



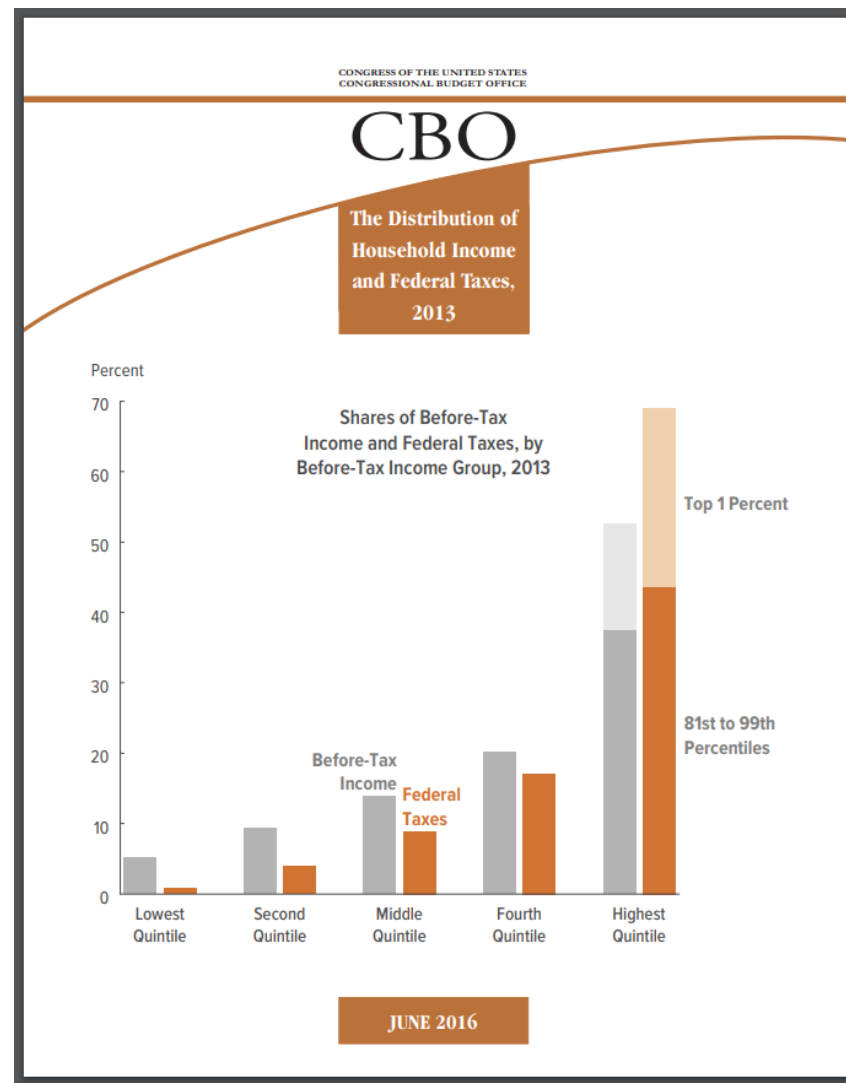
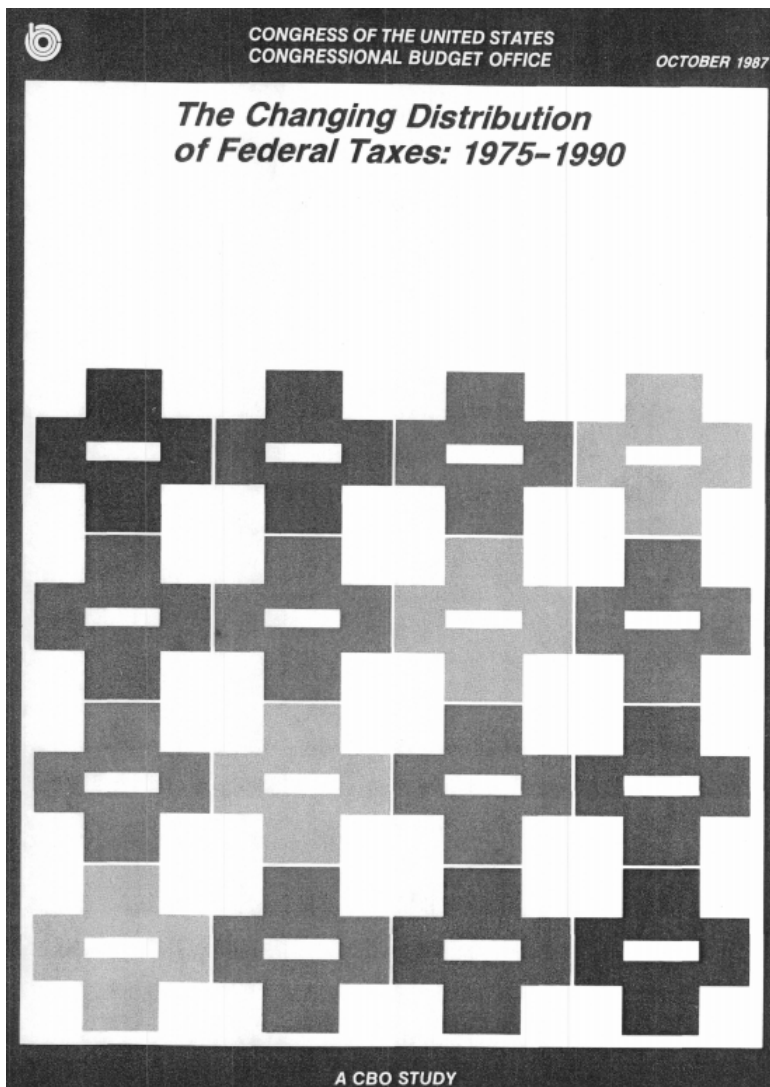
September 13, 2017

Methodological Improvements for CBO's Analysis of the Distribution of Household Income

Distributional Tax Analysis Conference
Washington, DC

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Tax Analysis Division

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.



Two major methodology changes in the **forthcoming report** on the distribution of household income:

- New income measure for ranking households and calculating average federal tax rates
- Correction for underreporting of means-tested transfers in household survey data

Distributional Analyses Have Historically Been Tax-Centric

Why?

Distributional Analyses Have Historically Been Tax-Centric

- Everyone pays taxes (either directly or indirectly).
- The tax system has explicit progressive/redistributive properties.
- There are high-quality tax data.
- There is a lot of theoretical work on tax incidence in the economics literature.

But there's more to
government than just **taxes**.

Increasingly, the distinction between tax and spending policies is more about the **legislative process** and less about the **impact on households**.

CBO will use a new framework to analyze how **means-tested transfers** and **federal taxes** jointly affect the distribution of household income.

CBO's Previous Distributional Framework

CBO's Previous Distributional Framework



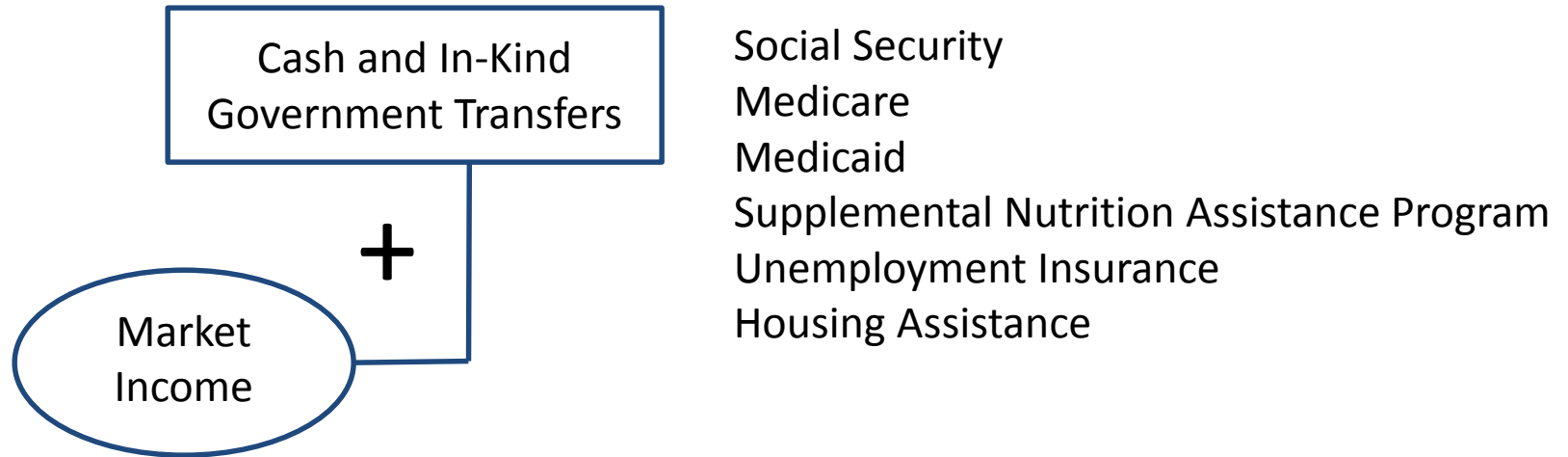
Labor Income: Wages and salaries

Business Income: Income from businesses and farms

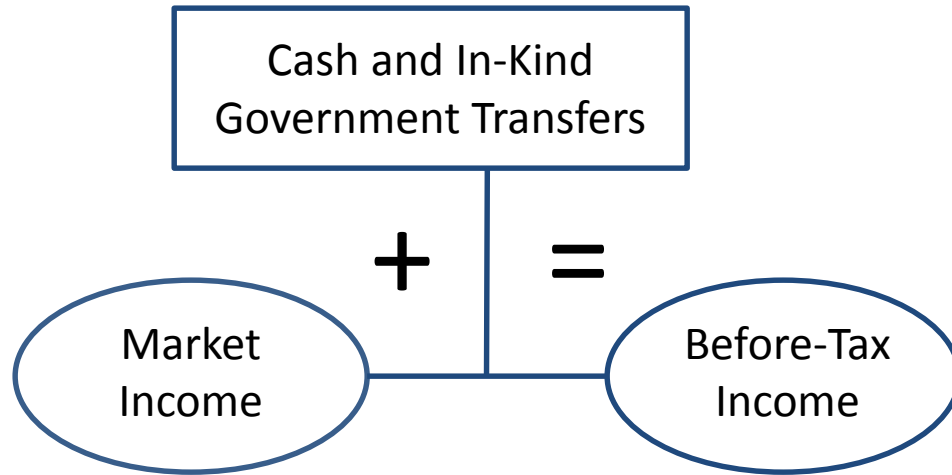
Capital Income: Capital gains, interest, and dividends

Other Income: Mainly retirement income

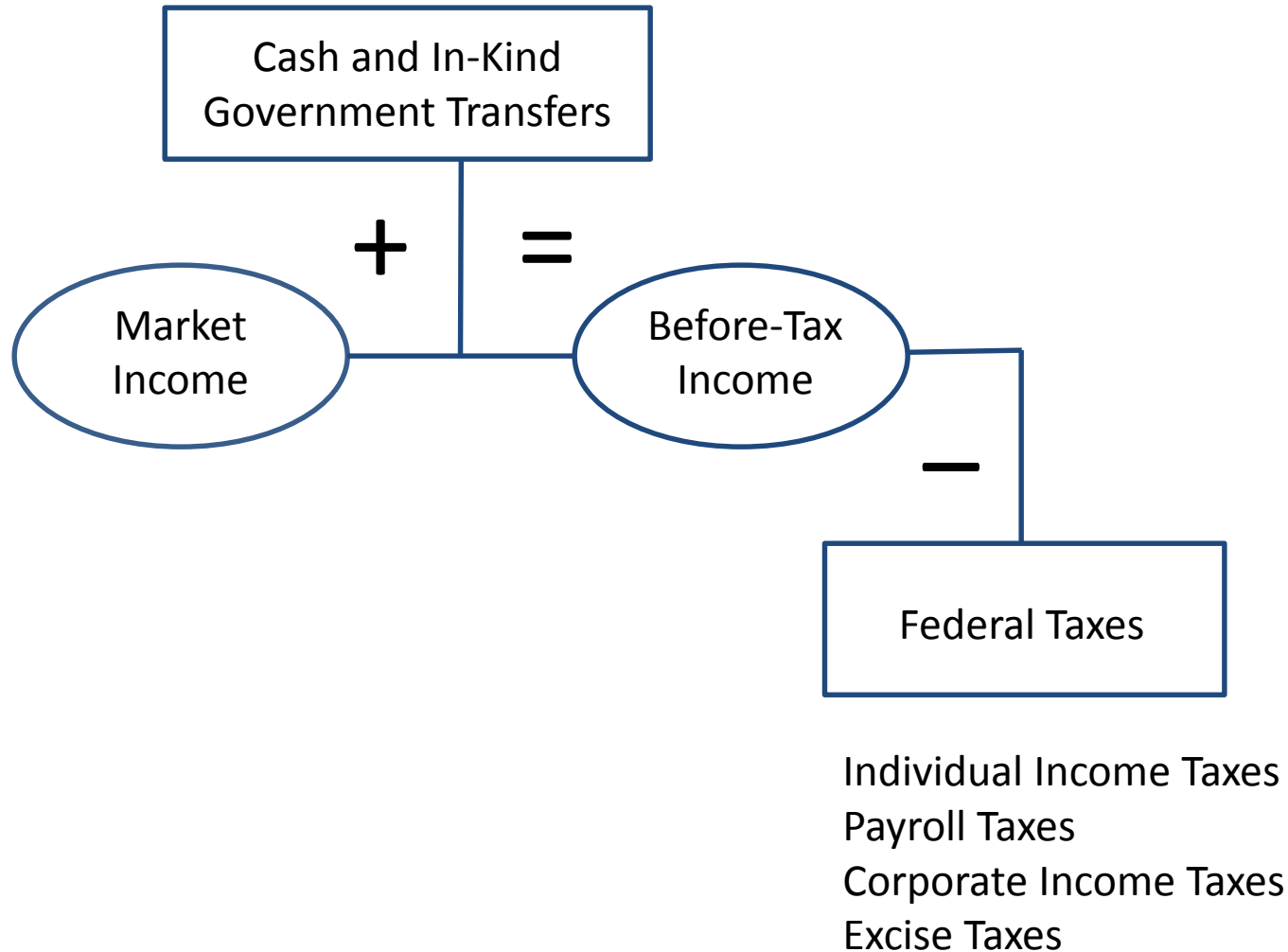
CBO's Previous Distributional Framework



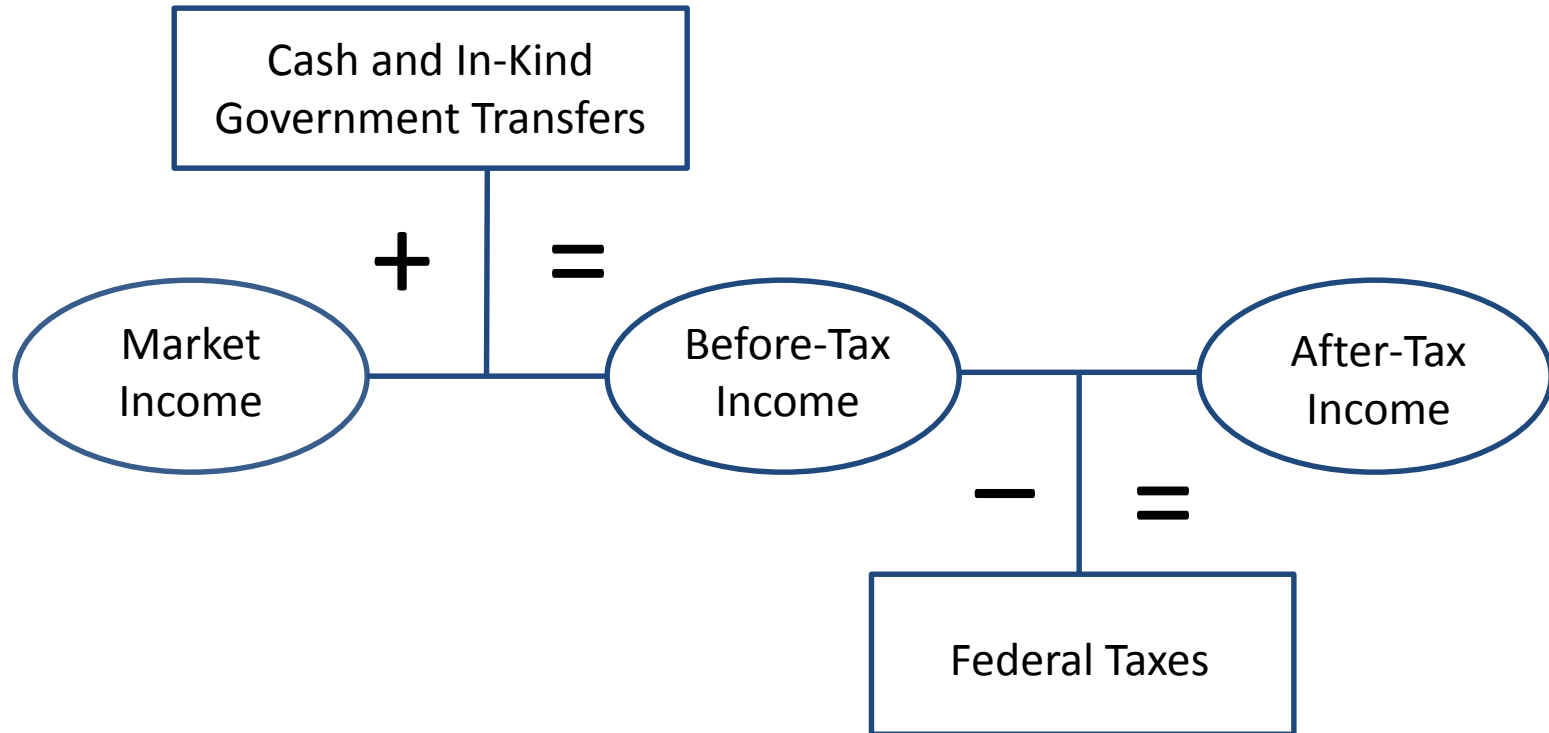
CBO's Previous Distributional Framework



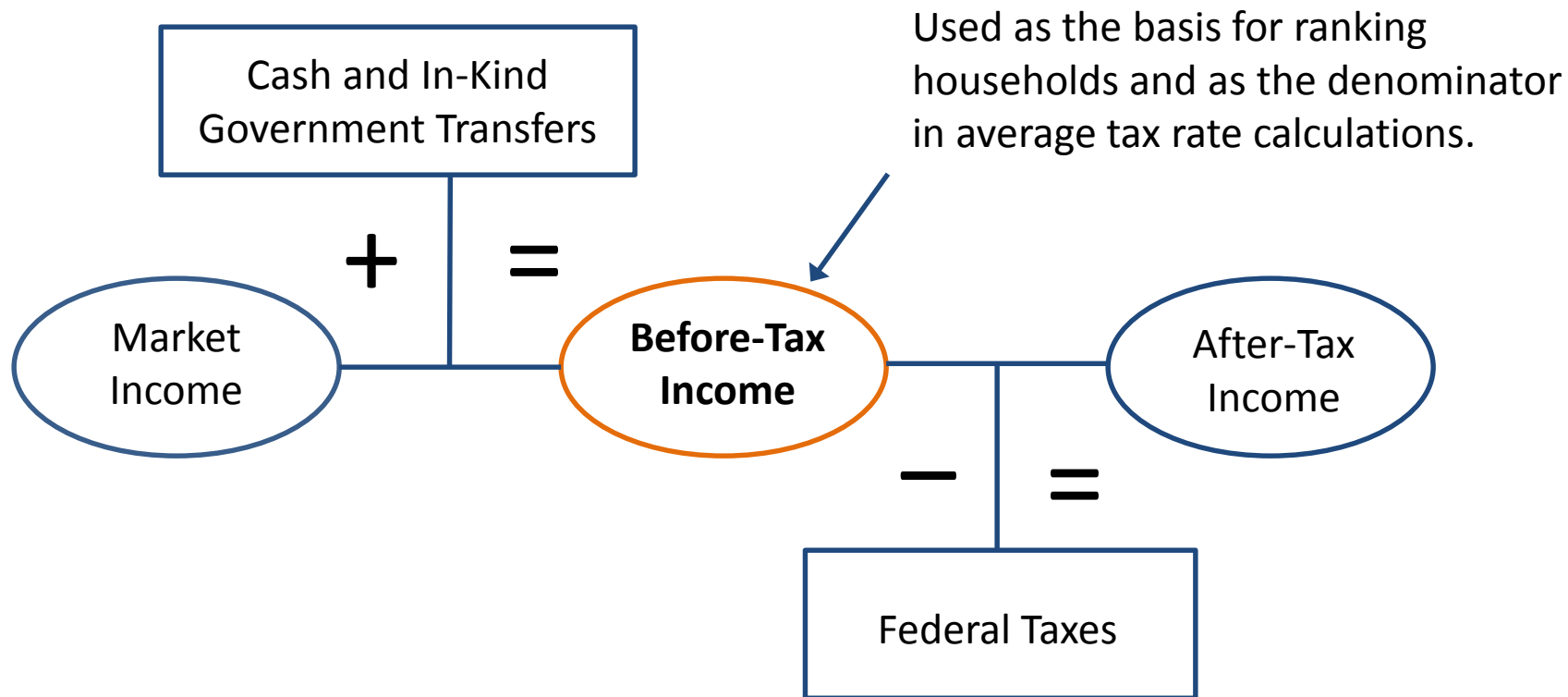
CBO's Previous Distributional Framework



CBO's Previous Distributional Framework



CBO's Previous Distributional Framework



CBO's Previous Distributional Framework

Strengths	Shortcomings
<ul style="list-style-type: none">• Before-tax income, a broad income measure, is a proxy for both overall economic well-being and ability to pay tax liabilities.• Before-tax income is therefore an appropriate denominator for calculating average federal tax rates.	<ul style="list-style-type: none">• The framework is tax-centric, so it is less suitable for distributional analysis of government transfers.• Therefore, the redistributive properties of transfers and taxes are not treated equally.

CBO's New Distributional Framework

CBO's New Distributional Framework



Market
Income

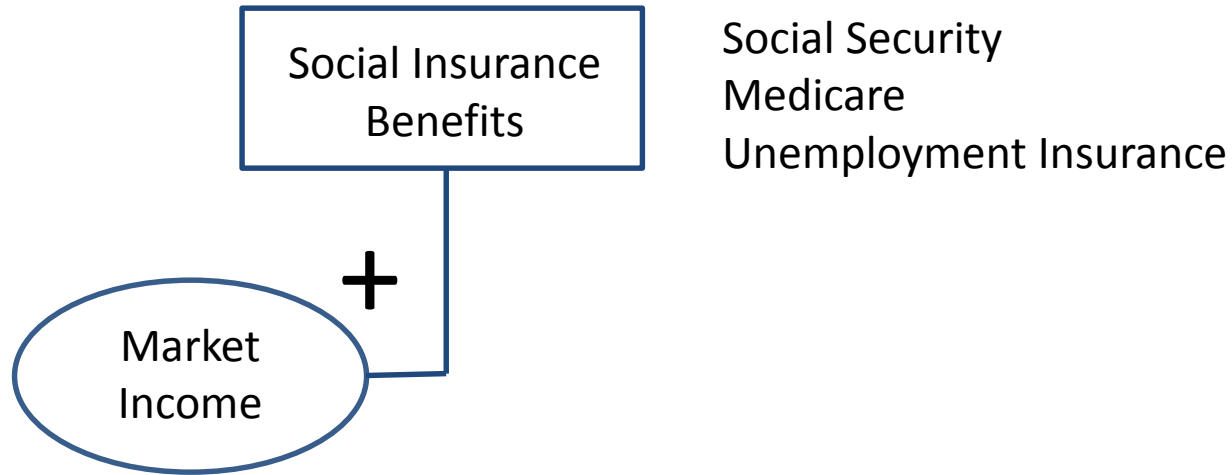
Labor Income: Wages and salaries

Business Income: From businesses and farms

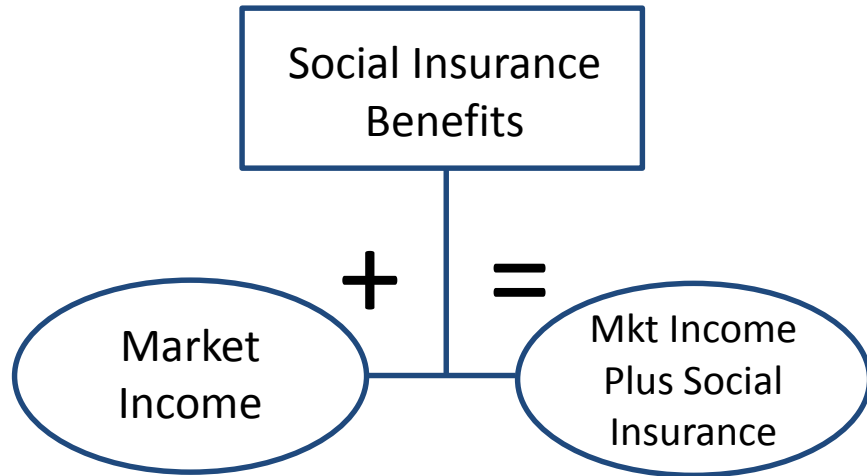
Capital Income: Capital gains, interest, and dividends

Other Income: Mainly retirement Income

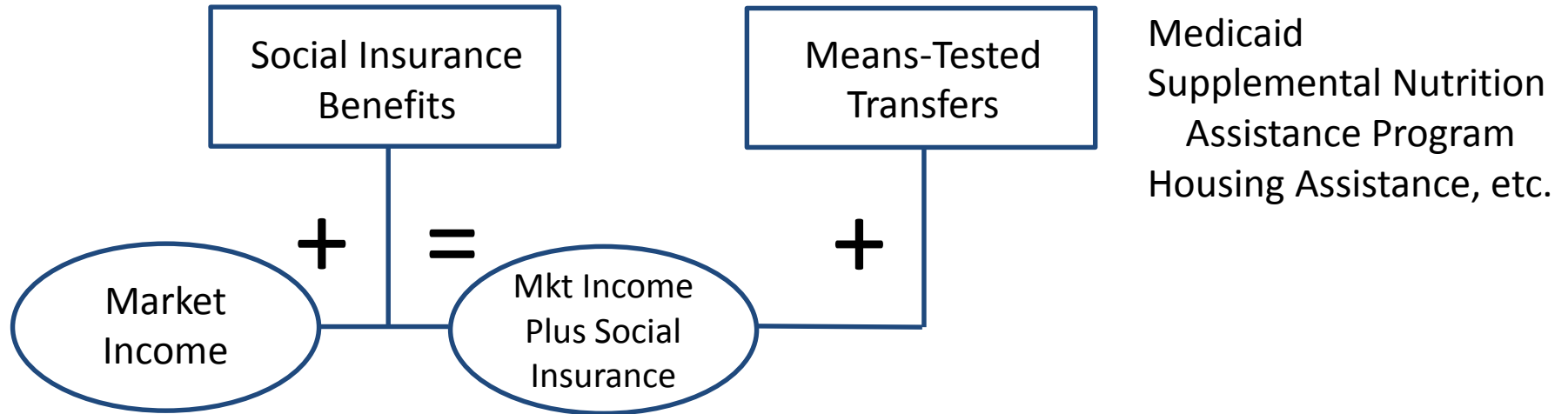
CBO's New Distributional Framework



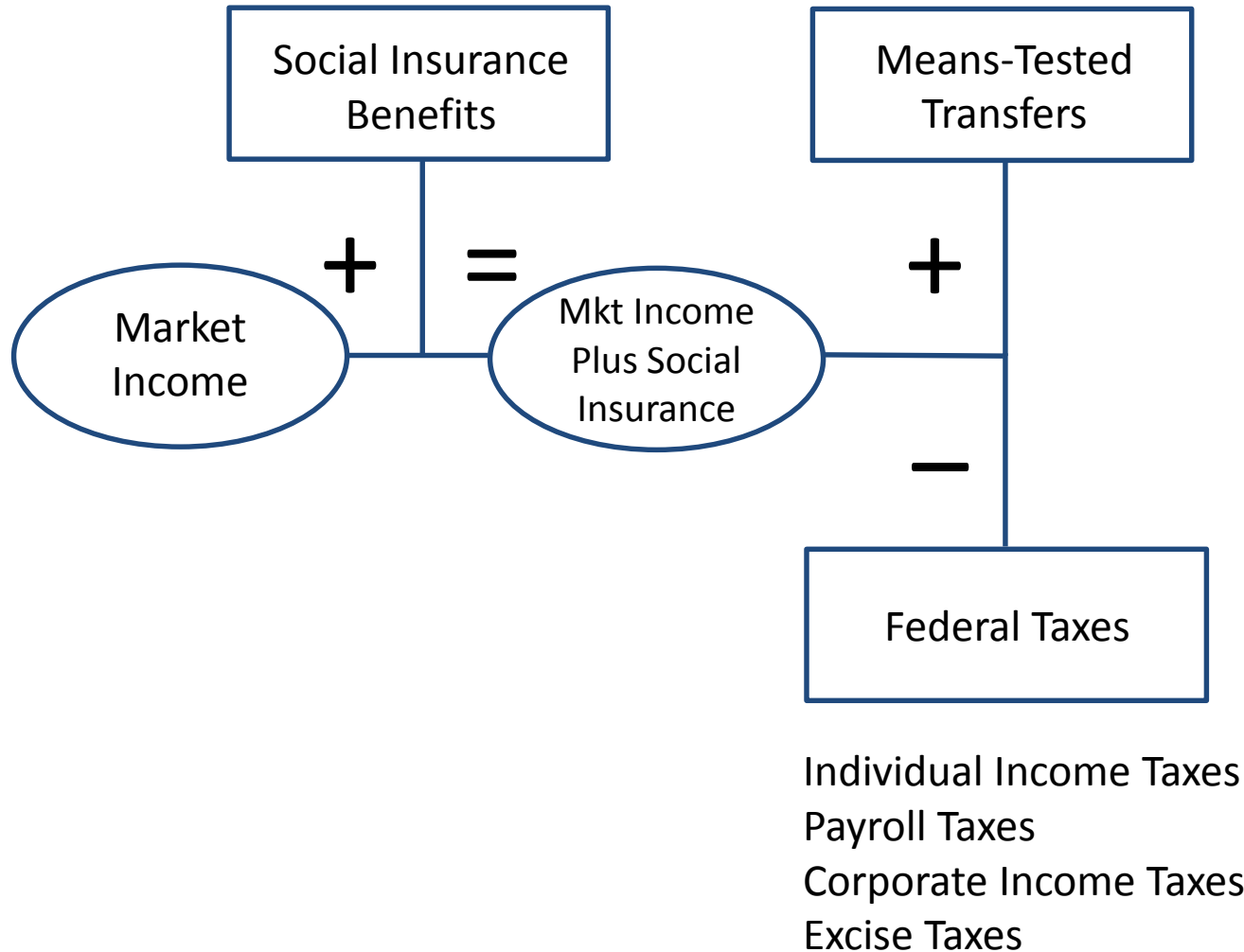
CBO's New Distributional Framework



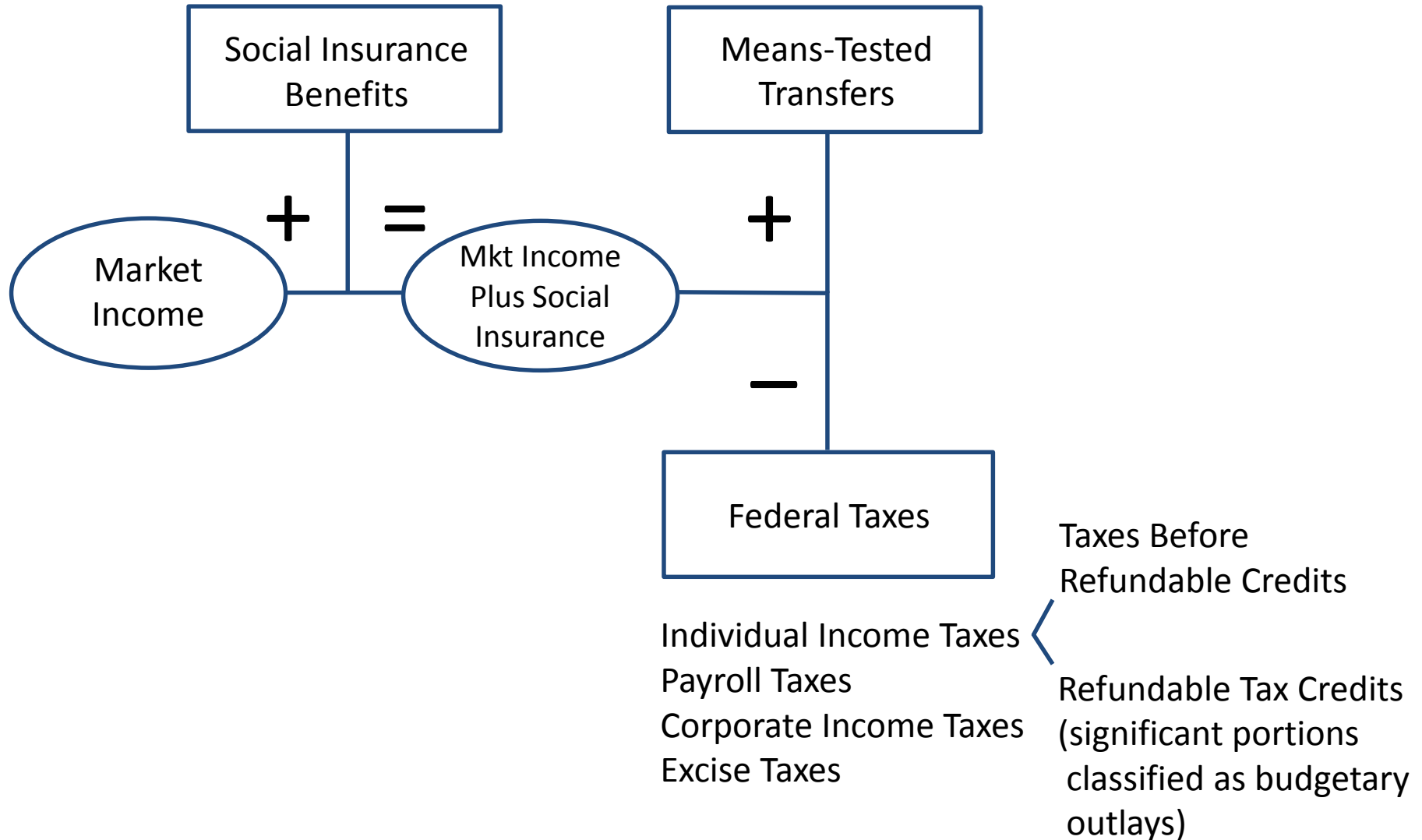
CBO's New Distributional Framework



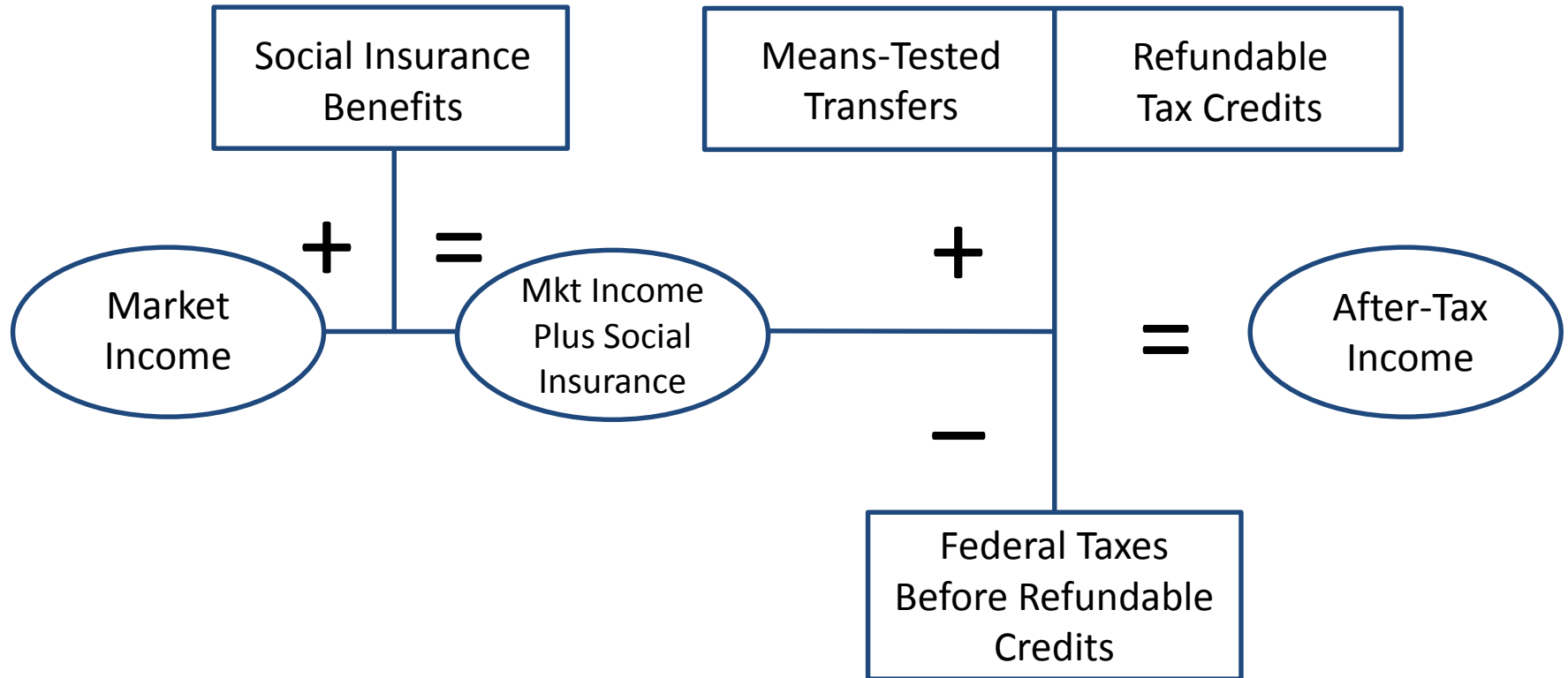
CBO's New Distributional Framework



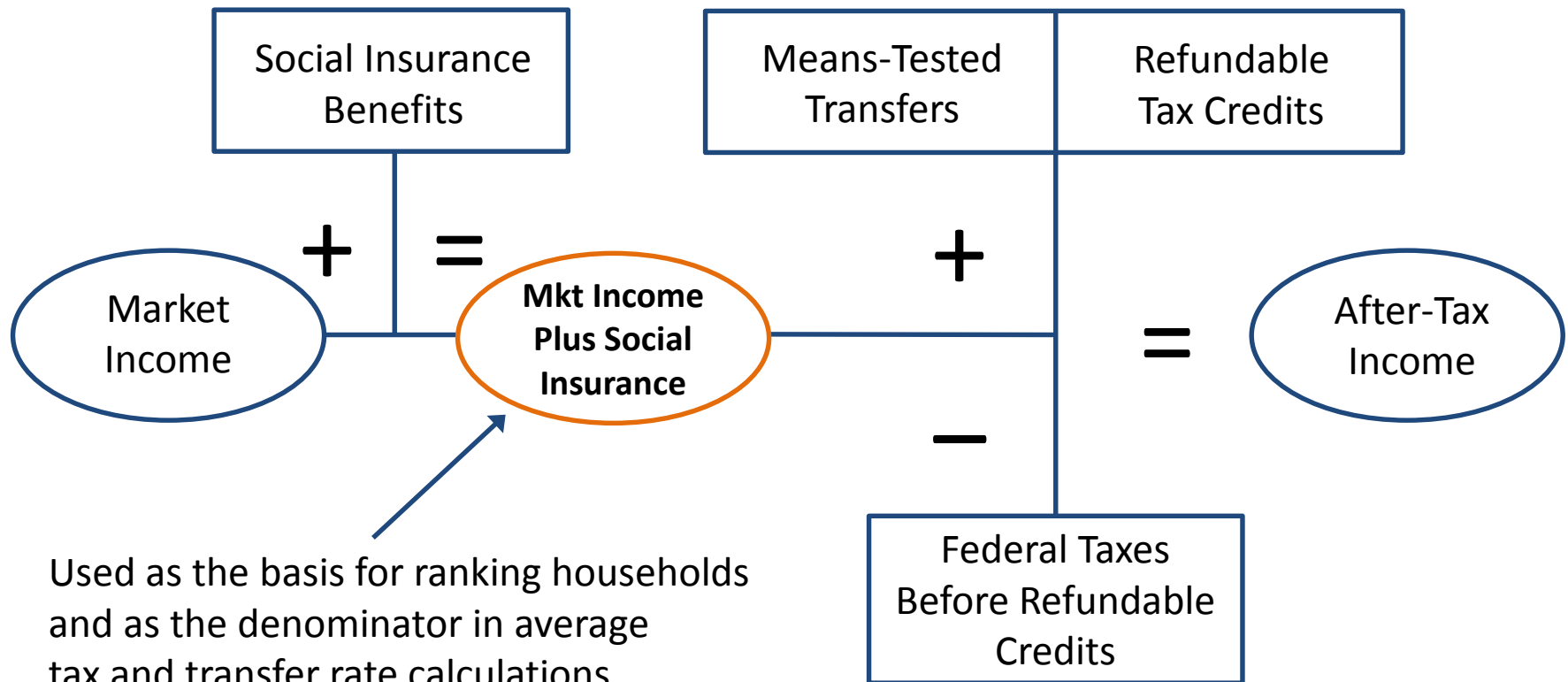
CBO's New Distributional Framework



CBO's New Distributional Framework



CBO's New Distributional Framework



CBO's New Distributional Framework

Strengths	Shortcomings
<ul style="list-style-type: none">• The framework allows analysts to calculate means-tested transfer rates, tax rates, and net tax and transfer rates.• It recognizes that life-cycle income patterns make social insurance benefits difficult to analyze in a cross-sectional framework.	<ul style="list-style-type: none">• The measure of income—market income plus social insurance benefits—does not fully represent one's ability to pay tax liabilities.• Social insurance programs have some redistributive effects that the framework does not capture.

Average Federal Tax Rates

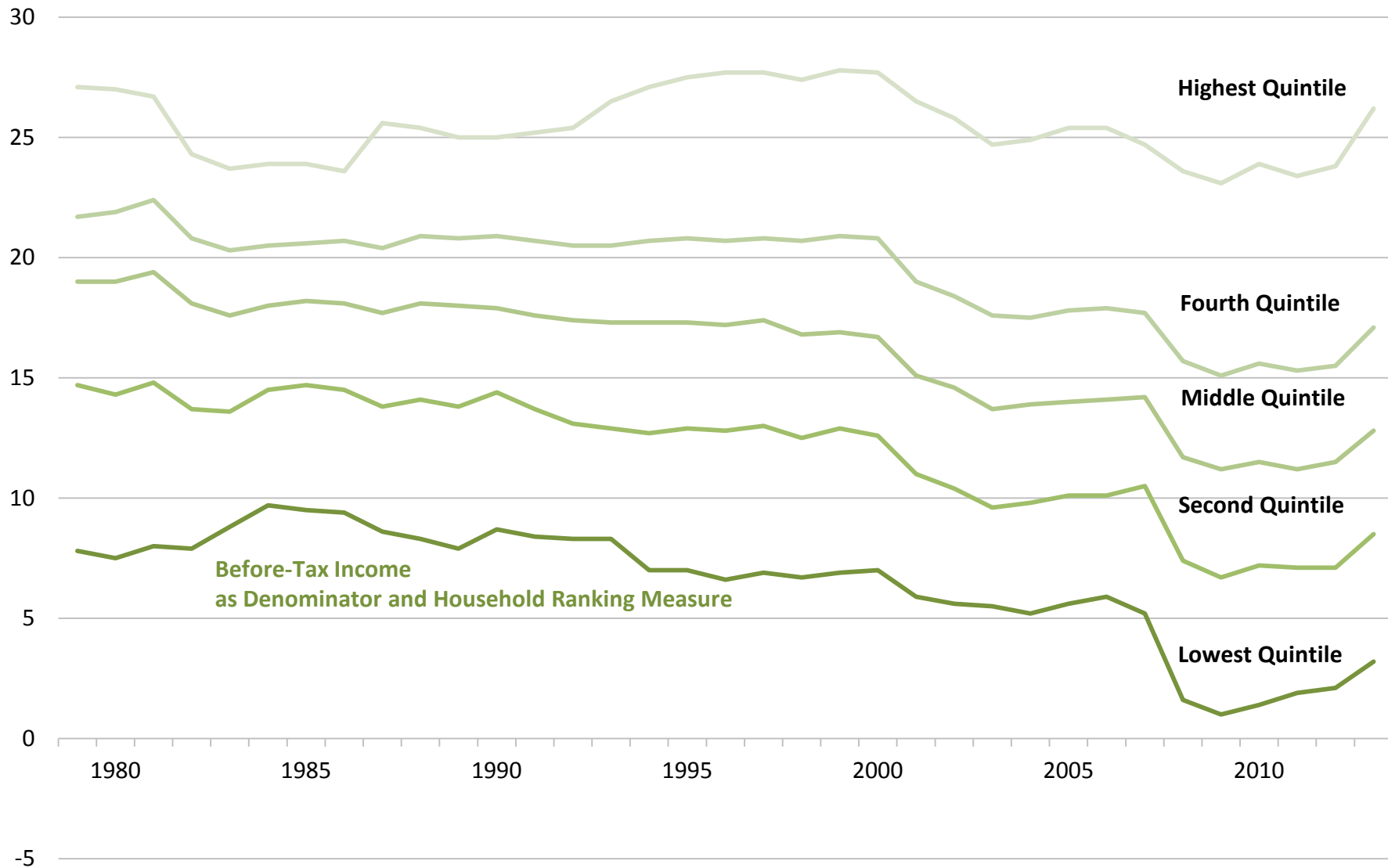
Before-Tax
Income
Framework

Versus

Market Income
Plus
Social Insurance
Benefits
Framework

Average Federal Tax Rates by Income Group, 1979 to 2013

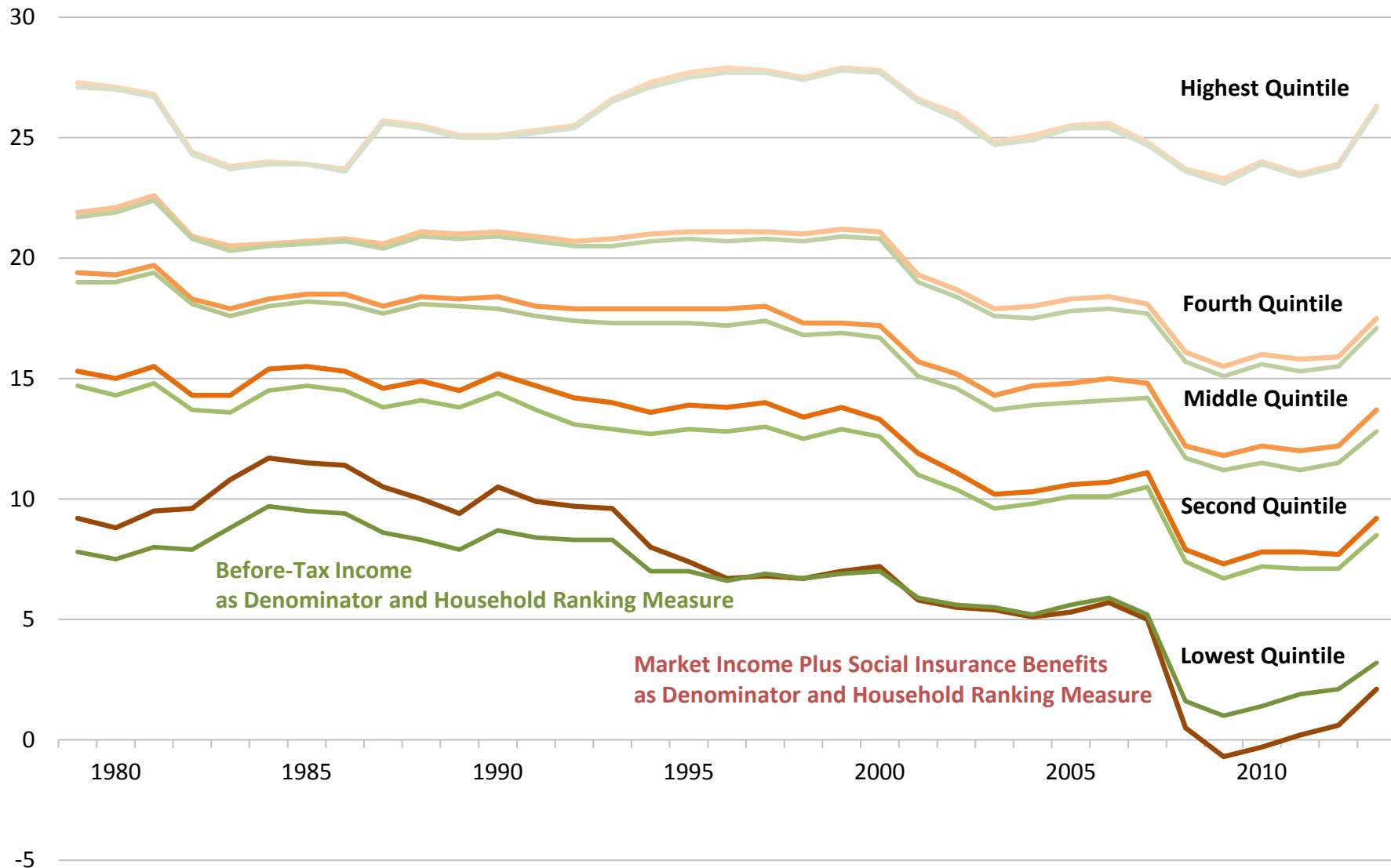
Percent



Before-Tax Income
as Denominator and Household Ranking Measure

Average Federal Tax Rates by Income Group, 1979 to 2013

Percent

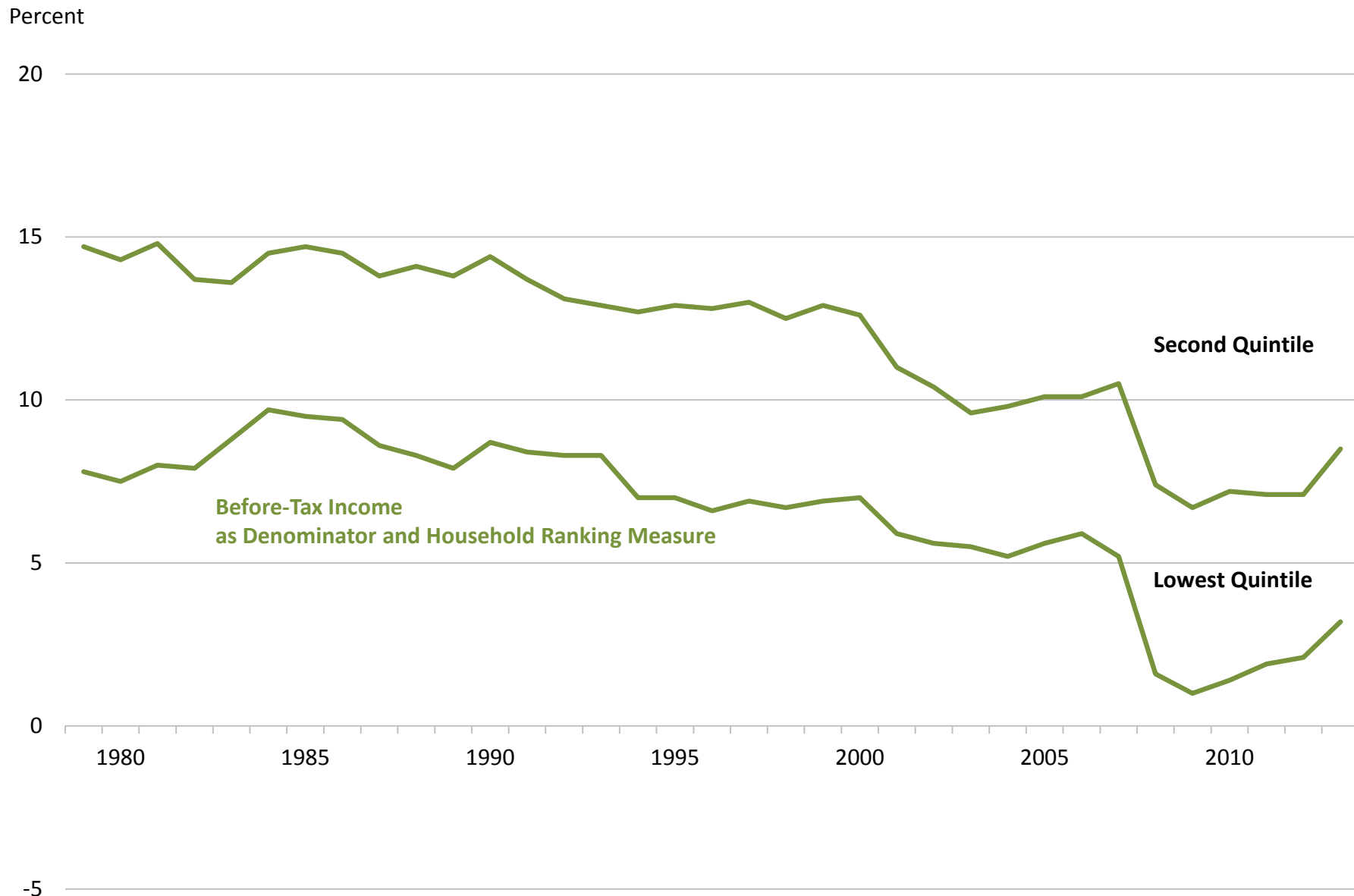


Differences between the frameworks are **primarily at the bottom** of the income distribution.

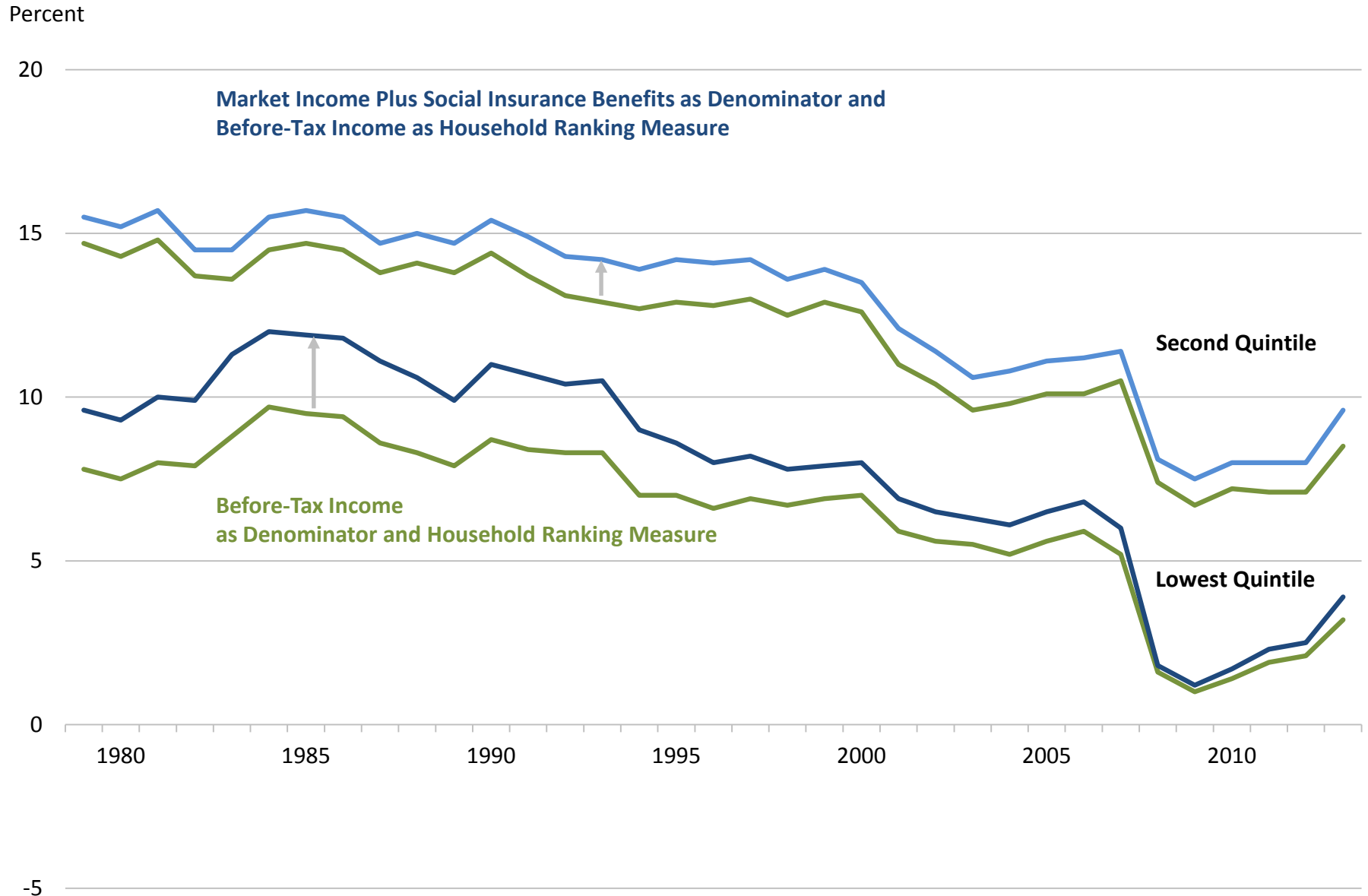
Differences can be decomposed into two, partially offsetting, steps:

1. New denominator, and
2. New household rankings.

Average Federal Tax Rates, by Select Income Groups, 1979 to 2013

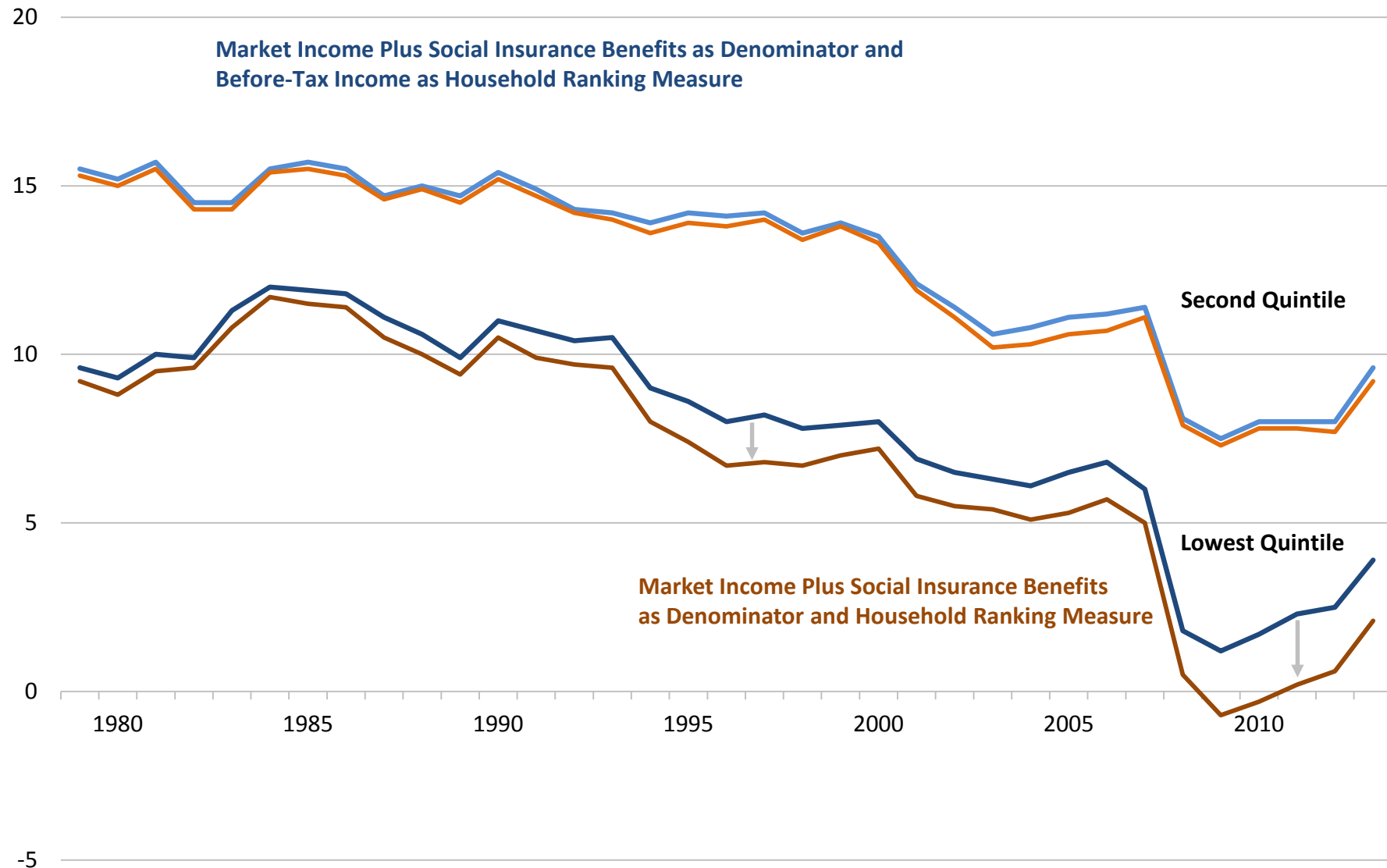


Average Federal Tax Rates, by Select Income Groups, 1979 to 2013

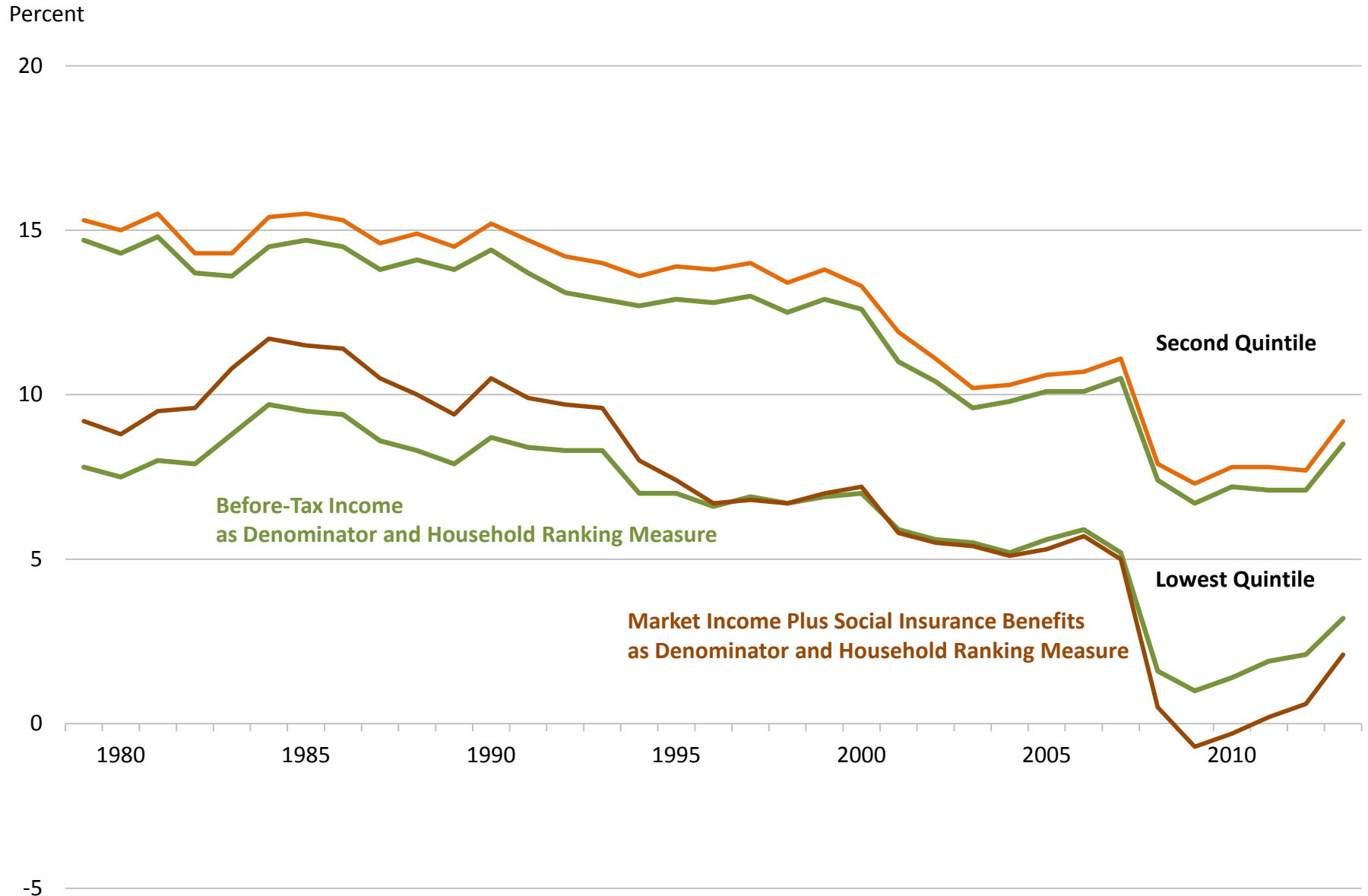


Average Federal Tax Rates, by Select Income Groups, 1979 to 2013

Percent



Average Federal Tax Rates, by Select Income Groups, 1979 to 2013



Correcting for Underreporting of Government Transfers

A Regression-Based Approach With Preliminary Results

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

CBO's tax model draws its transfer income data from the Annual Social and Economic Supplement of the Current Population Survey (CPS). The analysis in this section is conducted using only CPS data, before merging with administrative tax data.

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

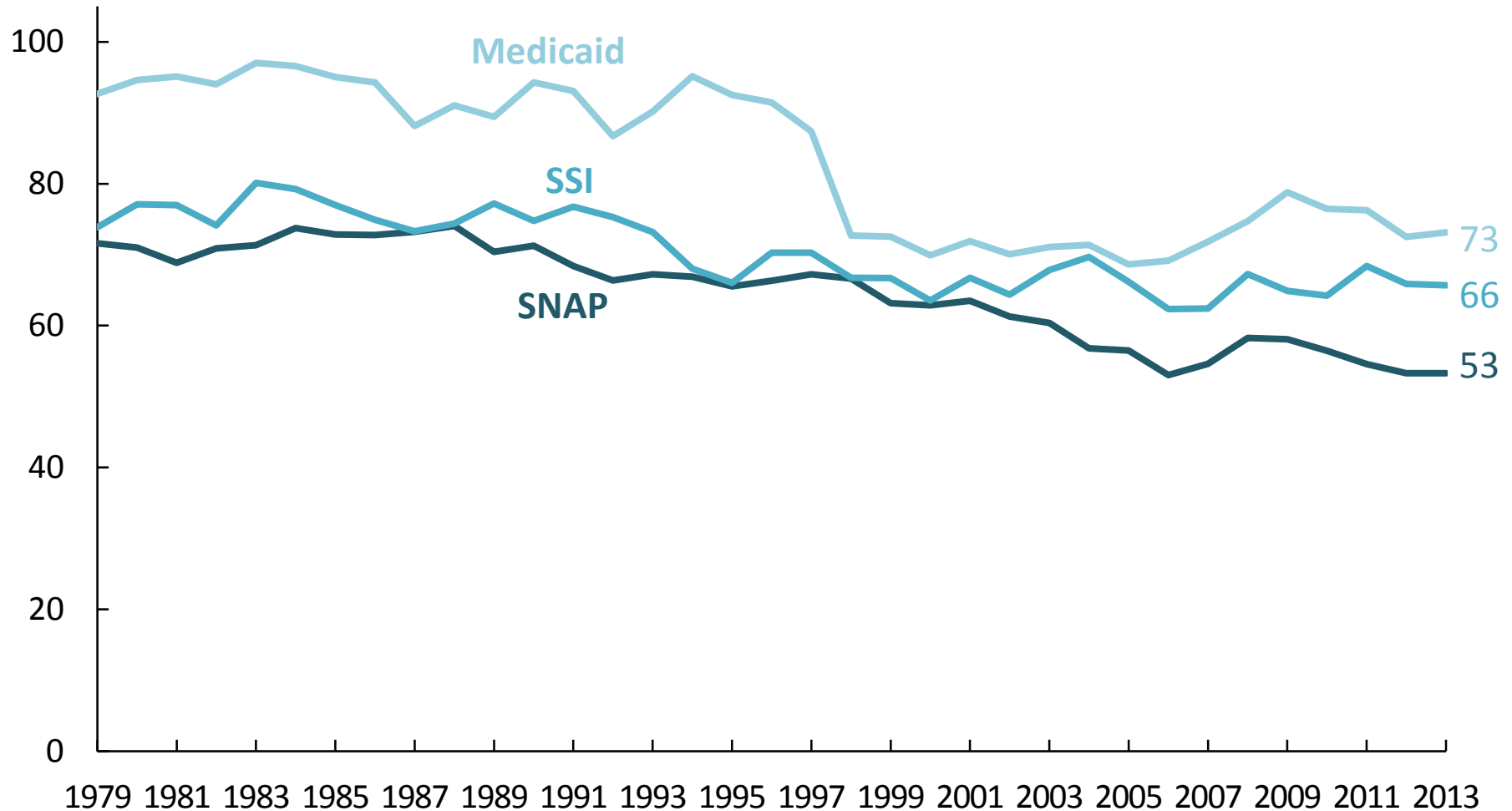
CBO's goal is to obtain a more complete (although partially imputed) accounting of income from government transfers in the CPS **with enough precision for quintile-level distributional analysis.**

This analysis is focused on three of the largest means-tested transfer programs—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

Reporting Rates in the CPS for Means-Tested Transfer Programs, 1979 to 2013

CPS Recipients as a Percentage of Administrative Recipients



Researchers typically use one of three methods to correct for underreporting:

- Administrative matching,
- Rules-based simulation, or
- 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: The Urban Institute's Transfer Income Model—see Zedlewski and Giannarelli (2015).

CBO is opting for a **regression-based estimation** approach, which is tractable for analyzing multiple programs over many years but is less precise at the micro level.

That approach allows CBO to perform quintile-level distributional analyses of various transfer programs from 1979 onward.

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 comprise individual and household characteristics based on program rules and other factors associated with program participation.

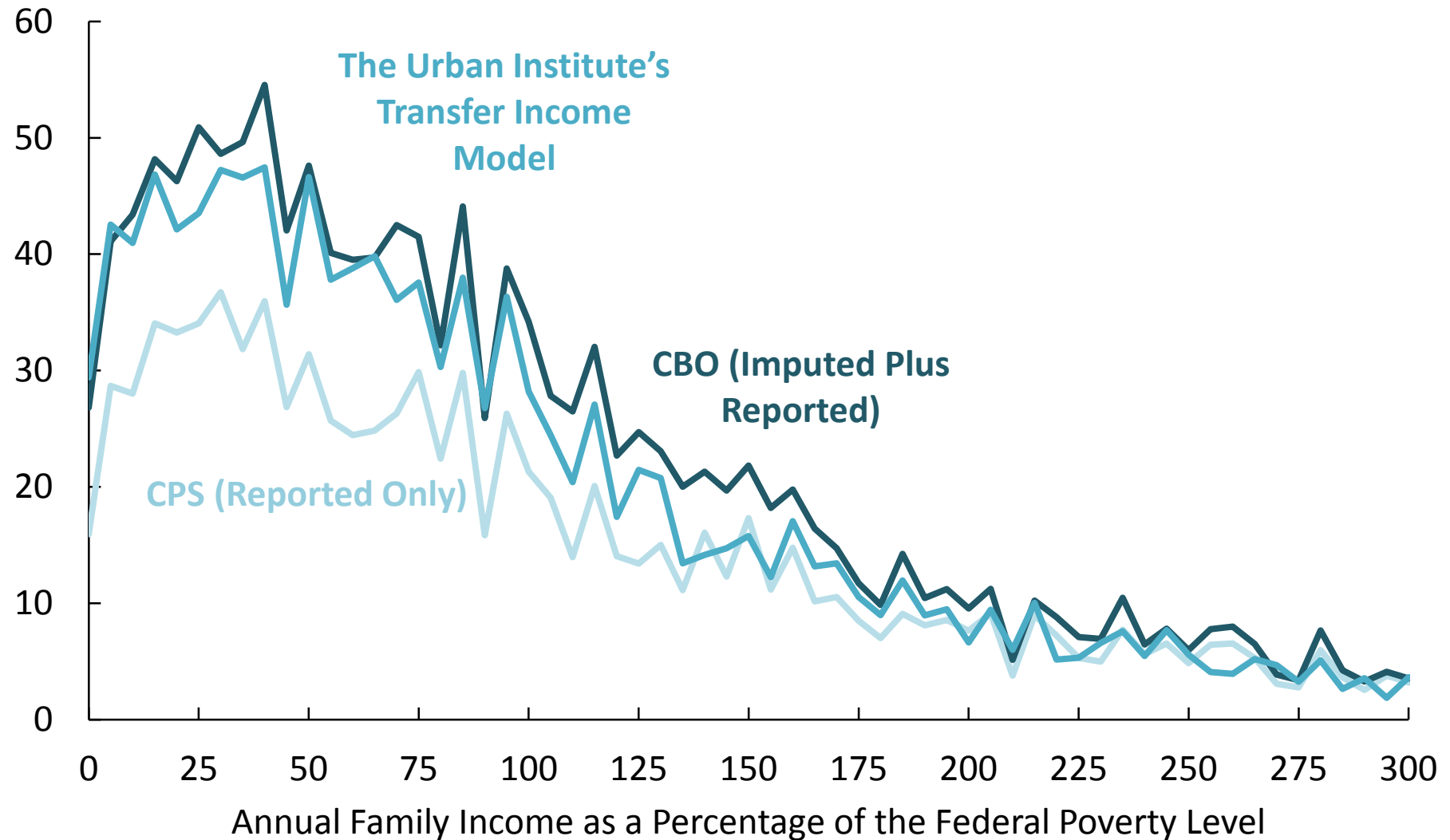
Individual characteristics include age, race, education, labor force status, disability, marital status, and receipt of other means-tested transfers.

Household/family characteristics include income (as a percentage of the federal poverty level), income composition, household size and structure, and geographic location.

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, seniors).

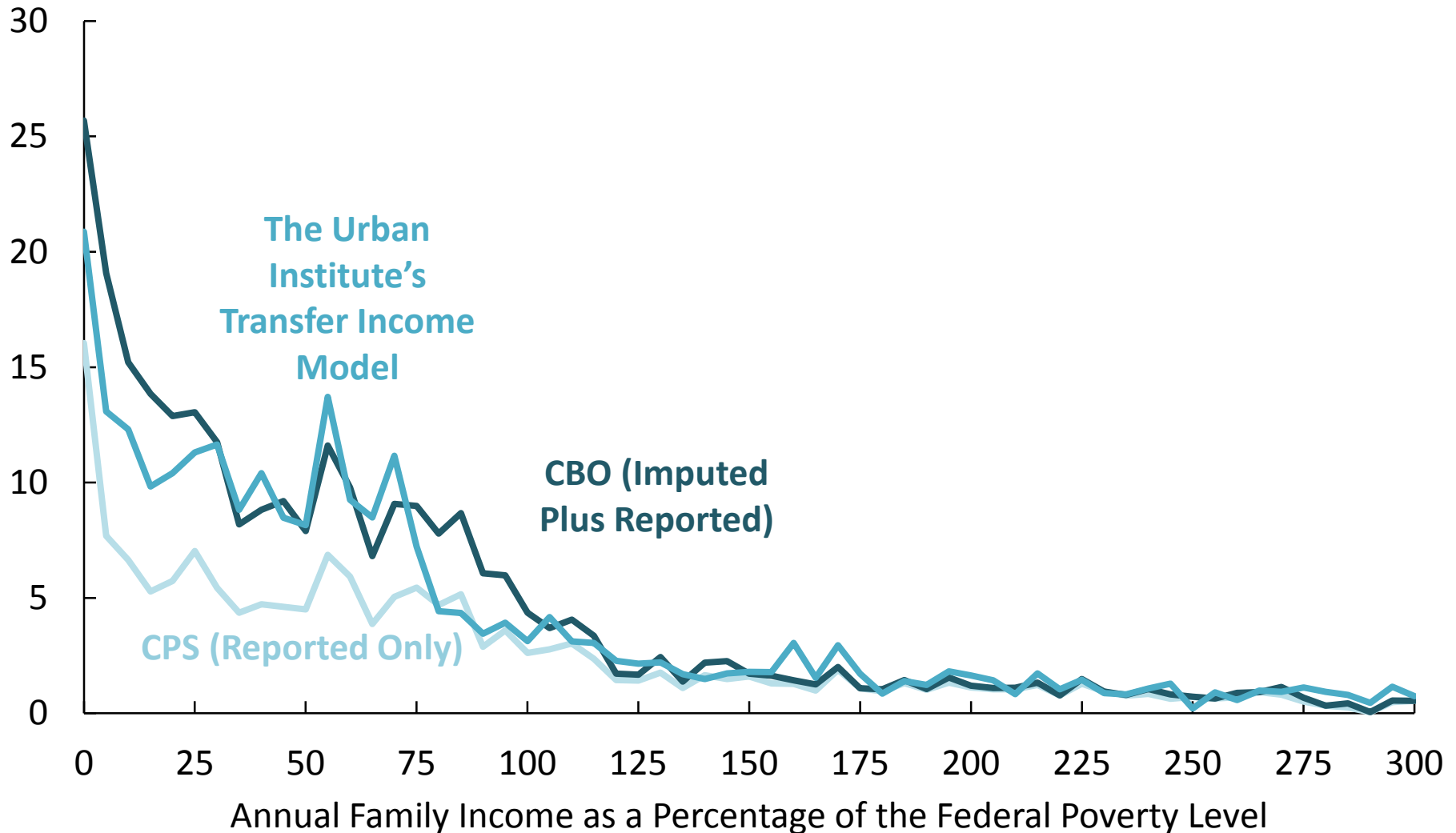
Medicaid Recipience Rates by Income, 2010

Percentage of Adults Receiving Benefits



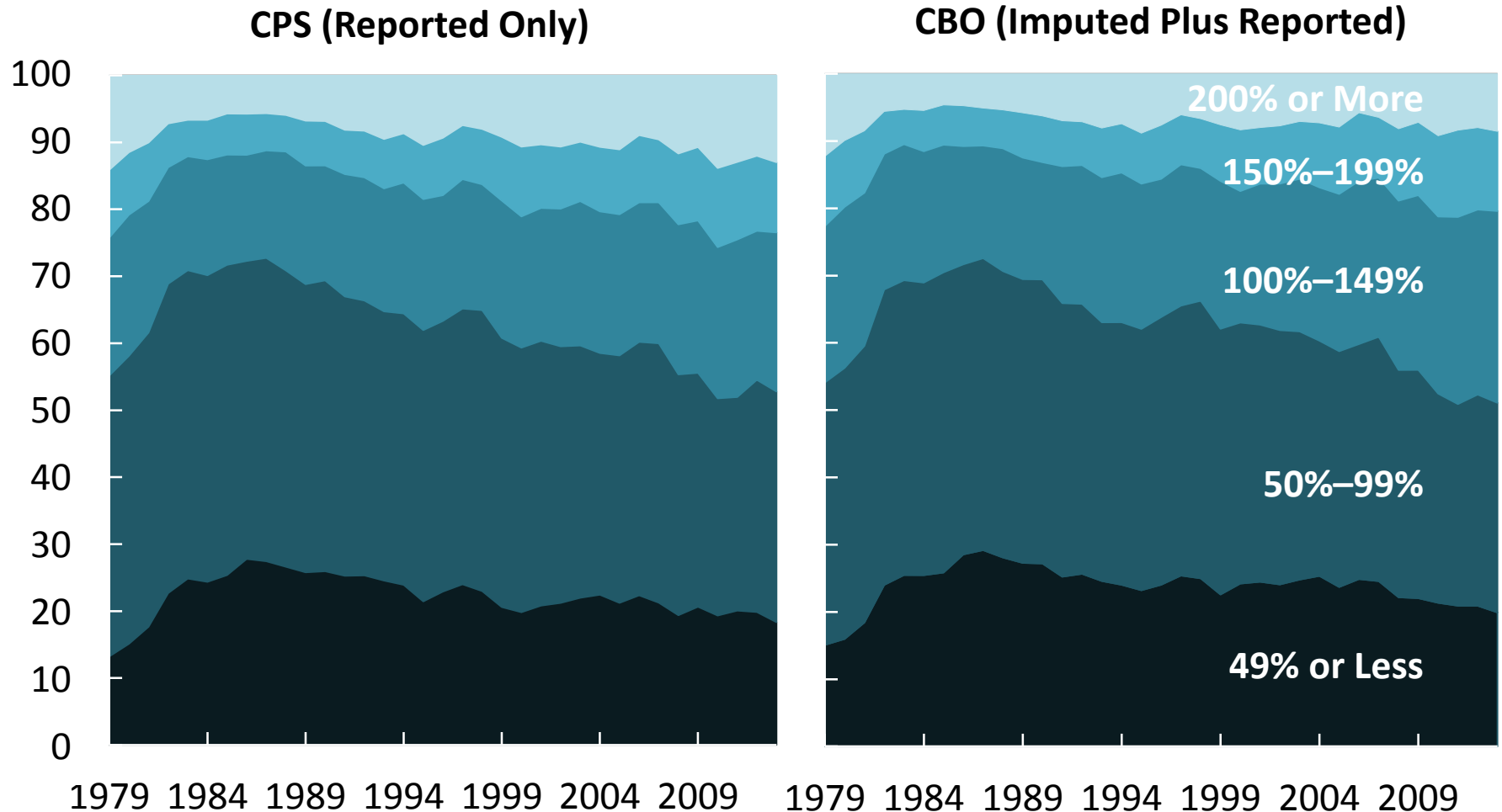
SSI Recipience Rates by Income, 2010

Percentage of Individuals Receiving Benefits



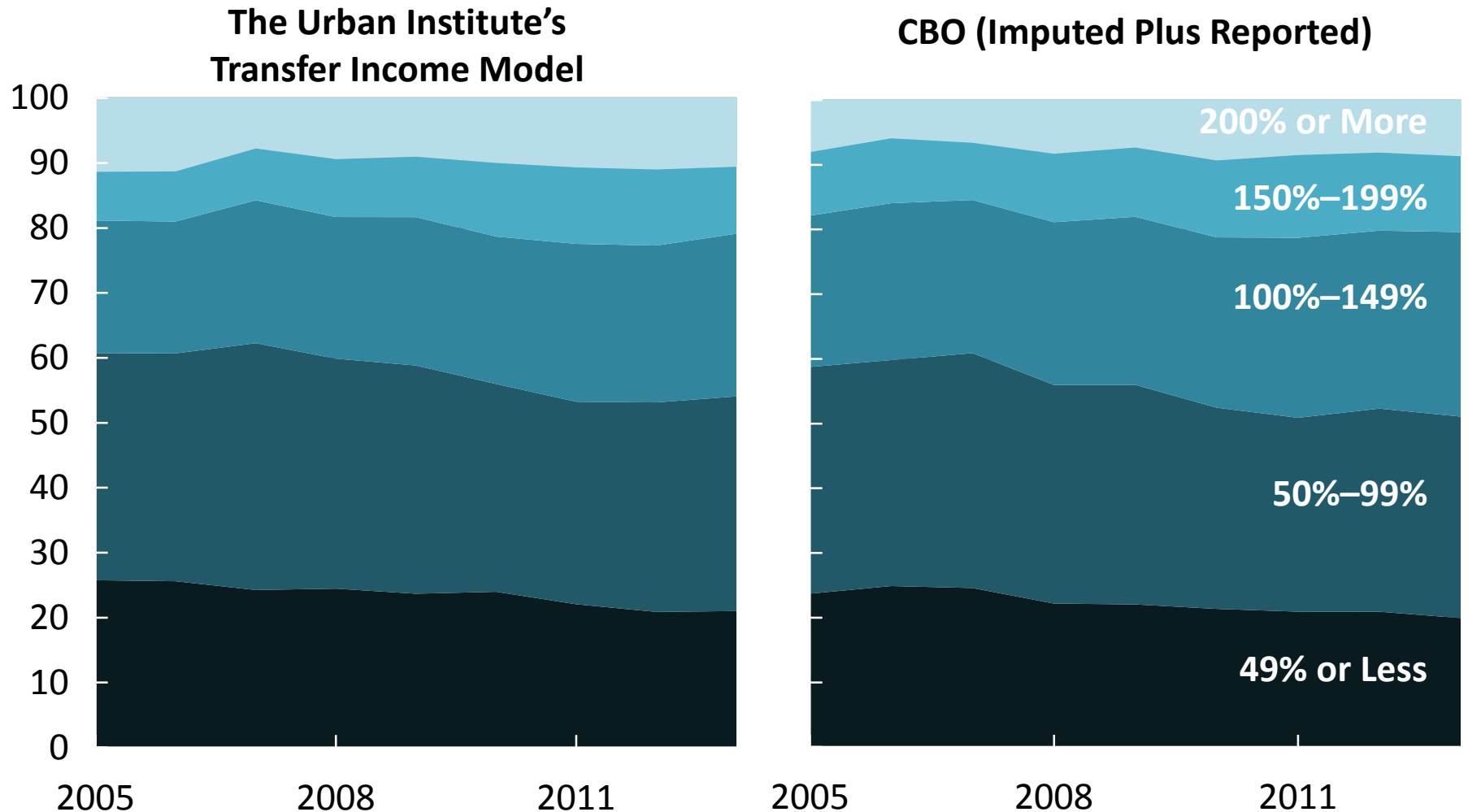
Distribution of SNAP Recipients by Annual Household Income as a Percentage of the Federal Poverty Level, 1979 to 2013

Percentage of Recipients



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

Percentage of Recipients



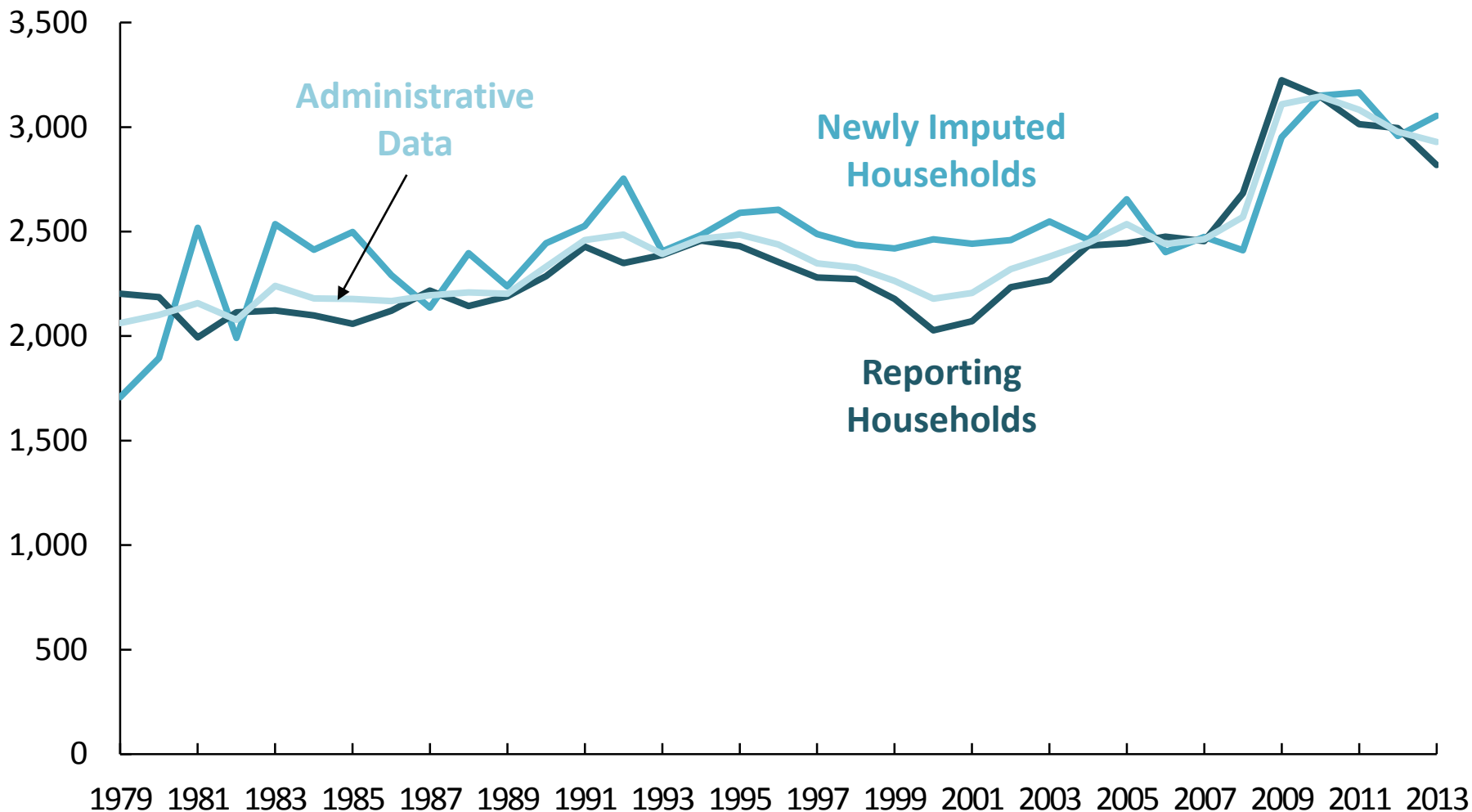
Step 3. Transfer income is assigned to recipients. The methodology underlying that assignment varies by program.

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

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 to 2013

Inflation-Adjusted 2013 Dollars

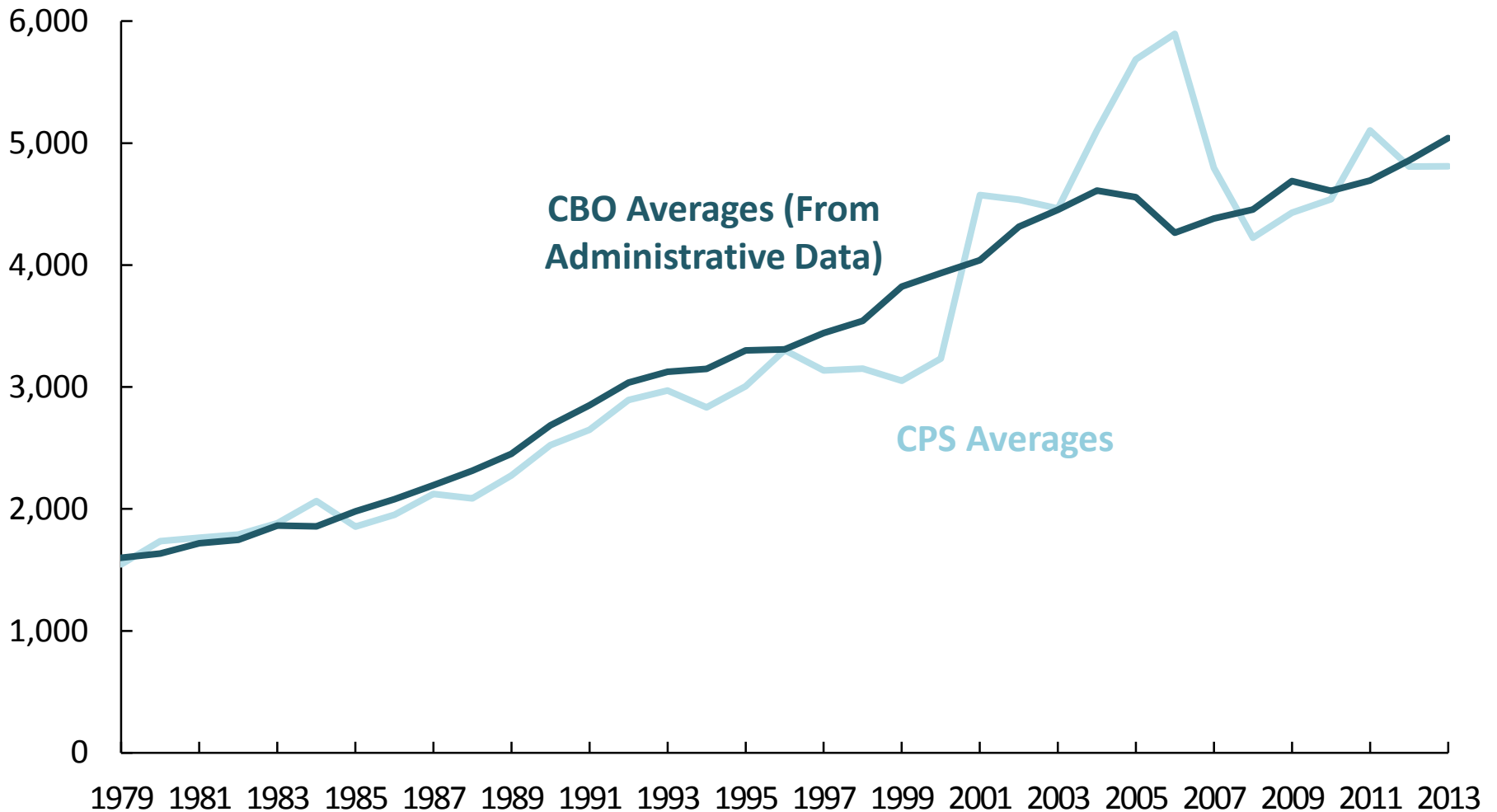


For Medicaid, CBO derives the **average cost to the government per recipient** from administrative data (by eligibility category).

Those averages are then assigned to all recipients (CPS “reported” values are overwritten).

Average Annual Cost per Medicaid Recipient, 1979 to 2013

Inflation-Adjusted 2013 Dollars



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

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

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

Social Insurance Benefits

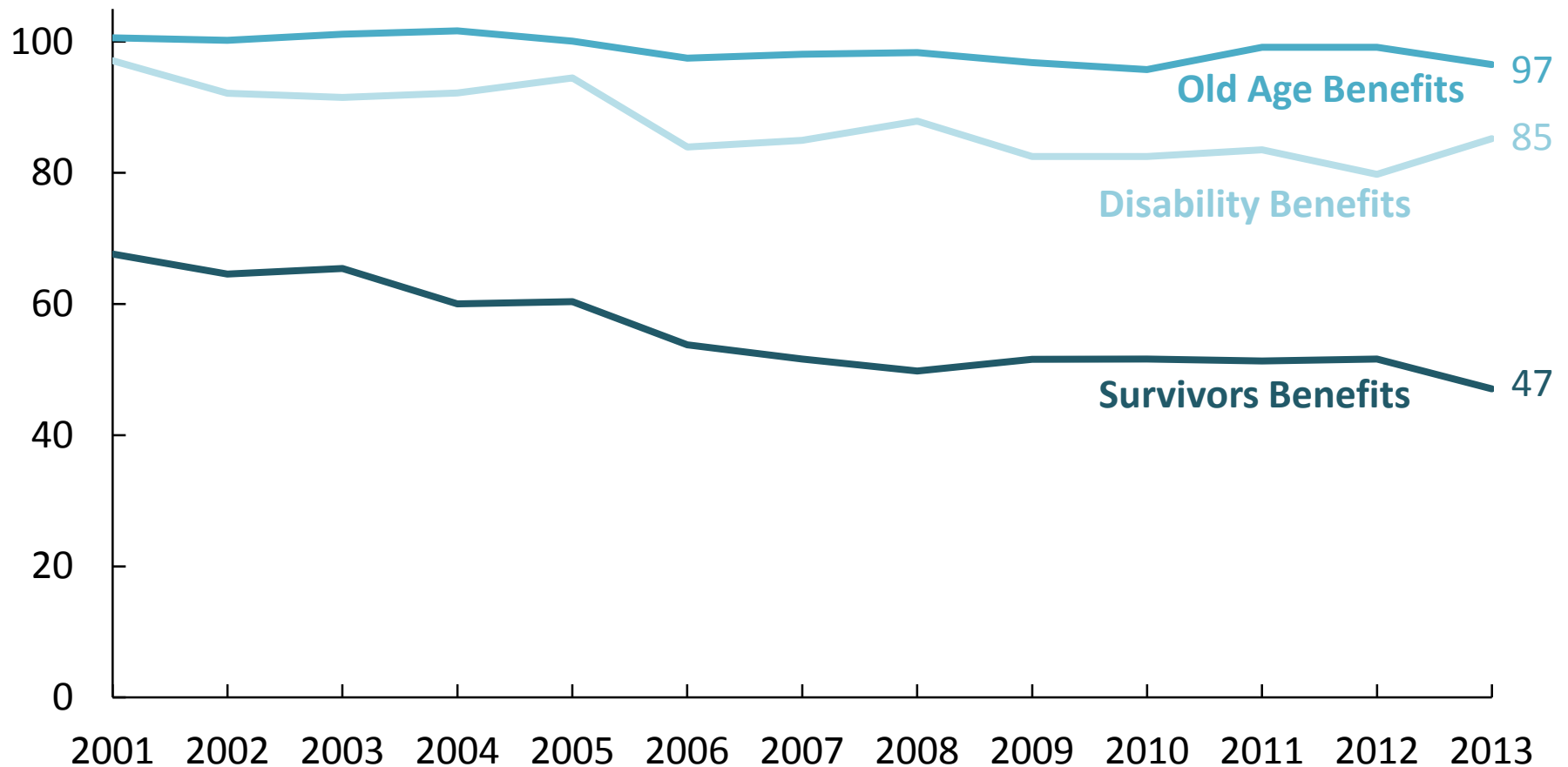
CBO uses a **different approach for imputing social insurance benefits.**

For its analysis of the distribution of household income, CBO does not currently 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 using the data available in the CPS. 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 are needed to impute Social Security survivors' benefits).

Social Security Reporting Rates in the CPS, 2001–2013

CPS Recipients as a Percentage of Administrative Recipients

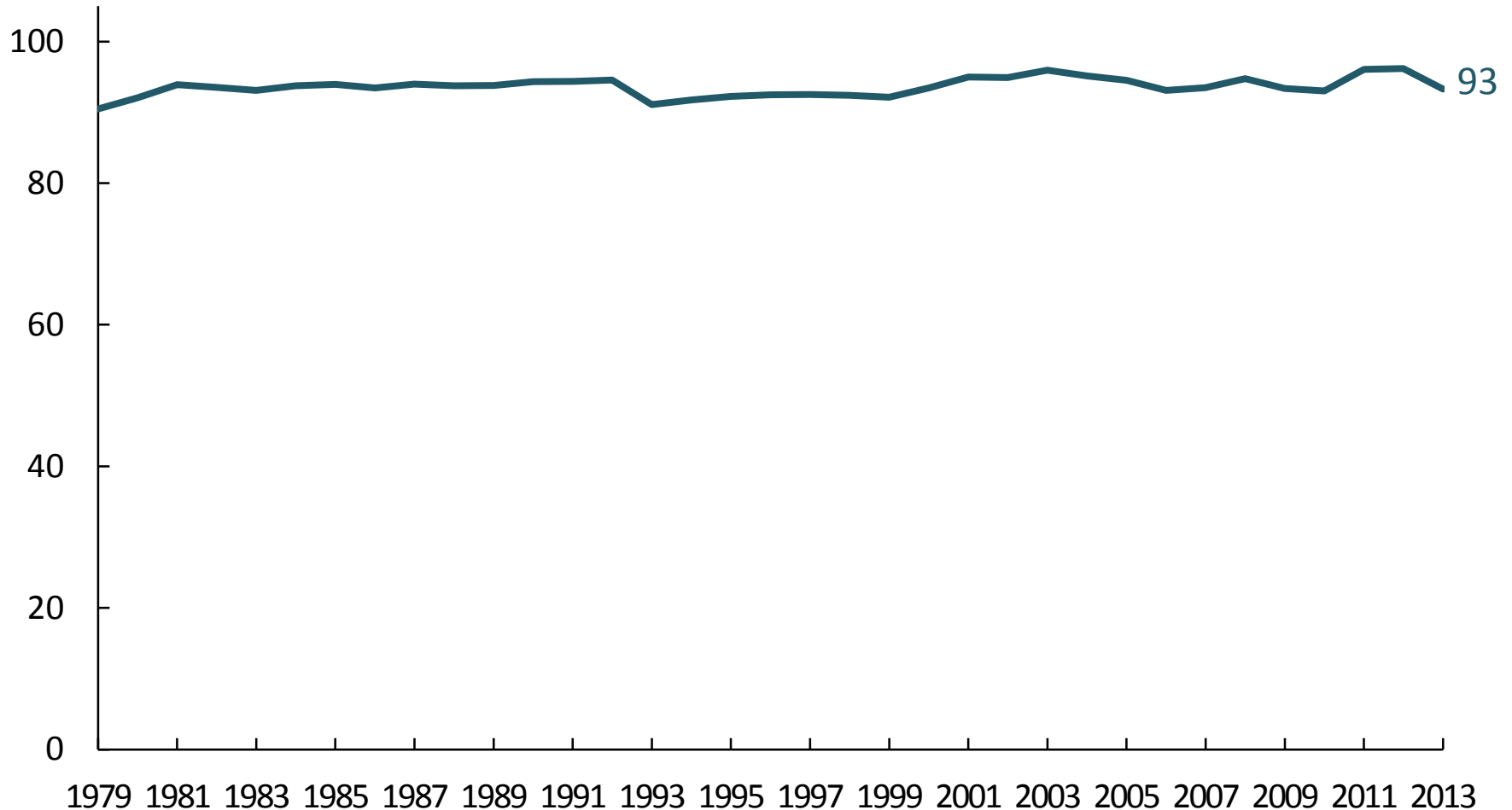


To impute Social Security benefits, CBO creates a pool of eligible recipients for each type of benefit and randomly assigns receipt until the administrative counts are matched.

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 to 2013

CPS Recipients as a Percentage of Administrative Recipients



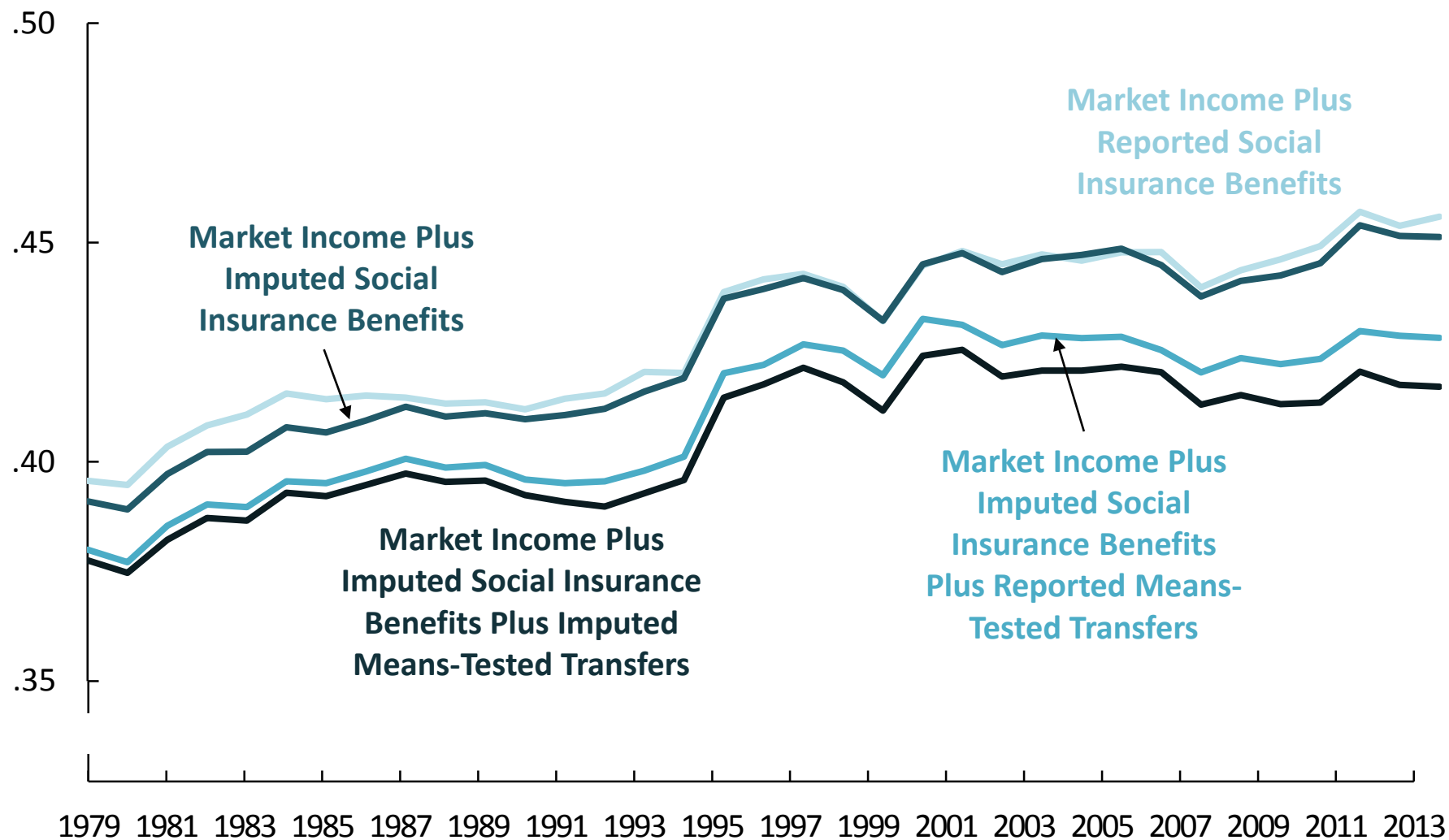
To impute Medicare benefits, CBO makes no change to reported recipients.

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

Preliminary Conclusions

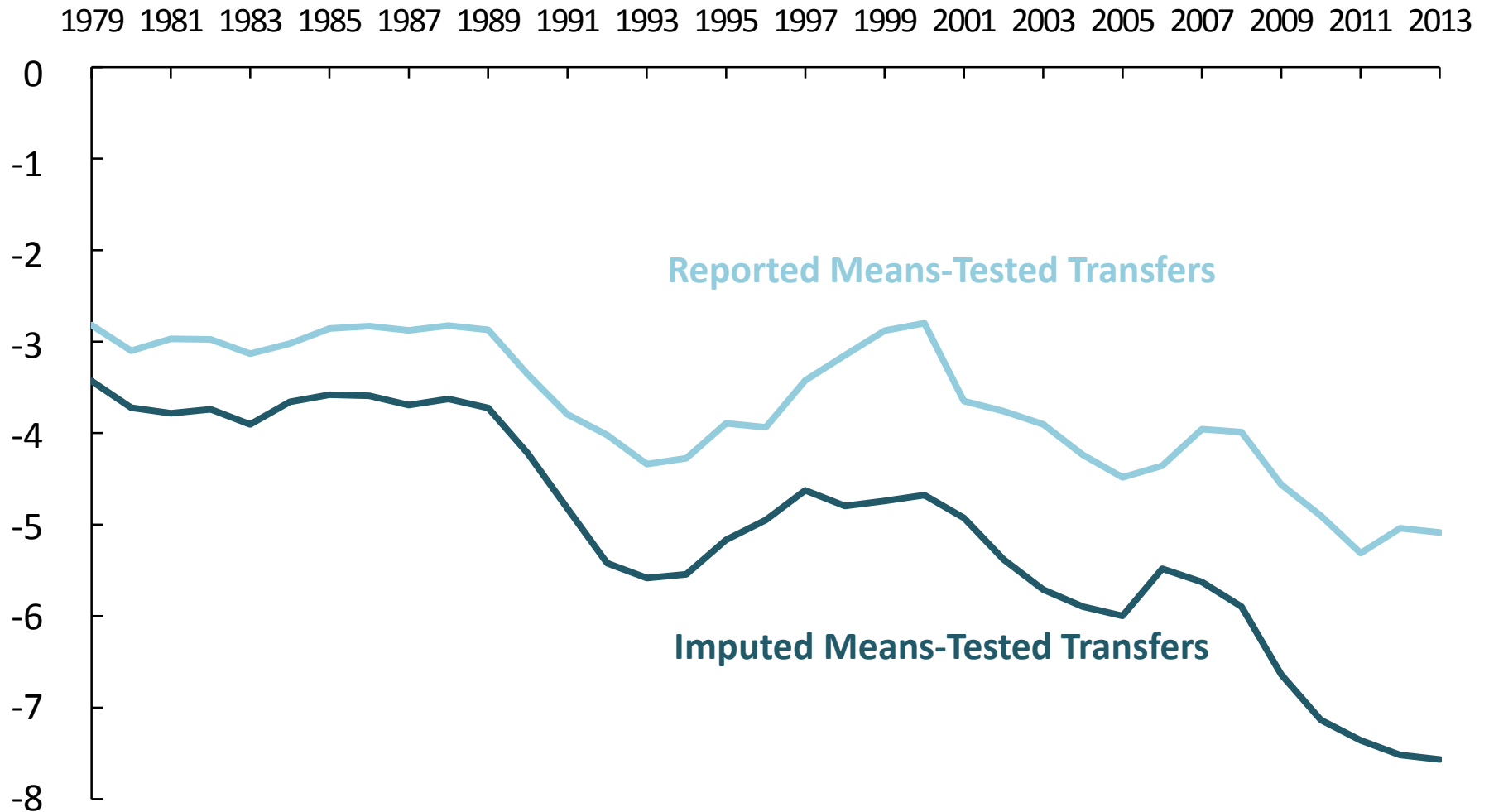
Income Inequality, 1979 to 2013

Gini Index



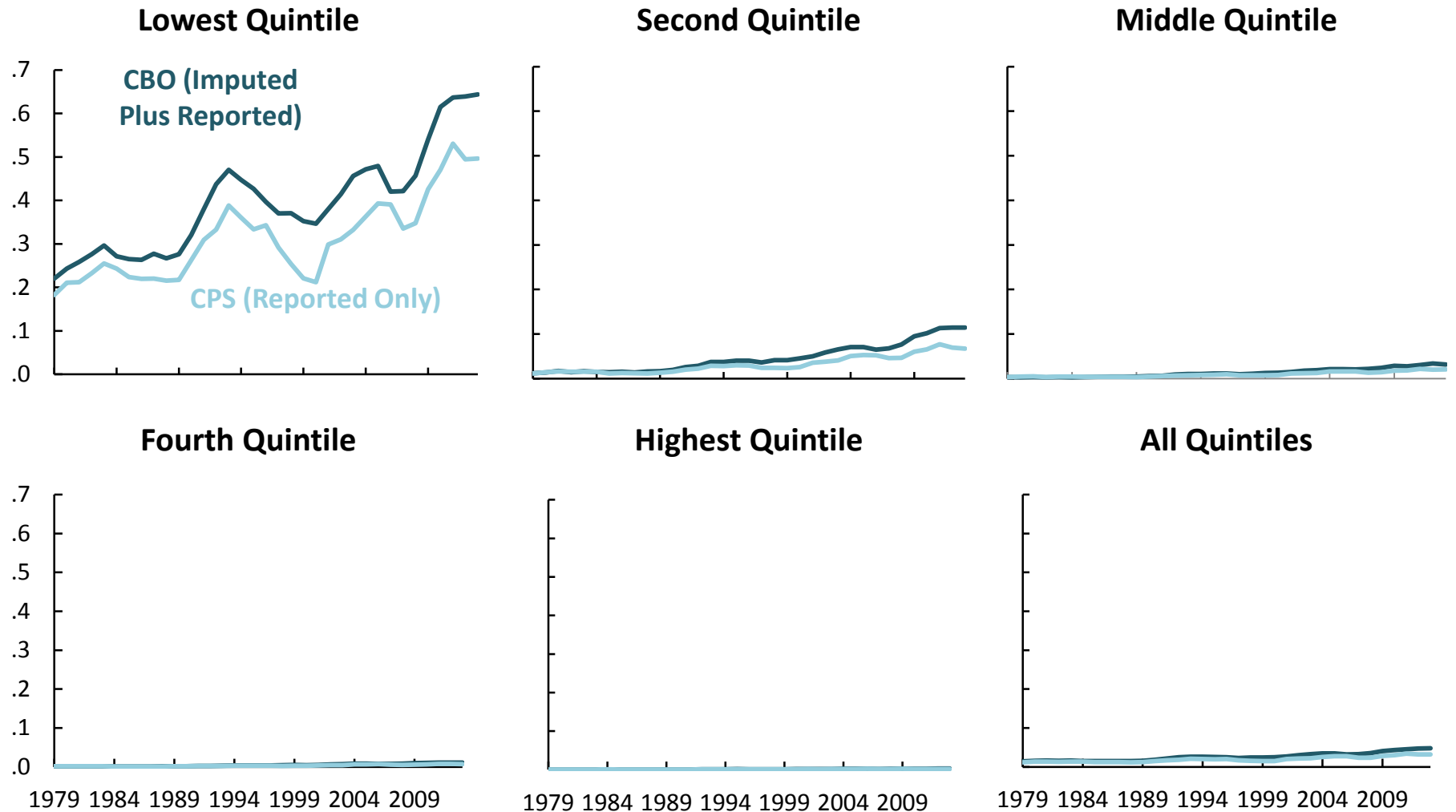
Change in Gini Index, 1979 to 2013

Percentage Change Relative to Market Income Plus Imputed Social Insurance Benefits



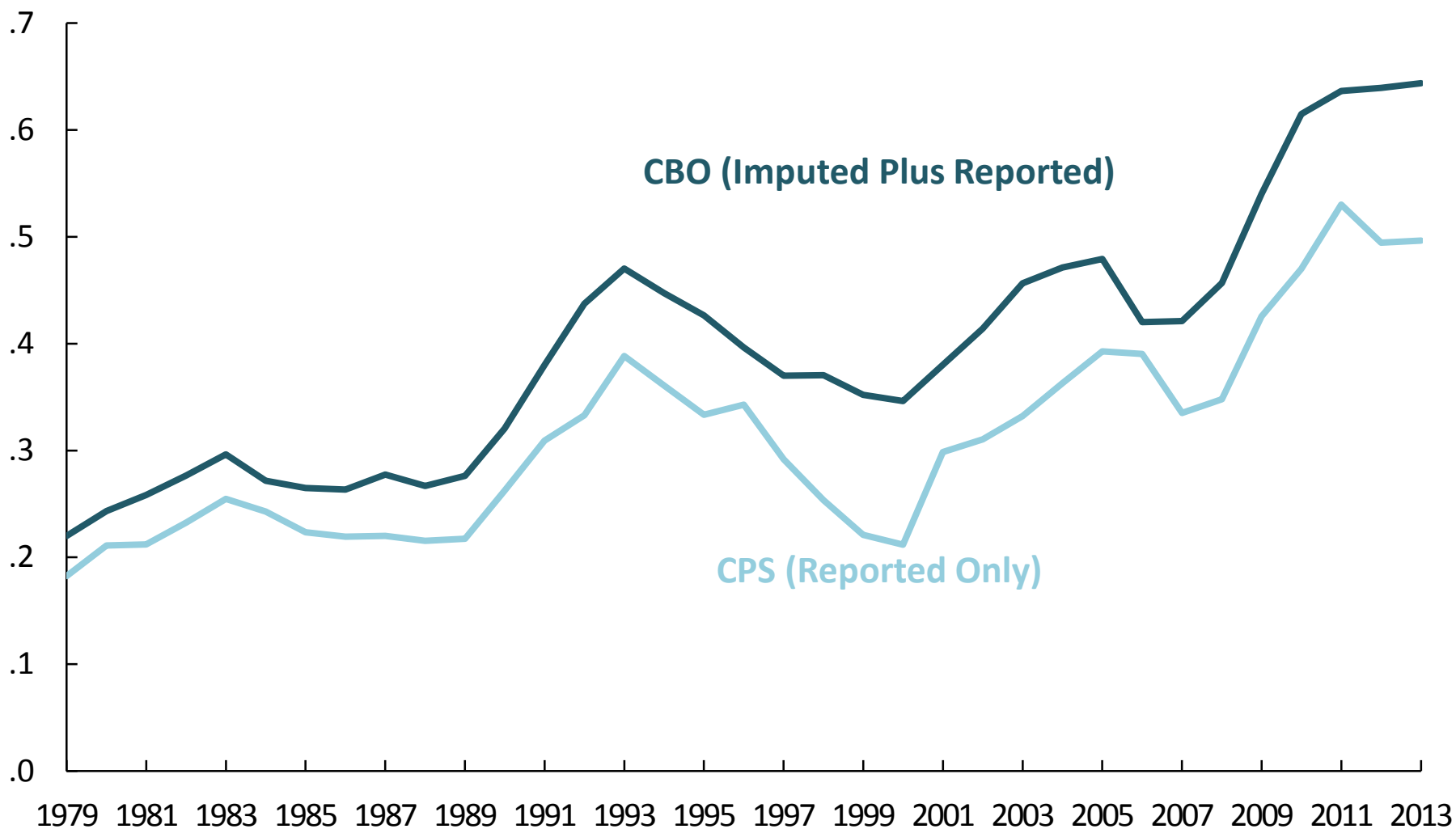
Means-Tested Transfer Rates by Quintile, 1979 to 2013

Ratio of Means-Tested Transfers to Base Income Measure



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

Ratio of Means-Tested Transfers to Base Income Measure



Notes to Figures

- Slides 48 and 70: 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 55: Adults are defined as individuals age 18 to 64 who are not disabled.
- Slides 55–58: Individuals or households are considered recipients if they participate in the program at any point during the calendar year.

Notes to Figures (Continued)

- Slides 55, 56, and 58: The Urban Institute's Transfer Income Model (TRIM) is a microsimulation model that uses CPS data 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 of the model, TRIM3, provides publicly available imputations for most major welfare programs going back to 1993. For more details, see Zedlewski and Gianarelli (2015).
- Slide 72: 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.
- Slides 75 and 76: Reported and imputed social insurance benefits are from Social Security and Medicare. Reported and imputed means-tested transfers are from Medicaid, SNAP, and SSI.

Notes to Figures (Continued)

- Slides 77 and 78: 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 benefits.

Definitions

- **Market income** consists of labor income, business income, capital gains (profits realized from the sale of assets), capital income excluding capital gains, income received in retirement for past services, and other sources of income.
- **Government transfers** are cash payments and in-kind benefits from social insurance and other government assistance programs. Those transfers include payments and benefits from federal, state, and local governments.
- **Before-tax income** is market income plus government transfers.
- **Social insurance benefits** are payments from Social Security for workers, spouses, survivors, and the disabled; Medicare; and unemployment insurance.

Definitions (Continued)

- **Means-tested transfers** consist of payments and benefits from Medicaid, the Supplemental Nutrition Assistance Program (SNAP; formerly known as the Food Stamp program), housing assistance programs, and several smaller programs.
- **Federal taxes** analyzed here consist of individual income taxes, payroll taxes, corporate income taxes, and excise taxes.
- **After-tax income** is before-tax income minus federal taxes.
- **Income groups** are created by ranking households by various income measures, adjusted for household size.
- **Quintiles** (fifths) contain equal numbers of people.

References

- Michael Davern and others, “A Partially Corrected Estimate of Medicaid Enrollment and Uninsurance: Results from an Imputational Model Developed off Linked Survey and Administrative Data,” *Journal of Economic and Social Measurement*, vol. 34, no. 4 (2009), pp. 219–240, <http://dx.doi.org/10.3233/JEM-2009-0324>.
- 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).

References (Continued)

- 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.
- 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 Giannarelli, *TRIM: A Tool for Social Policy Analysis* (Urban Institute, May 2015), <https://tinyurl.com/y7sbos8l>.