditure (CE) survey to administrative tax records and program data
- First to examine the role of key income sources in reducing consumption poverty for the elderly
  - Using administrative data on earnings and program receipt provides a more accurate picture on the impact of these income categories on consumption.

Outline

1. Overview of data
2. Summary of how we combine survey and administrative data to construct resource measures
3. Evaluating a blended income measure by comparing weighted totals of select income categories to publicly available aggregate data
4. Comparing income and expenditure distributions
5. The difference in poverty across key resource measures and elderly demographic subgroups
6. Examine the effect of key income sources on income and consumption poverty rates

Data: The CE Survey, Samples, Admin Data, and Linkage

The Consumer Expenditure (CE) Survey and our sample

- Use the Interview component of the Consumer Expenditure (CE) Survey
  - The reference period is the 12 months prior to the interview month for income and the 3 months prior to the interview month for expenditures
  - We use surveys conducted in January thru April 2015 to 2017
  - These are survey months for which the reference period for income closely aligns with the previous calendar year
- Link administrative records using Protected Identification Keys (PIKs)
  - Our CE sample consists of individuals in Consumer Units (CUs) that have at least one member linked to a PIK, an unambiguous state indicator, and are interviewed in the first and fourth interview wave (because those are the interviews when income is reported)
  - Re-weight to account for our sample choice
- For our analysis of the impact of SNAP on poverty, we restrict the sample to those for whom we have administrative SNAP data

Administrative Data Sources

Income Source	Administrative Source	Income Unit	Income Frequency	States Covered
Earnings	W-2 (IRS), Form 1040 (IRS)	Individual & Tax Unit	Annual	All
AGI & Other Cash	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
Veterans' Benefits	US VETS Data	Individual	Annual	All
Taxes (simulated)	Form 1040 (IRS)	Tax Unit	Annual	All
SNAP	State Agencies	Household	Monthly	20+ States
Housing Assistance	PIC & TRACS (HUD)	Household	Monthly	All

Constructing Resource Measures by Combining Survey & Administrative Data

Income Concept

- Our income concept of interest is post-tax, post-transfer income. Components include:
  - Pre-tax money income (e.g., earnings, asset income, retirement income, taxable transfers like OASDI and UI, non-taxable transfers like SSI and TANF, other cash income)
  - Tax liabilities and credits
  - Select in-kind transfers (specifically housing assistance and SNAP)
- We aim to create a survey-only version (relying on survey responses only) and blended version (combining survey and administrative data) of this income concept

Blending Pre-Tax Money Income

- Vast majority of CUs file tax returns. For these CUs, we use AGI reported on Form 1040 as a starting point
- But, admin AGI is net of deductions and may miss some jobs and informal income sources
  - Therefore, we continue to use survey analog of AGI when it is higher and reflects income plausibly missed in admin records
- We cannot perfectly align survey income components with admin AGI concept so we modify admin AGI to create AGI* to match better
- We continue to use survey AGI* when higher only if survey earnings are non-imputed and at least one of the following holds:
  - Administrative Data (W2s or 1040s) missing entire CU; CU member primarily self-employed or works in a "high-tip" industry

Blending Pre-Tax Money Income (cont.)

- For non-filers in CUs, we don't have 1040 AGI so begin with survey post-tax, post-transfer income as our baseline and substitute admin data whenever possible to create blended income
- We also account for additional cash income sources that aren't accounted for in AGI*

Incorporating Taxes and In-Kind Transfers

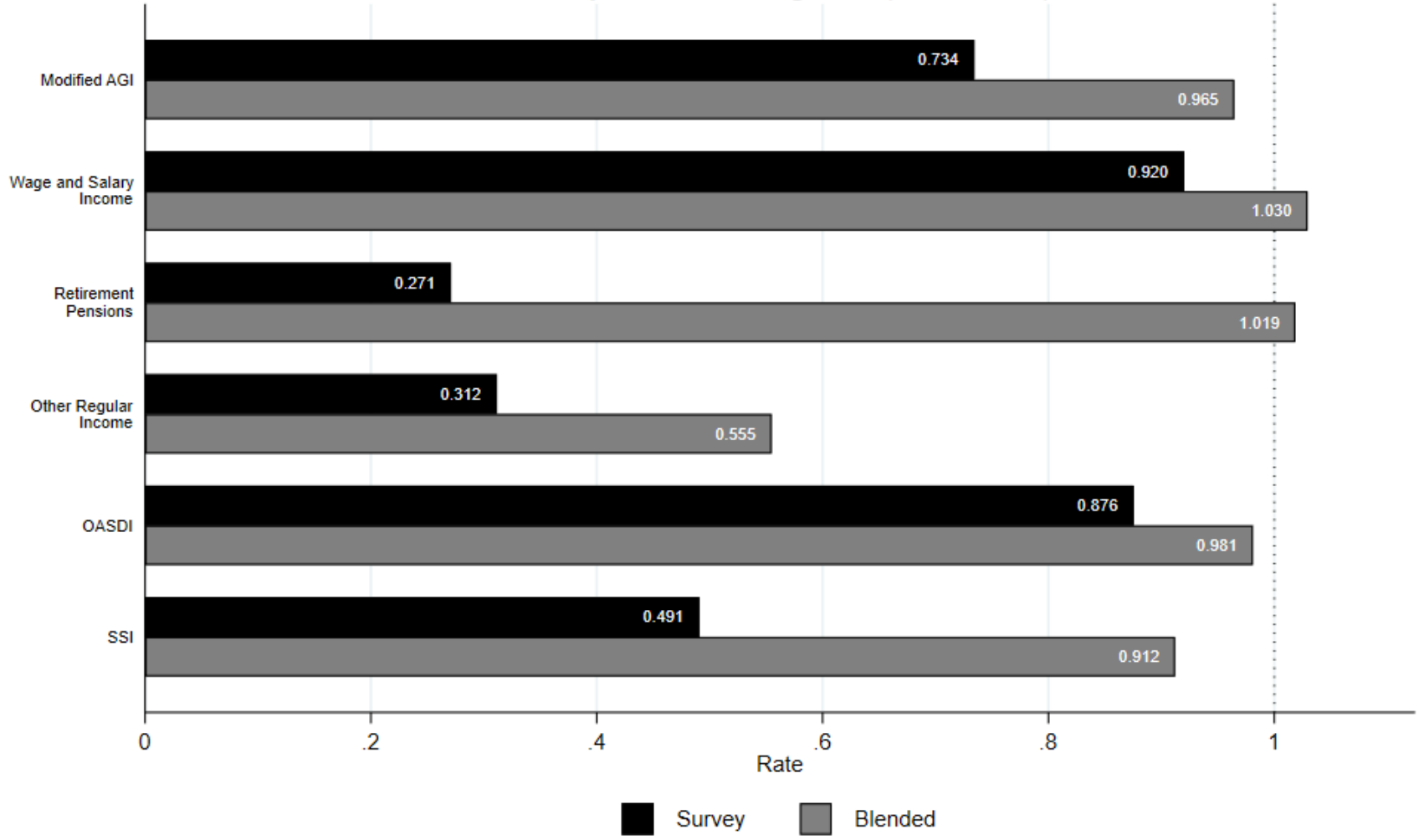
- Add tax liabilities and credits based on 1040 variables (for non-filers use W2s and other forms) using TAXSIM

Constructing Expenditures and Consumption

- To convert reported expenditures in the CE to a measure of consumption, we make a number of adjustments
  - We convert vehicle and housing spending to a service flow equivalent
  - We impute a rental equivalent for those living in government or subsidized housing
  - We exclude spending that is better interpreted as an investment such as outlays for retirement including pensions and social security

Comparing Weighted Totals to Publicly Available Aggregates

Average Reporting Rates of Blended versus Survey Income Categories (2014-2016)



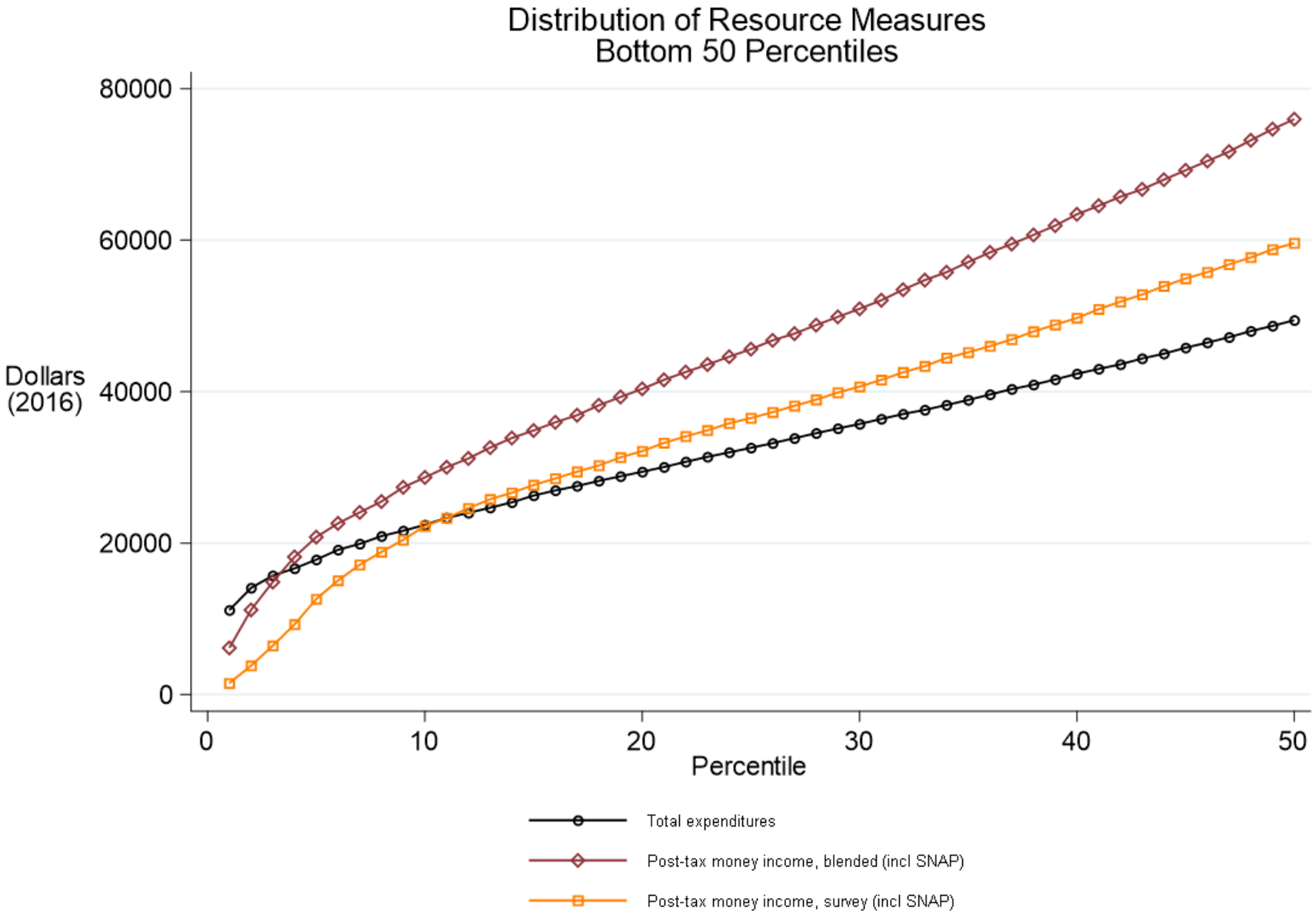
(1) Modified AGI consists of wages and salary income + self employment income + retirement pensions + interest and dividends + rental income and royalties + other REGULAR income + other NONRENTAL income.

(2) While the survey definition of Other Regular Income consists of income components such as VA benefits, Worker's Compensation, UI, child support, and alimony we only have the corresponding administrative sources for VA benefits. Hence, our blended measure is relatively understated.

Comparing Income and Expenditure Distributions

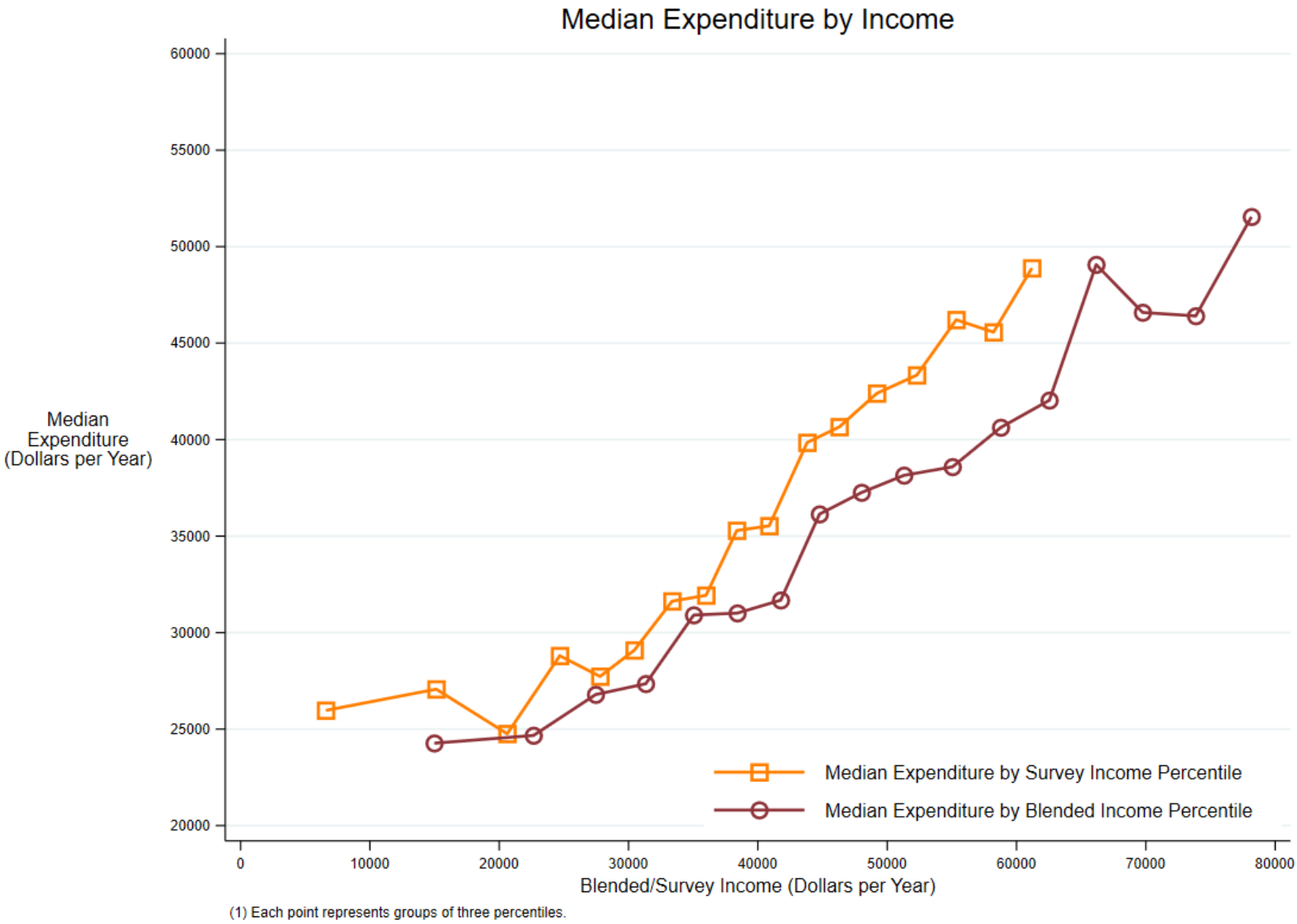
Univariate Distributions of Resource Measures

- As a part of our analyses comparing income to expenditures, we plot the univariate distributions of three different resource measures:
  - Post-tax money income plus SNAP benefits based on survey data only
  - Post-tax money income plus SNAP benefits obtained by blending administrative data with survey data
  - Yearly expenditures obtained by scaling up quarterly expenditures


Distribution of Resource Measures
Bottom 50 Percentiles
Dollars (2016)
80000
60000
40000
20000
0
0
10
20
30
40
50
Percentile
Total expenditures
Post-tax money income, blended (incl SNAP)
Post-tax money income, survey (incl SNAP)

Joint Distributions of Resource Measures

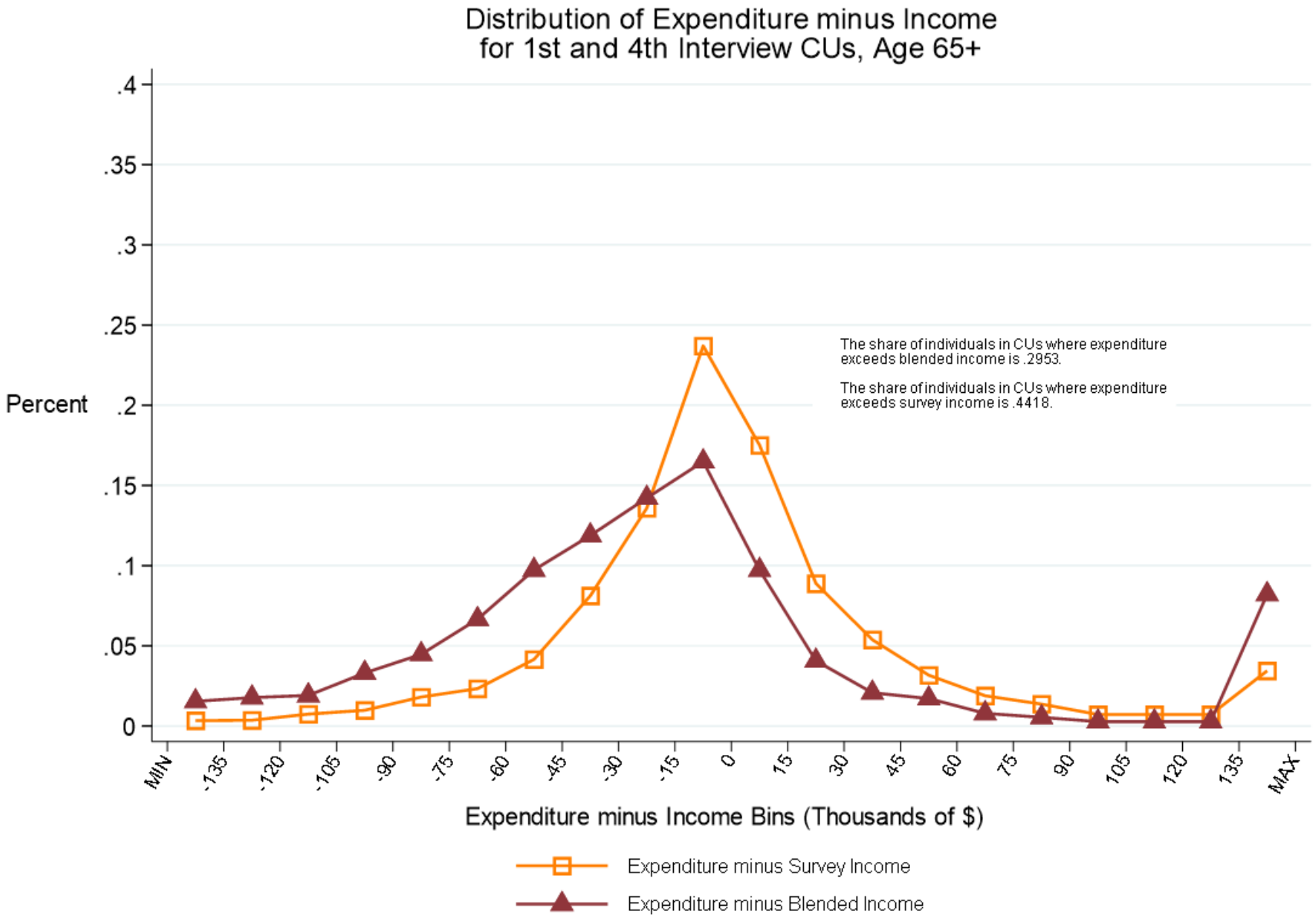
- We create two figures that report the relationship between expenditures and blended/survey income
  - The first figure reports the relationship between median expenditure conditioned on survey and blended income for the lower half of the income distribution
    - Each marker represents groups of three percentiles
  - The second figure plots the discrepancy between mean expenditures below select percentiles of survey and blended income
- Values on the axes are equivalence scaled to a two-adult, two-child family unit and inflation adjusted to 2016 dollars



(1) Each point represents groups of three percentiles.

Comparisons of Expenditures minus Income

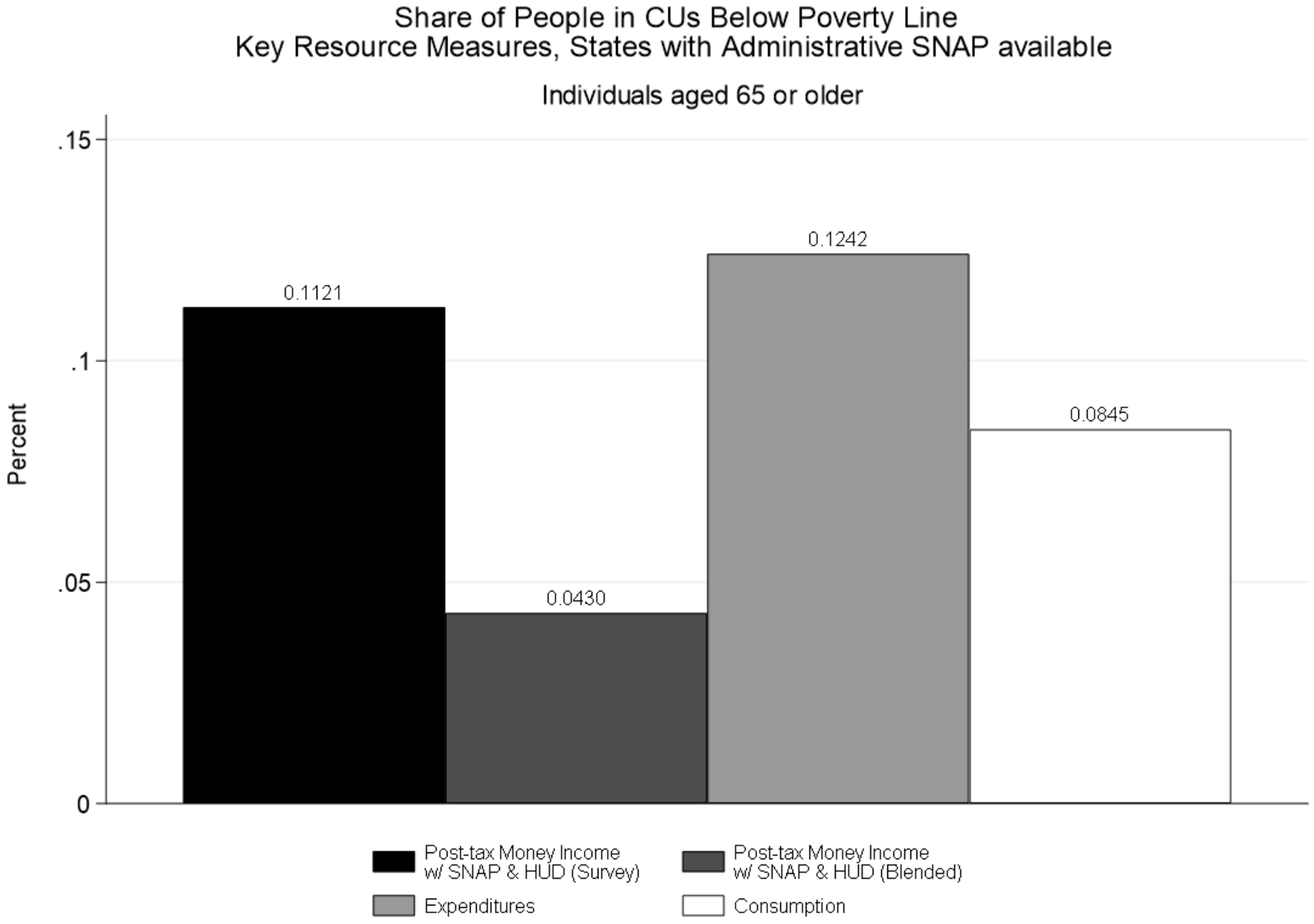
- As part of our analysis looking at individual differences between expenditure and income, we compare the distributions of expenditure minus blended and survey income across samples containing individuals interviewed in the 1st and 4th wave
- We plot the densities of expenditures minus blended and survey income for those aged 65 or older
  - The vertical axis is the percent of individuals is the Percent of CUs, Size Weighted
  - The horizontal axis is expenditure minus income bins in the thousands of dollars
  - The markers are at the midpoint of each bin


Distribution of Expenditure minus Income
for 1st and 4th Interview CUs, Age 65+
Percent
.4
.35
.3
.25
.2
.15
.1
.05
0
The share of individuals in CUs where expenditure exceeds blended income is .2953.
The share of individuals in CUs where expenditure exceeds survey income is .4418.
MIN
-135
-120
-105
-90
-75
-60
-45
-30
-15
0
15
30
45
60
75
90
105
120
135
MAX
Expenditure minus Income Bins (Thousands of $)
Expenditure minus Survey Income
Expenditure minus Blended Income

Income and Consumption Poverty Measures

Poverty Measures in the CE

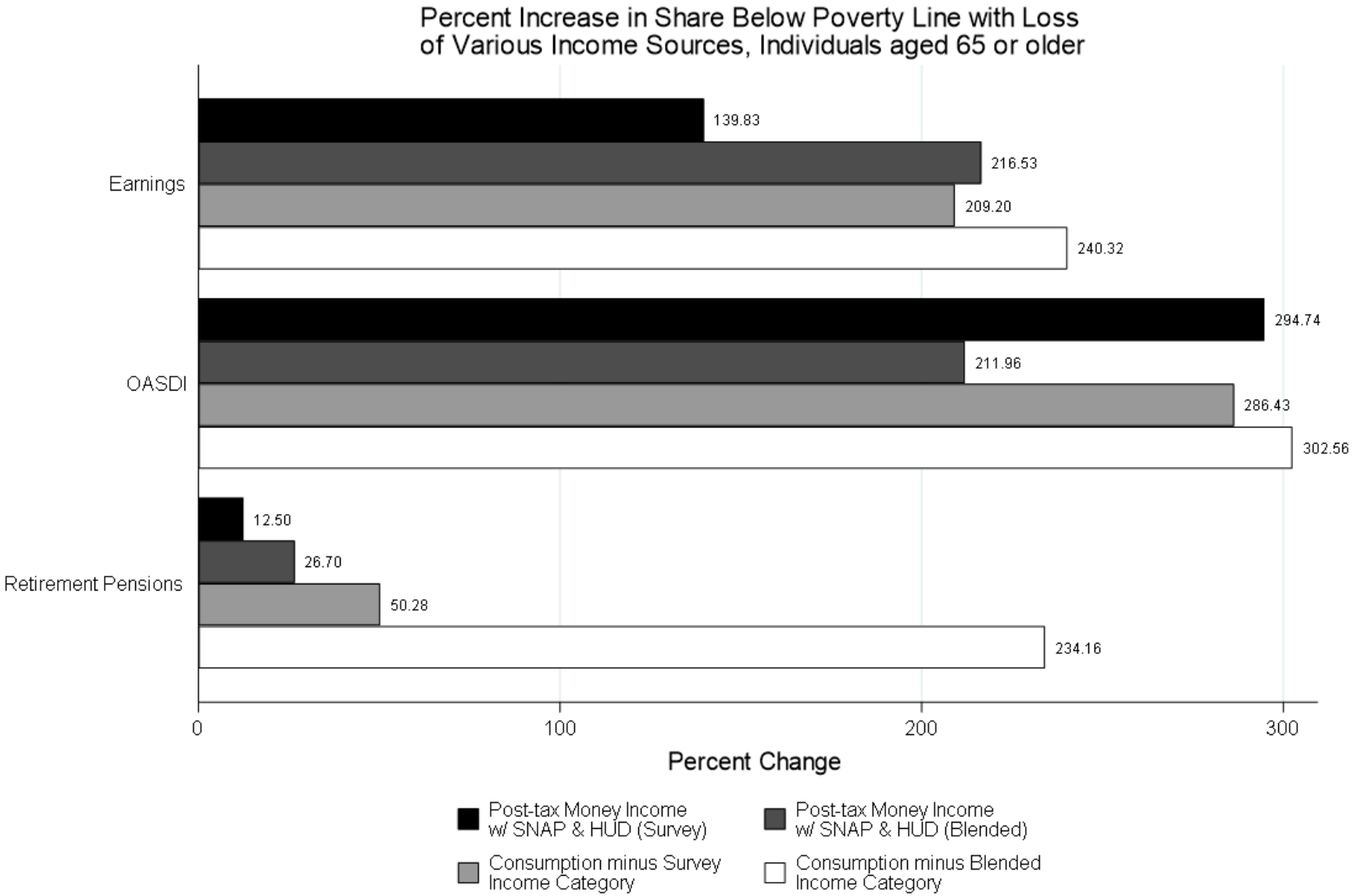
- In order to evaluate our income and consumption poverty measures, we calculate the share of individuals in CUs below select multiples of the poverty line across four different series, all of which are inflation and equivalence scale adjusted
  - Post-tax money income plus SNAP plus Housing (entirely survey based)
  - Post-tax money income plus SNAP plus Housing (blended)
  - Expenditures
  - Consumption (includes housing subsidies, rental equivalent for owned homes and cars)
- To establish our poverty line, we begin from the SPM threshold for reference year 2016, as provided by the BLS
- We produce these results for those 65 or older
  - Also do for those in consumer units with someone 65 or older


Share of People in CUs Below Poverty Line
Key Resource Measures, States with Administrative SNAP available
Individuals aged 65 or older
Percent
.15
.1
.05
0
0.1121
0.0430
0.1242
0.0845
Post-tax Money Income w/ SNAP & HUD (Survey)
Post-tax Money Income w/ SNAP & HUD (Blended)
Expenditures
Consumption

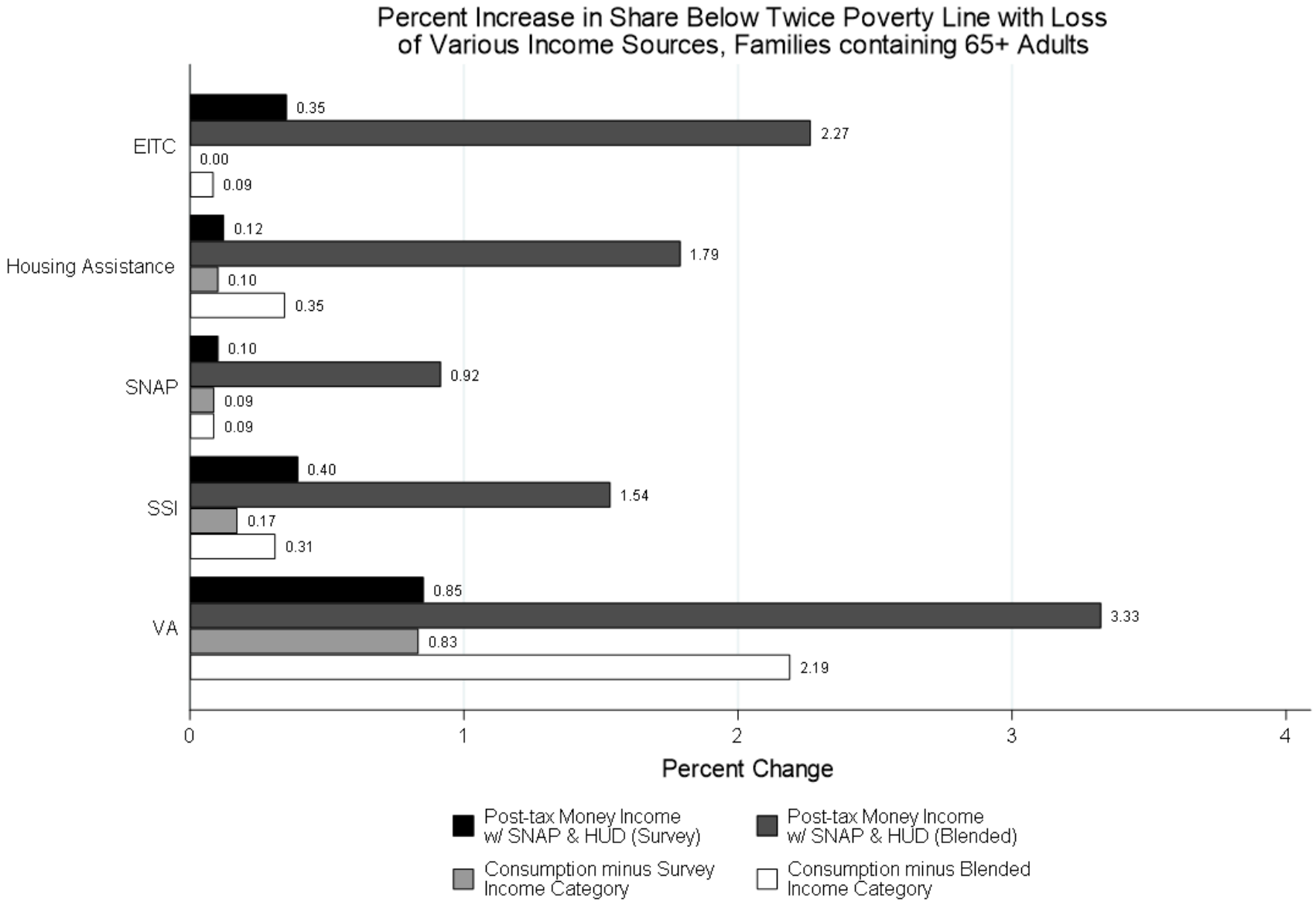
Poverty Reduction of Key Income Sources

What is the poverty reduction of different programs measured using income and consumption?

- To assess the impact of various income sources on poverty reduction, we recalculate share of people below the poverty line after excluding the value of various programs from the following three resource measures, all of which are inflation and equivalence scale adjusted
  - Blended post-tax money income + SNAP + HUD (blended)
  - Survey post-tax money income + SNAP + HUD (survey)
  - Consumption
- To ensure comparability between resource measures, we report versions where we subtract survey income components from survey income, blended income components from blended income and subtract both survey and blended income components from consumption
  - We do this for OASDI, retirement pensions, earnings (sum of wage and salary and self-employment income), SNAP, EITC, CTC, Housing Benefits, Veteran's Disability, SSI, and welfare



These income categories have so large an effect on the share of the population below multiples of the poverty line for many that we display their effects in a separate figure.



(1) The survey category for VA contains all other sources of what the CE defines as regular non-rental income.

Conclusions

- Our results show the feasibility of improving CE Survey income measures and of examining the poverty reduction of transfer programs and other income sources using consumption data
- Material well-being is higher with blended income and consumption than when relying on only survey reported income
- Program effects tend to be larger with blended income and consumption than when relying on only survey reported income
- Refinements of our methods can be made, which will not be speedy because of access issues and the disclosure process