Congressional Budget Office

Correcting for Underreporting of Government Transfers: A Regression-Based Approach With Preliminary Results

Presentation at a Workshop Organized by the

Washington Center for Equitable Growth
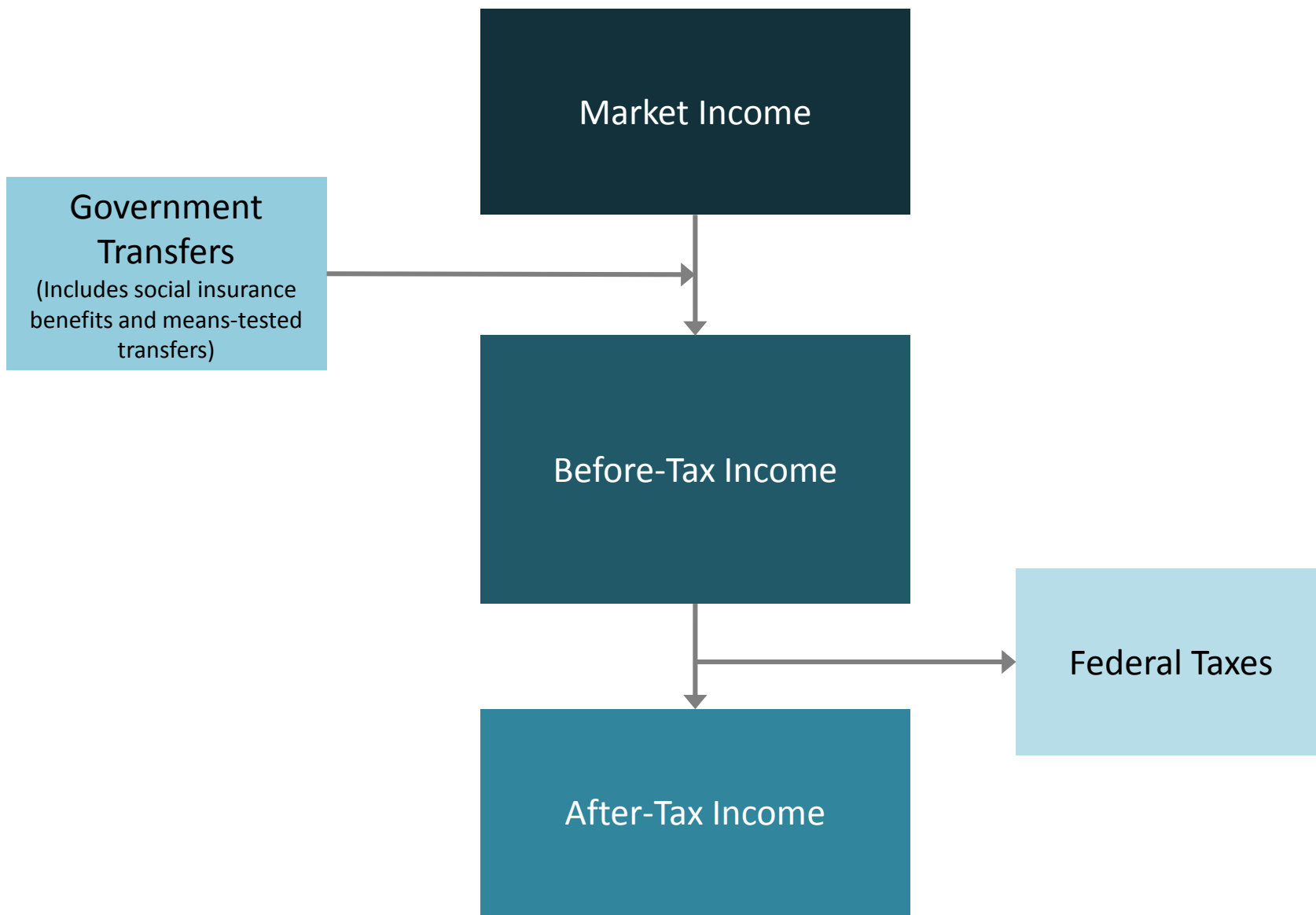
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As developmental work for analysis for the Congress, the information in this presentation is preliminary and is being circulated to stimulate discussion and critical comment.
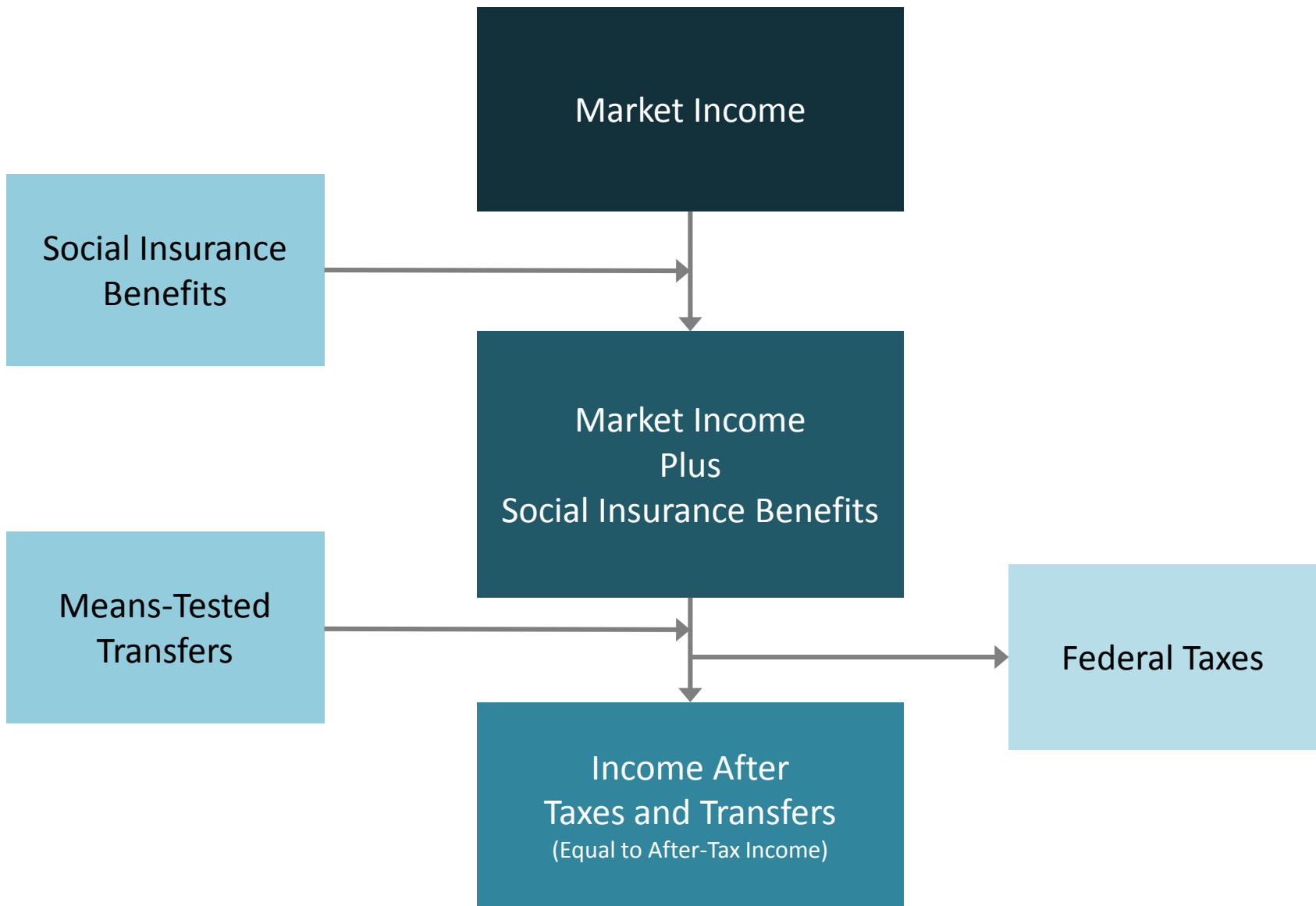
Background

CBO regularly produces a report on the **distribution of household income and federal taxes**.

This year, the agency is working to change its analytical framework to treat means-tested transfers as equivalent to taxes.

Old Analytical Framework

Market Income

Government Transfers
(Includes social insurance benefits and means-tested transfers)

Before-Tax Income

Federal Taxes

After-Tax Income

New Analytical Framework

Market Income

Social Insurance Benefits

Market Income Plus Social Insurance Benefits

Means-Tested Transfers

Federal Taxes

Income After Taxes and Transfers
(Equal to After-Tax Income)

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Explicit analysis of government transfers requires **a complete accounting of transfer income**.

CBO's tax model uses the Annual Social and Economic Supplement of the Current Population Survey (CPS) for transfer income data.

Underreporting of transfer income in the CPS has increased over time, as is well documented in Wheaton (2008), Meyer, Mok, & Sullivan (2009), and Moffitt & Scholz (2009).

As a result, CPS-based analyses are likely to **understate income growth at the bottom of the distribution** and the role of transfers in reducing income inequality.

Reporting Rates in the CPS:
Means-Tested Transfers, 1979–2013

CPS Recipients as a Percentage of Administrative Recipients
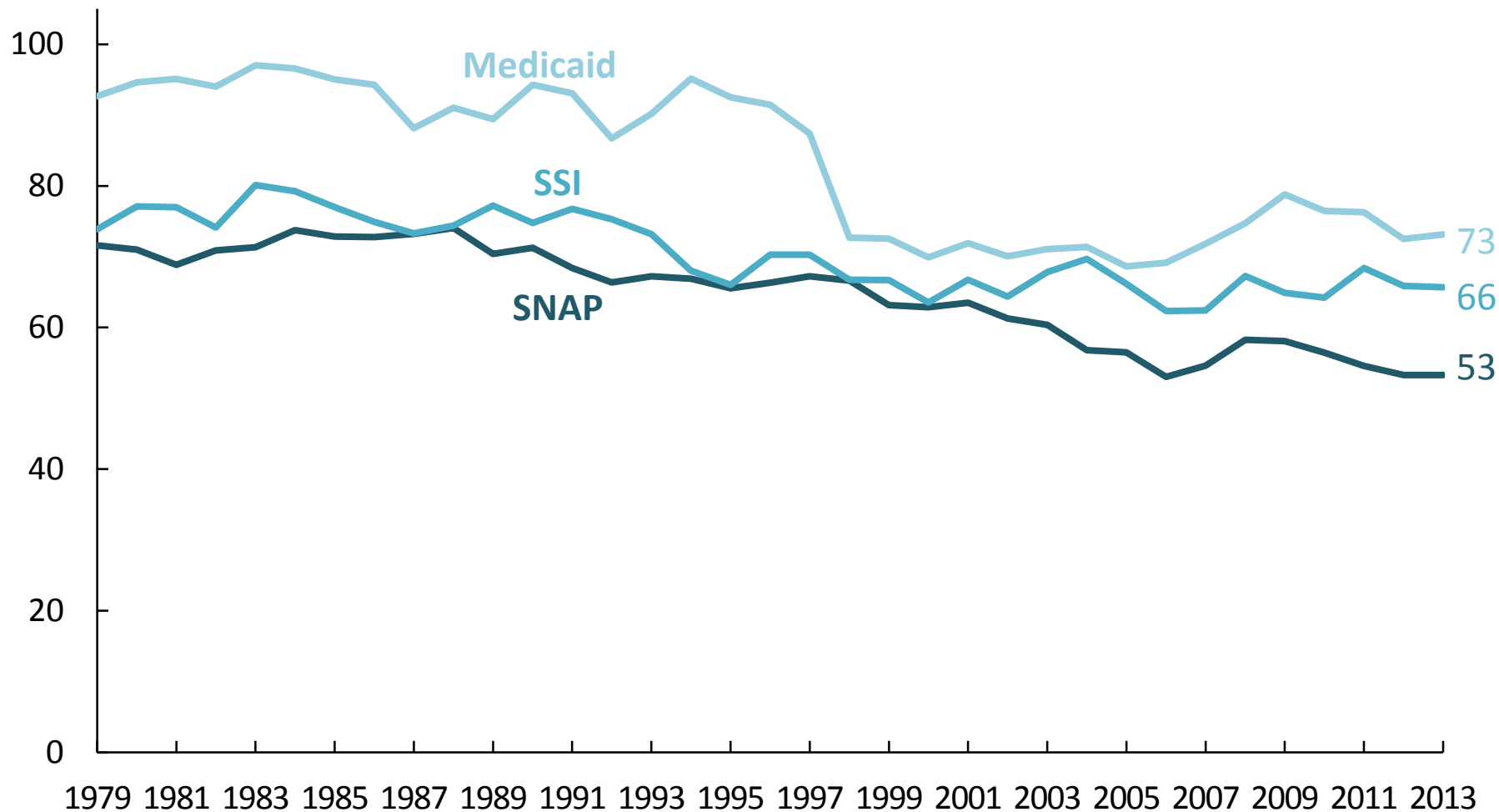
CBO's goal is to obtain a more complete (although partially imputed) accounting of income from government transfers in the CPS **with enough precision for quintile-level distributional analysis**.

The analysis is focused on three of the largest means-tested transfers—Medicaid, the Supplemental Nutrition Assistance Program (SNAP), and Supplemental Security Income (SSI)—and the two largest social insurance benefits—Social Security and Medicare.

Means-Tested Transfers

Researchers typically use three ways to correct for underreporting:

- Administrative matching,

- Rules-based simulation, and

- Regression-based estimation.

Administrative matching offers near-perfect accounting, but administrative microdata are not widely available. Examples: Davern et al. (2009); Meyer and Sullivan (2008).

Rules-based simulation offers precise estimates at the micro level, but requires a significant research investment. Example: Zedlewski and Giannarelli (2015).

Regression-based estimation is tractable for multiple programs/years but is less precise at the micro level. Example: Moffitt and Scholz (2009).

CBO's preliminary regression-based estimation has three steps:

1. Use reported data to estimate the probability of receipt for all units.

2. Impute transfer receipt based on estimated probabilities.

3. Assign transfer income to recipients.

Step 1. Predicted probabilities are estimated using a probit model with CPS-reported receipt as the dependent variable.

Independent variables are based on program rules and other characteristics associated with program participation.

Individual characteristics include age, race, education, labor force status, disability, marital status, and receipt of other means-tested transfers.
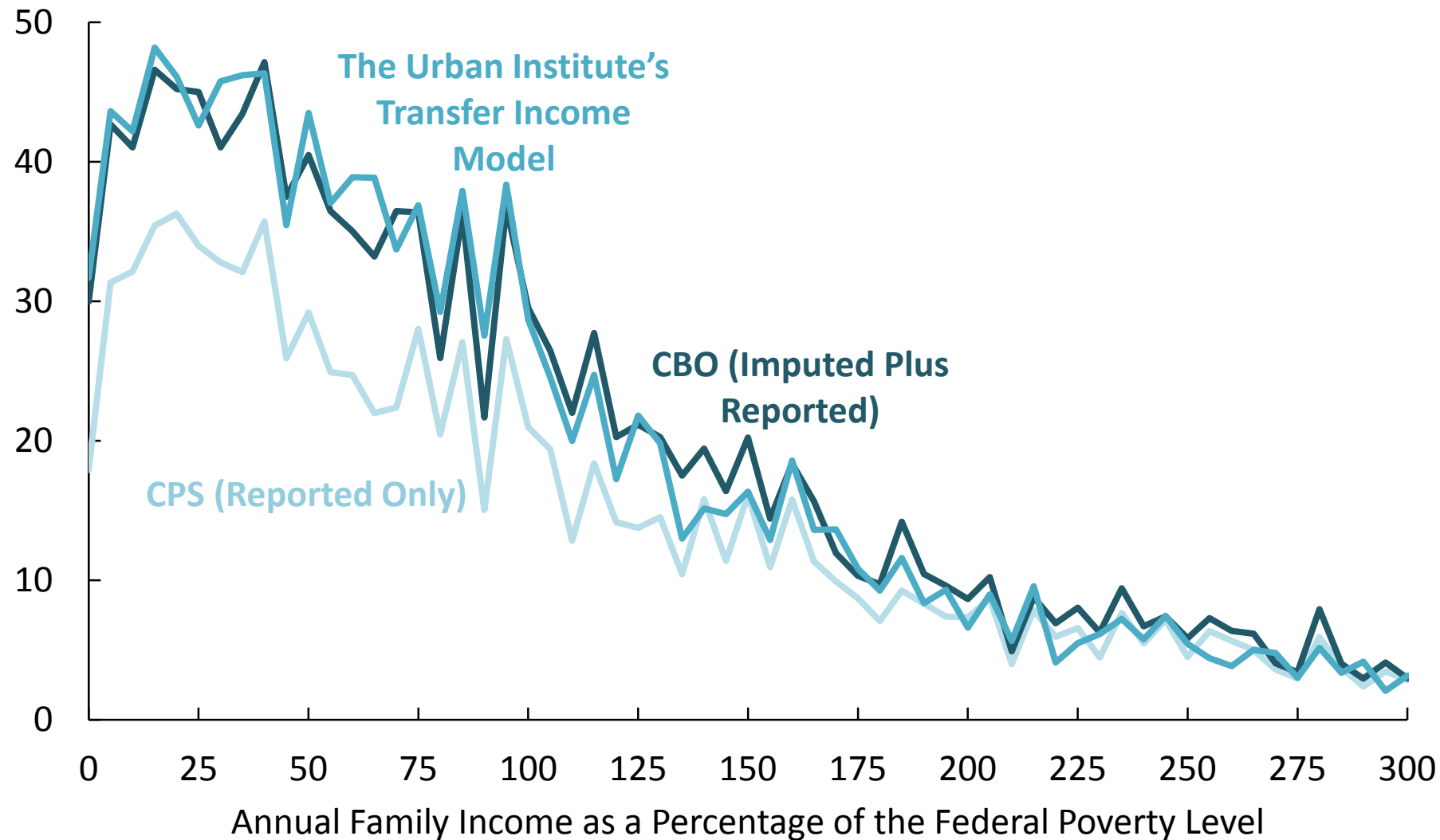
Household/family characteristics include income (as a percentage of the federal poverty level), income composition, household size and structure, and geography.

Step 2. Transfer receipt is **imputed to nonreporters with the highest probability of receipt** until the administrative total is reached. This process is repeated to match the targets for each category (e.g., children, elderly).
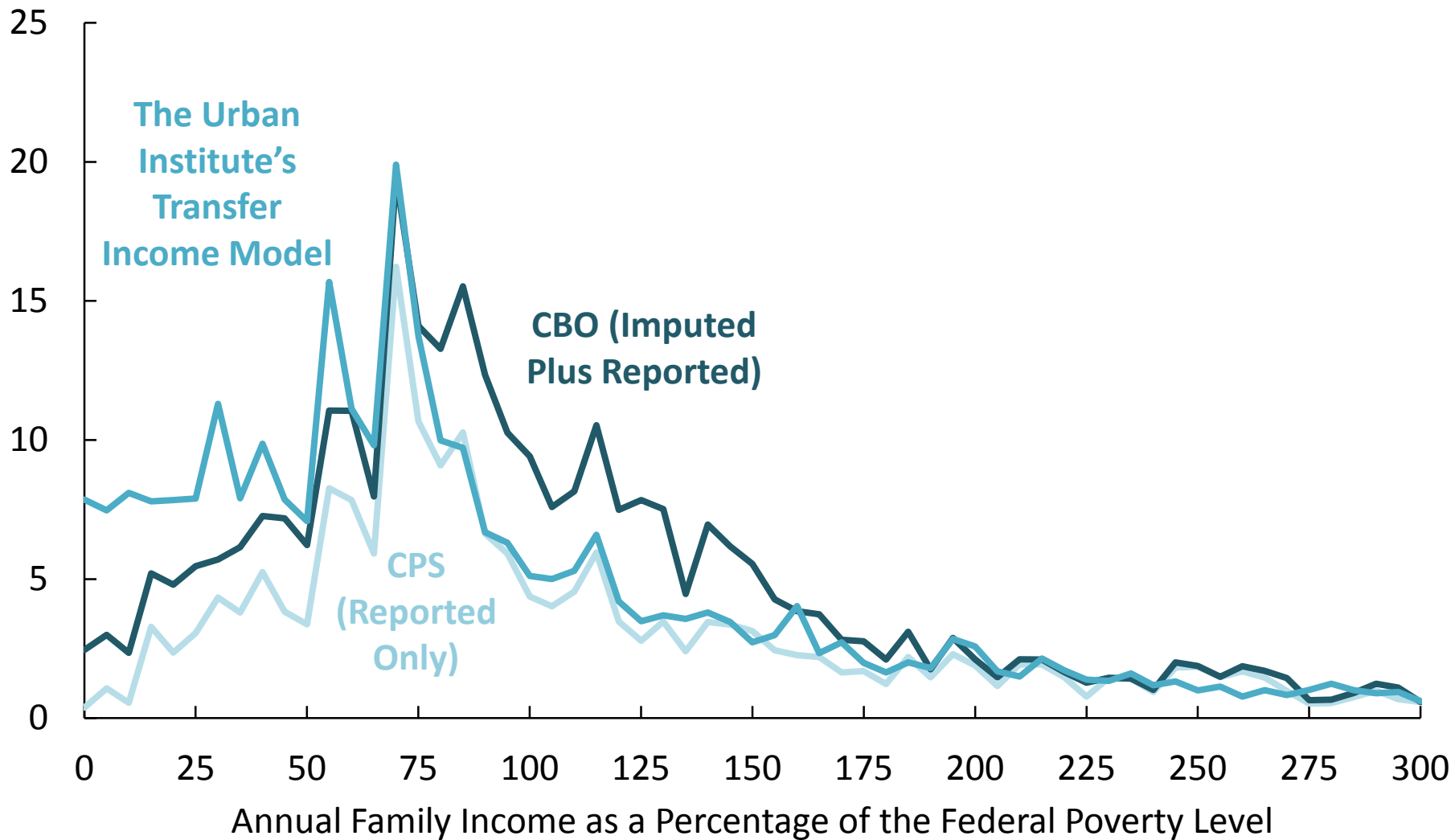
Medicaid Recipiency Rates, by Income, 2010

Percentage of Adults Receiving Benefits

The Urban Institute's Transfer Income Model

CPS (Reported Only)

CBO (Imputed Plus Reported)

Annual Family Income as a Percentage of the Federal Poverty Level

SSI Recipiency Rates, by Income, 2010

Percentage of Individuals Receiving Benefits

The Urban Institute's Transfer Income Model

CBO (Imputed Plus Reported)

CPS (Reported Only)

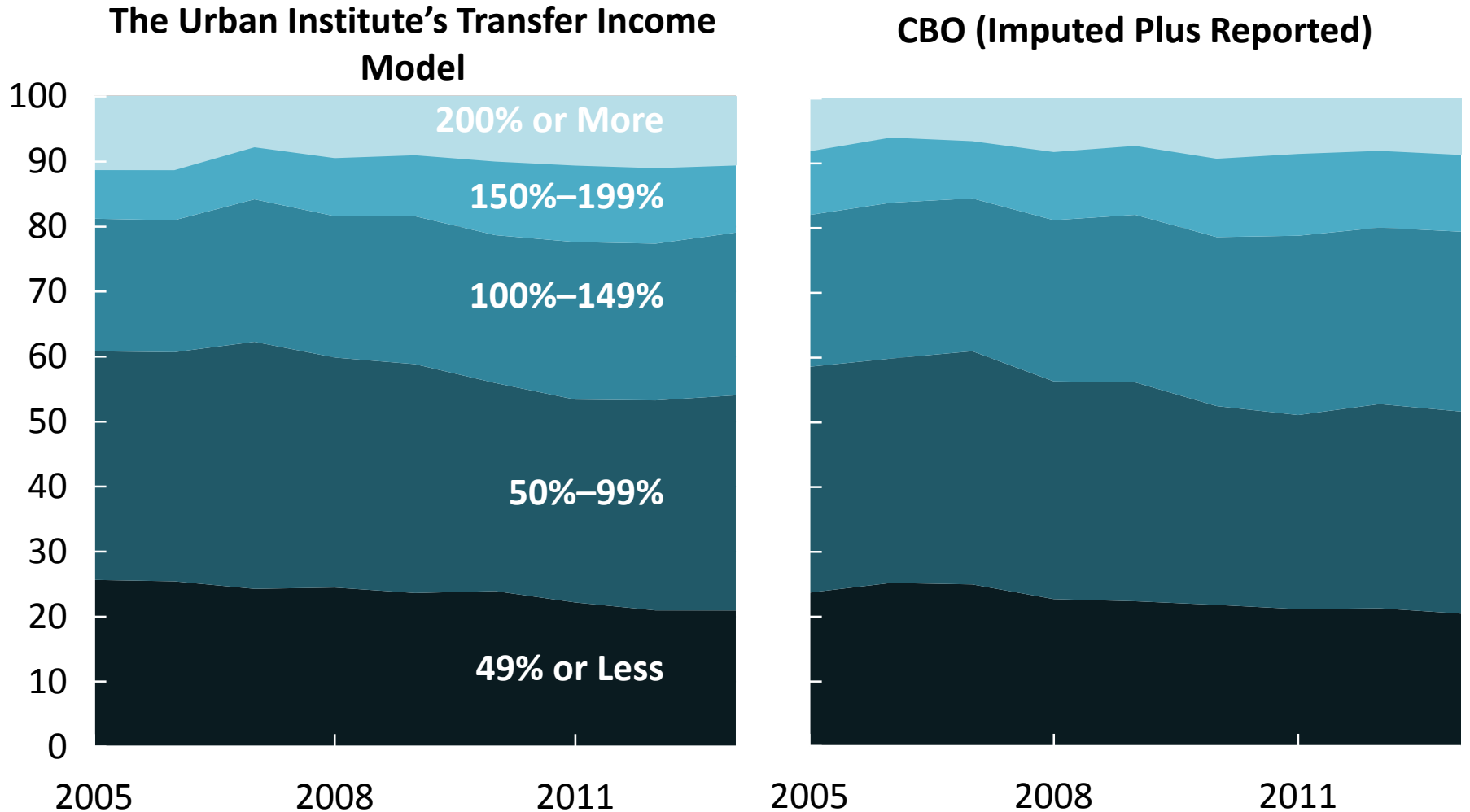Annual Family Income as a Percentage of the Federal Poverty Level

Distribution of SNAP Recipients, by Annual Household Income as a Percentage of the Federal Poverty Level, 1979–2013

Percentage of Recipients
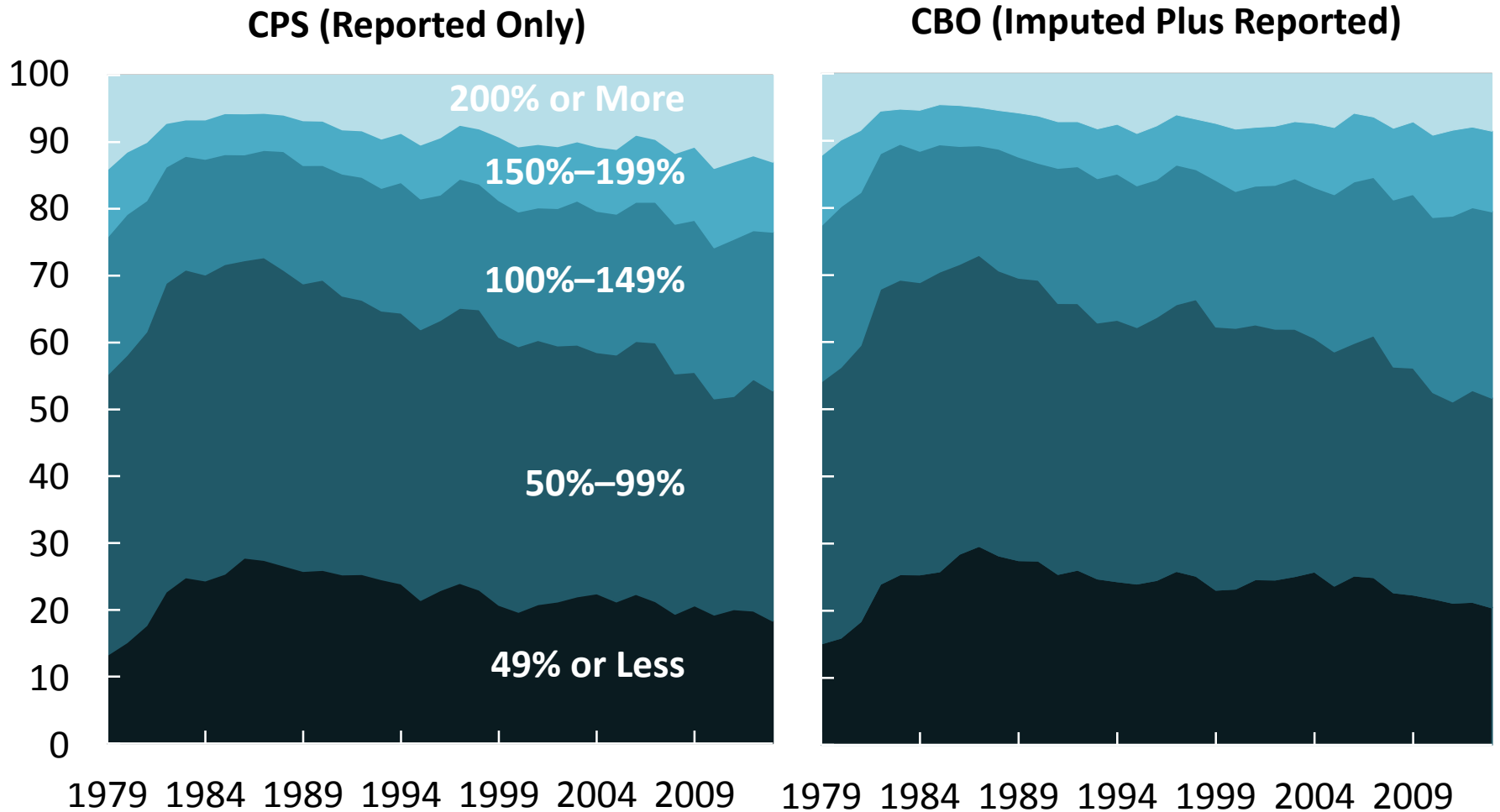
CPS (Reported Only)

200% or More

150%–199%

100%–149%

50%–99%

49% or Less

CBO (Imputed Plus Reported)

Distribution of SNAP Recipients, by Annual Household Income as a Percentage of the Federal Poverty Level, 2005–2013

Percentage of Recipients

The Urban Institute's Transfer Income Model

CBO (Imputed Plus Reported)

200% or More

150%–199%

100%–149%

50%–99%

49% or Less

Step 3. Transfer income is assigned to recipients. The assignment methodology varies by program.

For *SNAP* and *SSI*, CBO derives the **average benefit per household** from reported values (by household size and income-to-poverty ratio).

Those averages are then **assigned to newly imputed recipients** and are adjusted as needed to match administrative totals.

# Average Annual SNAP Benefits per Household, 1979–2013

Constant 2013 Dollars
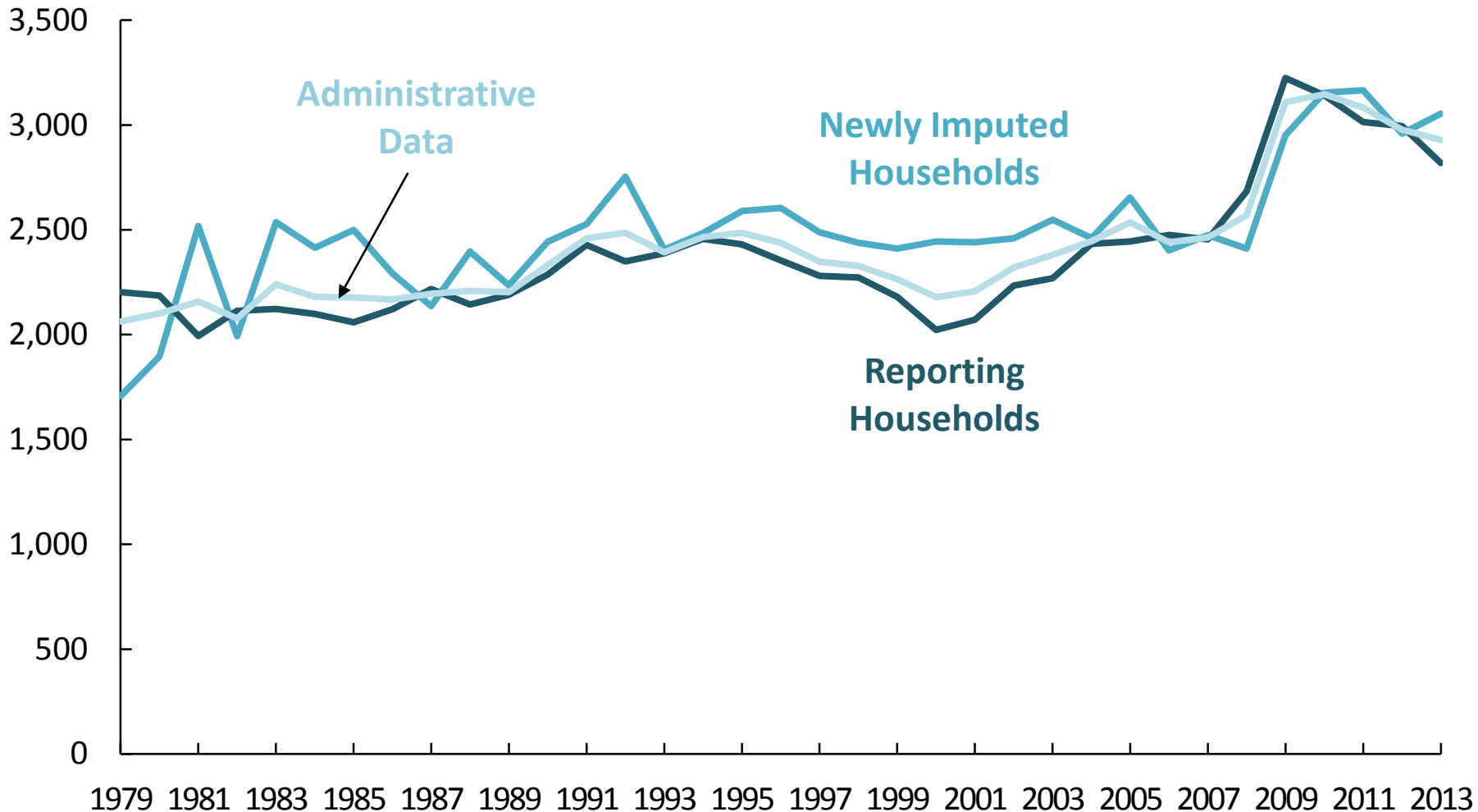
For *Medicaid,* CBO derives the **average cost to the government per participant** from administrative data (by eligibility category).

Those averages are then **assigned to all recipients** (CPS "reported" values are overwritten).

Average Annual Cost per Medicaid Recipient, 1979–2013

Constant 2013 Dollars

CBO Averages (From Administrative Data)

CPS Averages
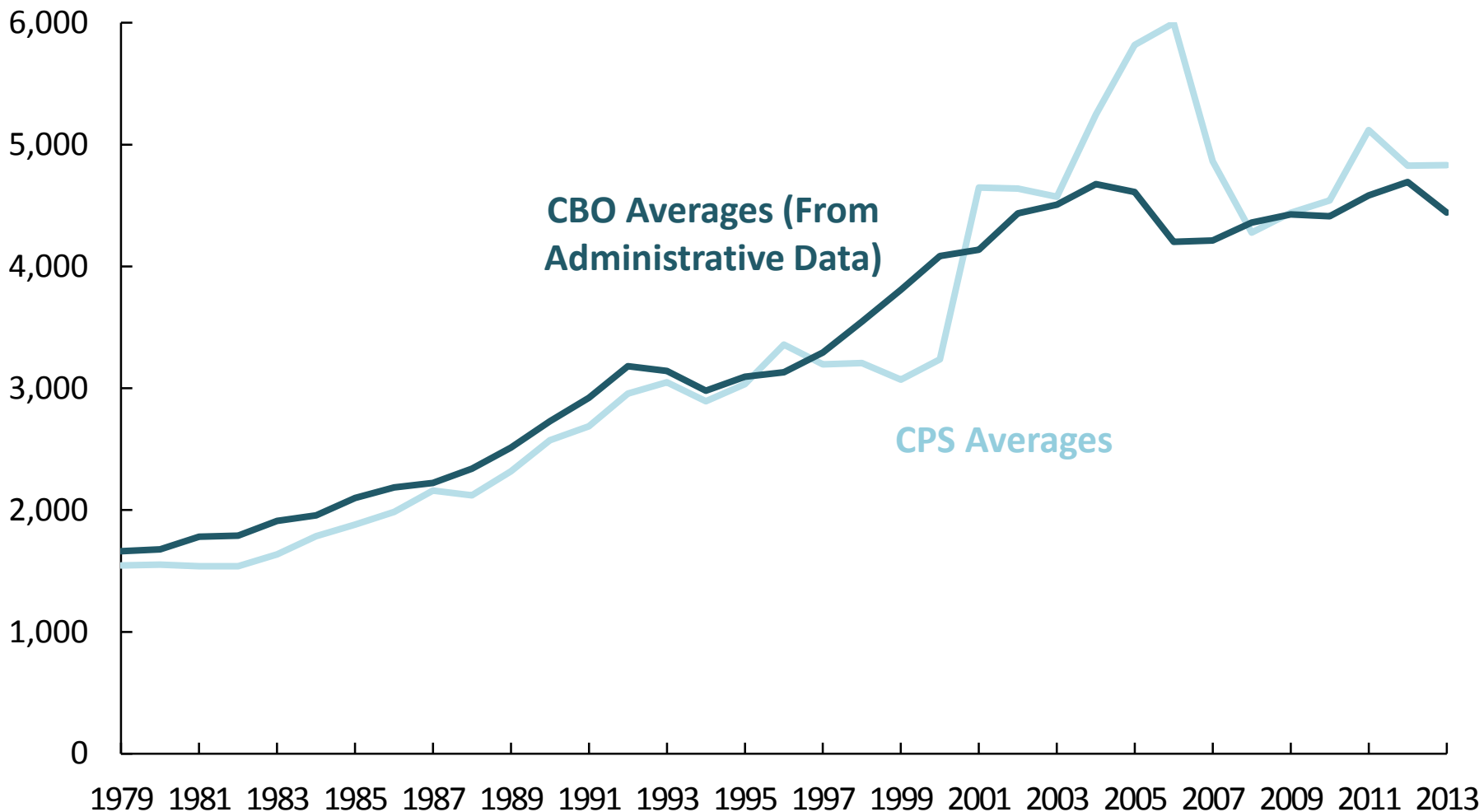
CBO's regression-based approach has both **strengths and limitations**.

The approach is straightforward to implement and easily scalable across multiple programs. Distributional results are similar to rules-based methods.

It does not, however, account for false positives in the CPS, and assumes that nonreporters have the same characteristics as reporters. It has a limited ability to simulate different policy scenarios.

Social Insurance Benefits

CBO uses a **different approach for imputing social insurance benefits**.

CBO does not perform any explicit distributional analysis of social insurance benefits, since they are **included in the base income measure**.

Receipt of social insurance benefits is difficult to model with a regression. It is dependent on life-cycle income/labor force participation, it is not means tested, and there are no income data for children in the CPS (which is important for imputing Social Security survivors' benefits).

Social Security Reporting Rates in the CPS, 2001–2013

CPS Recipients as a Percentage of Administrative Recipients
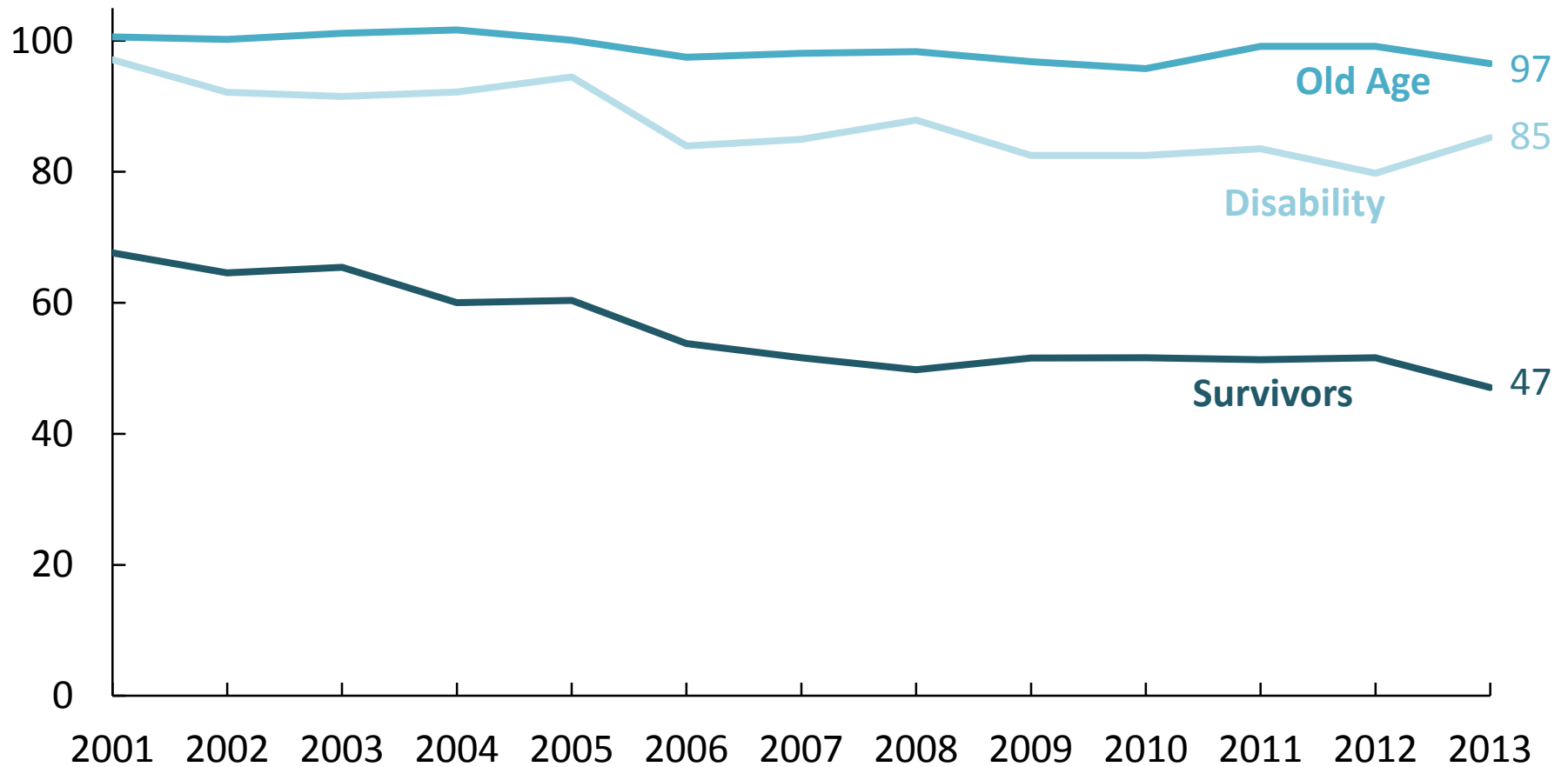
To impute Social Security benefits, CBO creates a pool of eligible recipients for each type of benefit and randomly assigns receipt until the administrative counts are matched.

The average benefit for each benefit type is then assigned to new recipients and aligned to administrative totals as needed.

Medicare Reporting Rates in the CPS, 1979–2013

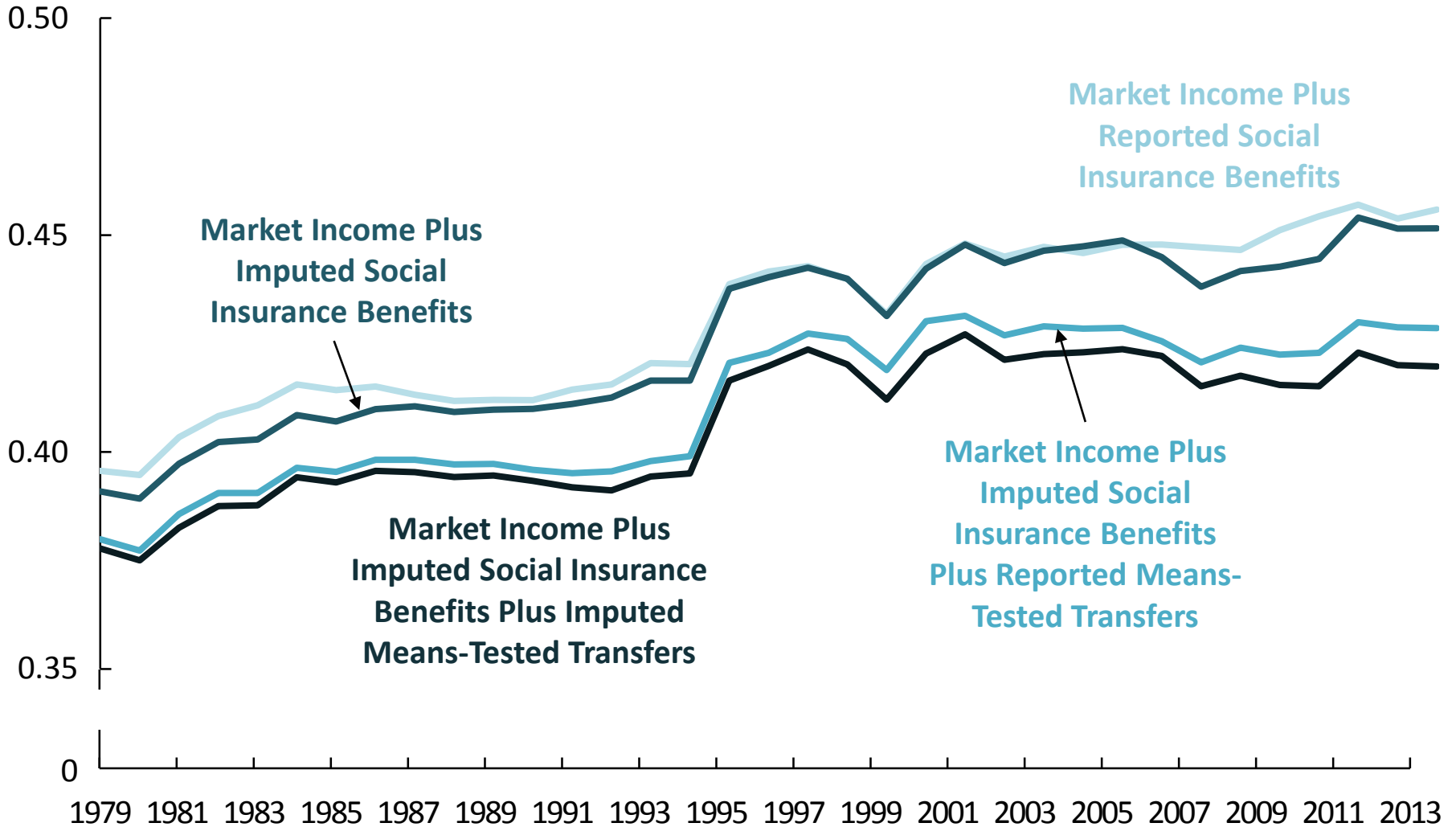CPS Recipients as a Percentage of Administrative Recipients
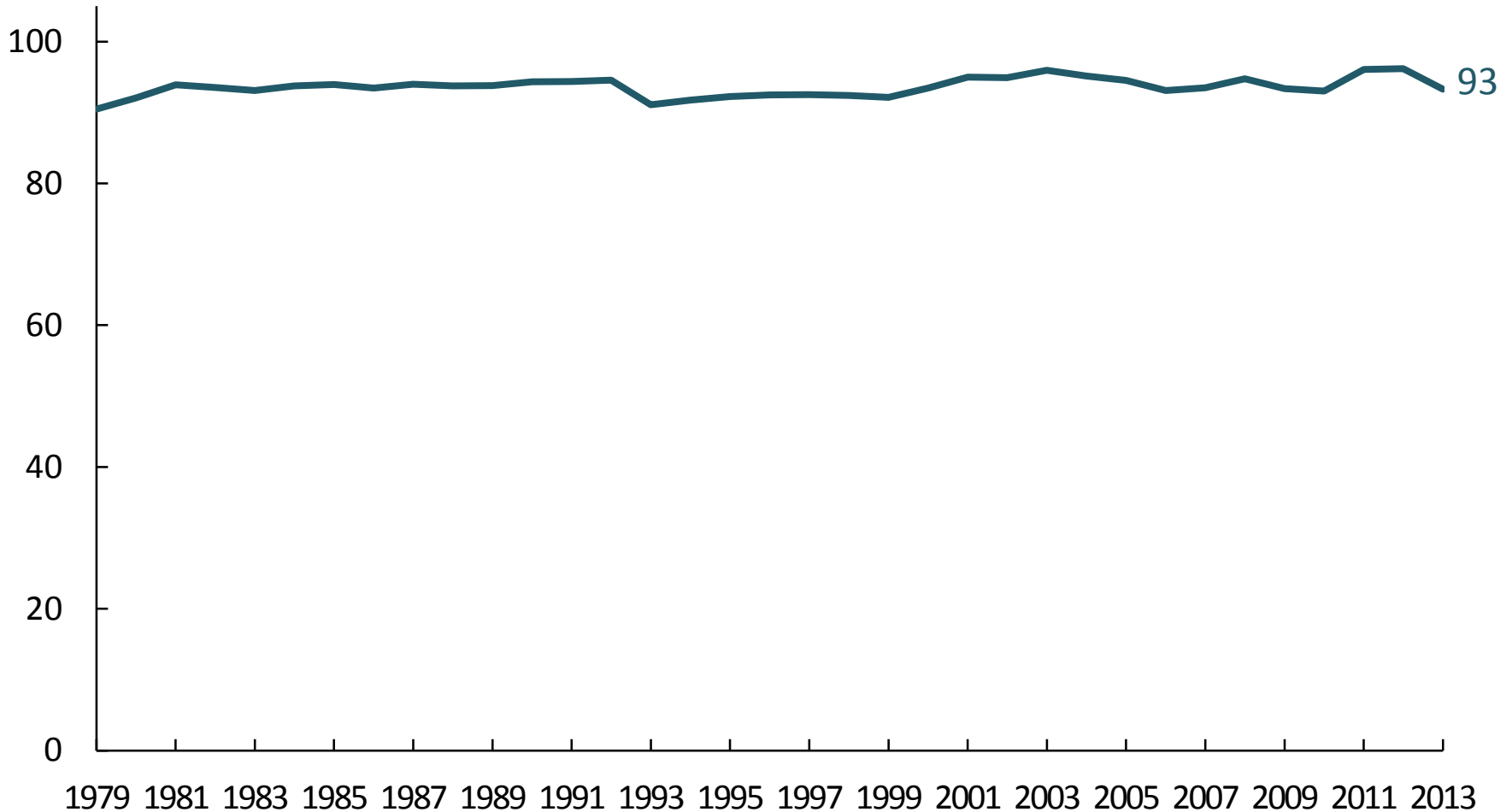
To impute Medicare benefits, CBO makes no change to reported recipients.

CBO assigns the average cost to the government per participant to all recipients. Benefits from the Low Income Subsidy for Prescription Drug Coverage are allocated separately.

Preliminary Conclusions

Income Inequality, 1979–2013

Gini Index

Market Income Plus
Reported Social
Insurance Benefits

Market Income Plus
Imputed Social
Insurance Benefits

Market Income Plus
Imputed Social Insurance
Benefits Plus Imputed
Means-Tested Transfers

Market Income Plus
Imputed Social
Insurance Benefits
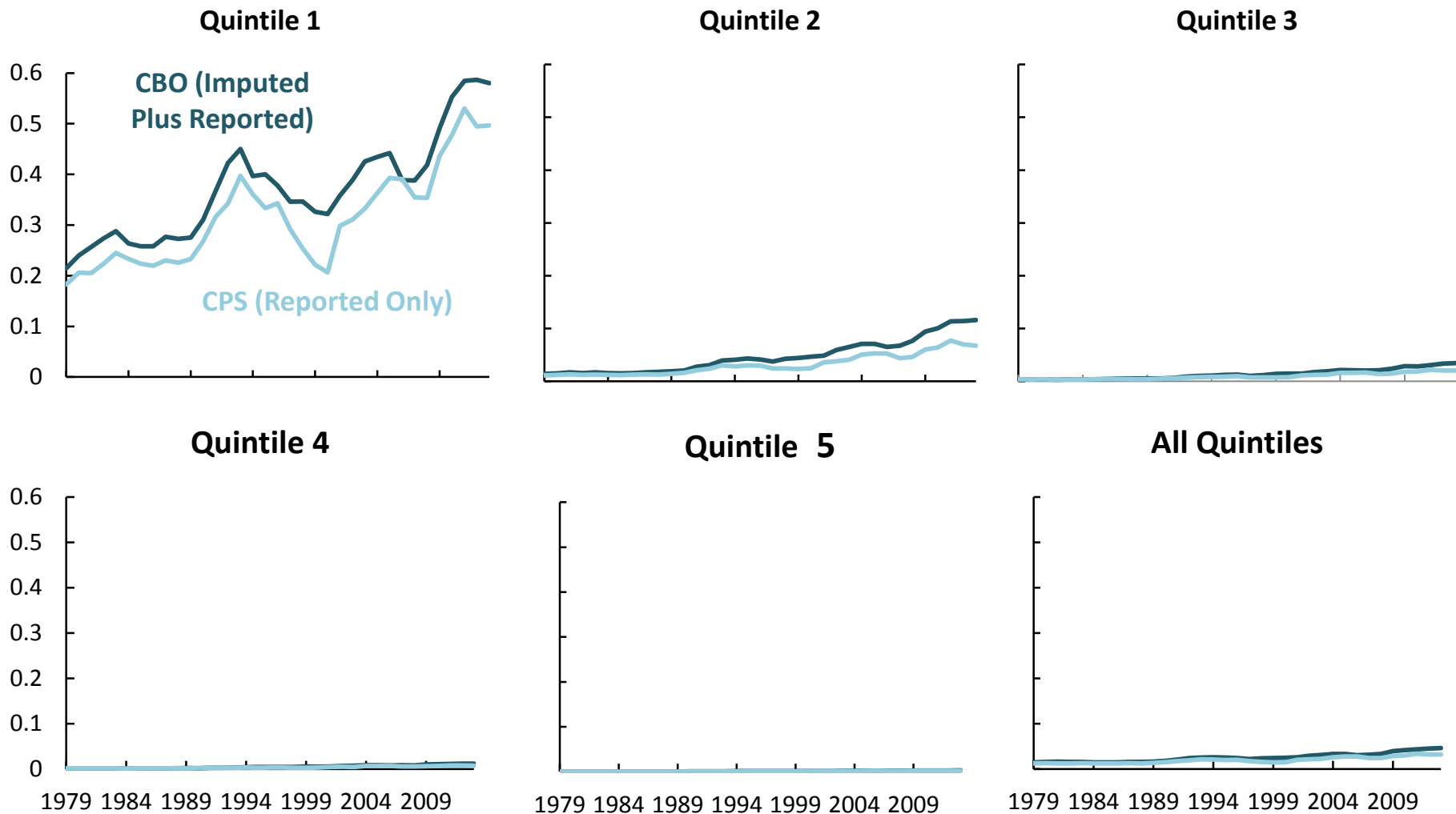Plus Reported Means-
Tested Transfers

Change in Gini Index, 1979–2013

Percentage Change Relative to Market Income Plus Imputed Social Insurance Benefits

Reported Means-Tested Transfers

Imputed Means-Tested Transfers
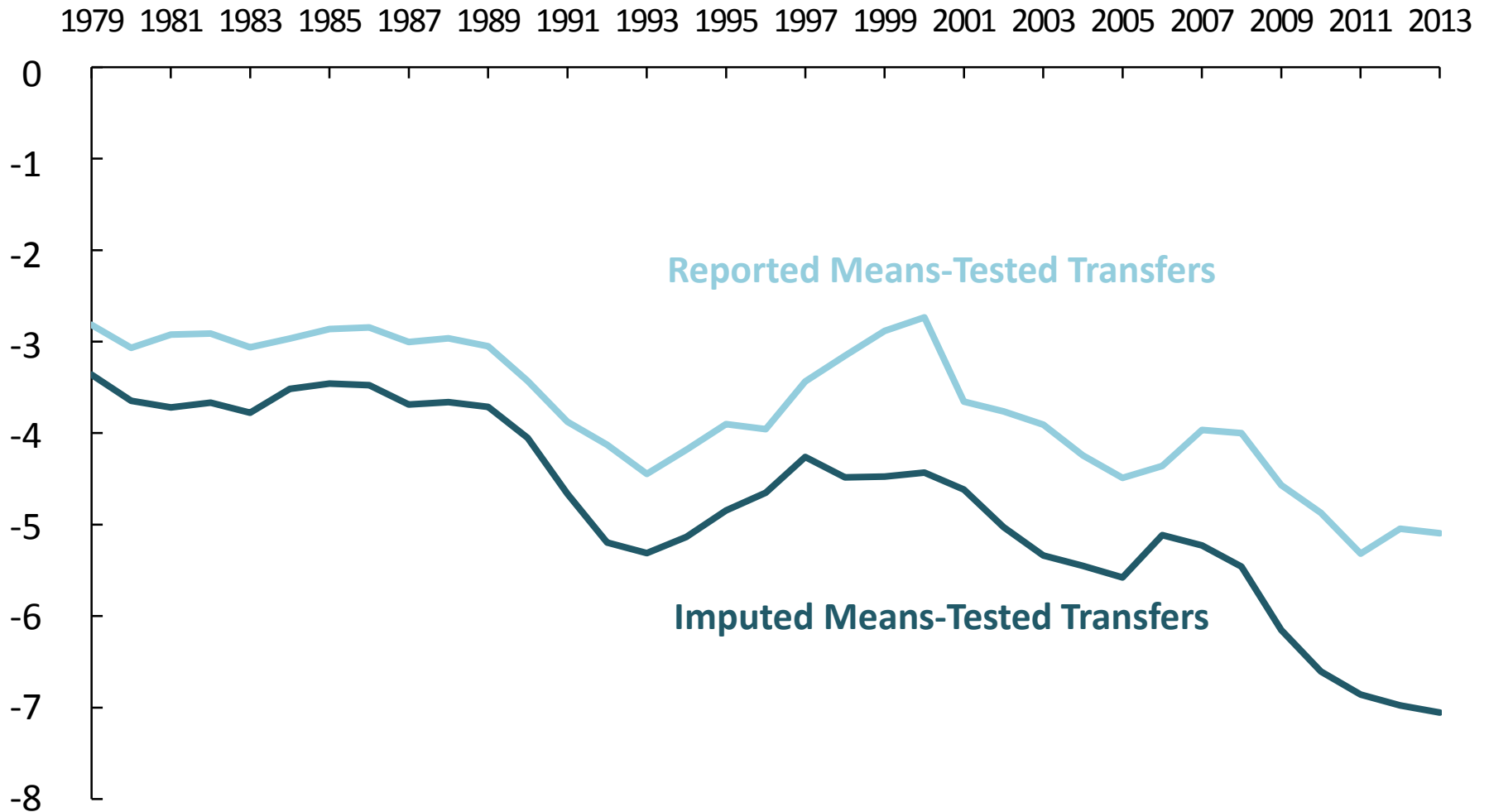
Means-Tested Transfer Rates, by Quintile, 1979–2013

Ratio of Means-Tested Transfers to Base Income Measure

Quintile 1

CBO (Imputed Plus Reported)

CPS (Reported Only)

Quintile 2

Quintile 3

Quintile 4

Quintile 5

All Quintiles

1979 1984 1989 1994 1999 2004 2009

Means-Tested Transfer Rates, Bottom Quintile, 1979–2013

Ratio of Means-Tested Transfers to Base Income Measure

CBO (Imputed Plus Reported)

CPS (Reported Only)
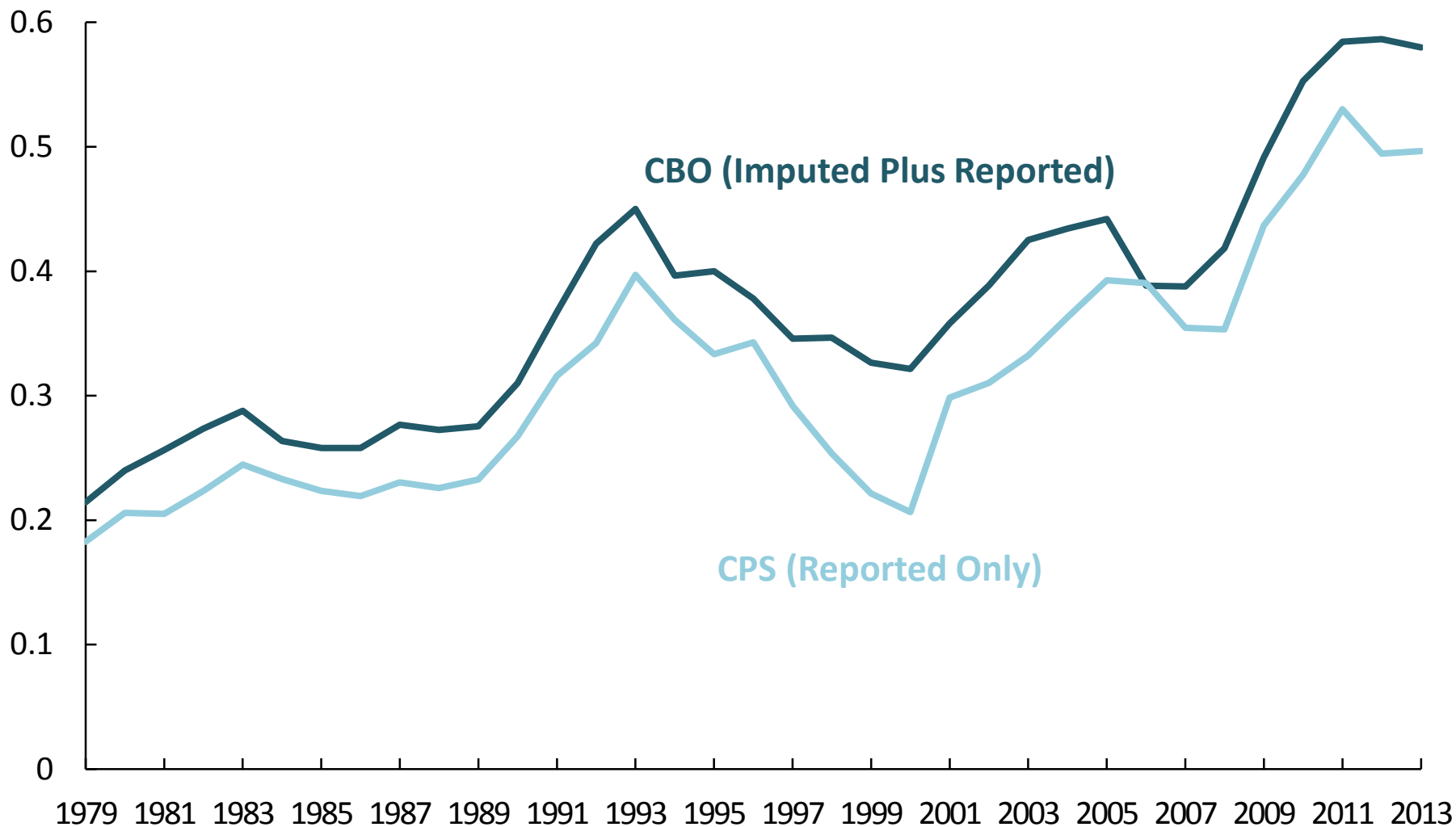
Notes to Figures

- Slides 7 and 32: The reporting rate equals the weighted sum of recipients in the CPS (including CPS imputations) divided by the number of recipients in the administrative data, adjusted for recipients outside the CPS sampling frame. Where administrative totals are available on a monthly basis, they have been converted to reflect the total number of program participants across the calendar year.

- Slide 17: Adults are defined as individuals aged 18–64 who are not disabled.

- Slides 17, 18, 19, and 20: Individuals or households are considered recipients if they participate in the program at any point during the calendar year.

Notes to Figures (Continued)

■ Slides 17 and 18: The Urban Institute's Transfer Income Model (TRIM) is a microsimulation model that uses the CPS as a basis to simulate program rules for various transfer programs. It uses those rules to determine program eligibility, participation, and benefits. The current version, TRIM3, has publicly available imputations for most major welfare programs going back to 1993. For more details, see Zedlewski and Gianarelli (2015).

■ Slide 33: The reporting rate equals the weighted sum of recipients in the CPS (including CPS imputations) divided by the number of recipients in the administrative data.

■ Slide 35: Reported and imputed social insurance benefits include Social Security and Medicare. Reported and imputed means-tested transfers include Medicaid, SNAP, and SSI.

Notes to Figures (Continued)

- Slide 38: Social insurance benefits include Social Security and Medicare. Means-tested transfers include Medicaid, SNAP, and SSI.

- Slides 39 and 40: The base income for the CBO (Imputed Plus Reported) quintiles and means-tested transfer rates is market income plus *imputed* social insurance benefits. The base income for the CPS (Reported Only) quintiles and means-tested transfer rates is market income plus *reported* social insurance benefits. Means-tested transfers include Medicaid, SNAP, and SSI.

References

■ Bruce D. Meyer, Wallace K. C. Mok, and James X. Sullivan, *The Under-Reporting of Transfers in Household Surveys: Its Nature and Consequences*, Working Paper 15181 (National Bureau of Economic Research, July 2009), www.nber.org/papers/w15181.

■ Bruce D. Meyer and James X. Sullivan, *Using Two-Sample Methods to Correct for Reporting Bias in Surveys*, Working Paper 0902 (University of Chicago, December 2008), https://tinyurl.com/y8jjnqma (PDF; 176 KB).

■ Robert A. Moffitt and John Karl Scholz, *Trends in the Level and Distribution of Income Support*, Working Paper 15488 (National Bureau of Economic Research, November 2009), www.nber.org/papers/w15488.

References (Continued)

- Laura Wheaton, *Underreporting of Means-Tested Transfer Programs in the CPS and SIPP*, (Urban Institute, February 6, 2008), https://tinyurl.com/yd4caq7n.

- Sheila Zedlewski and Linda Gianarelli, *TRIM: A Tool for Social Policy Analysis*, (Urban Institute, May 2015), https://tinyurl.com/y7sbos8l.