How CBO Analyzes the Distribution of Household Income, Means-Tested Transfers, and Taxes
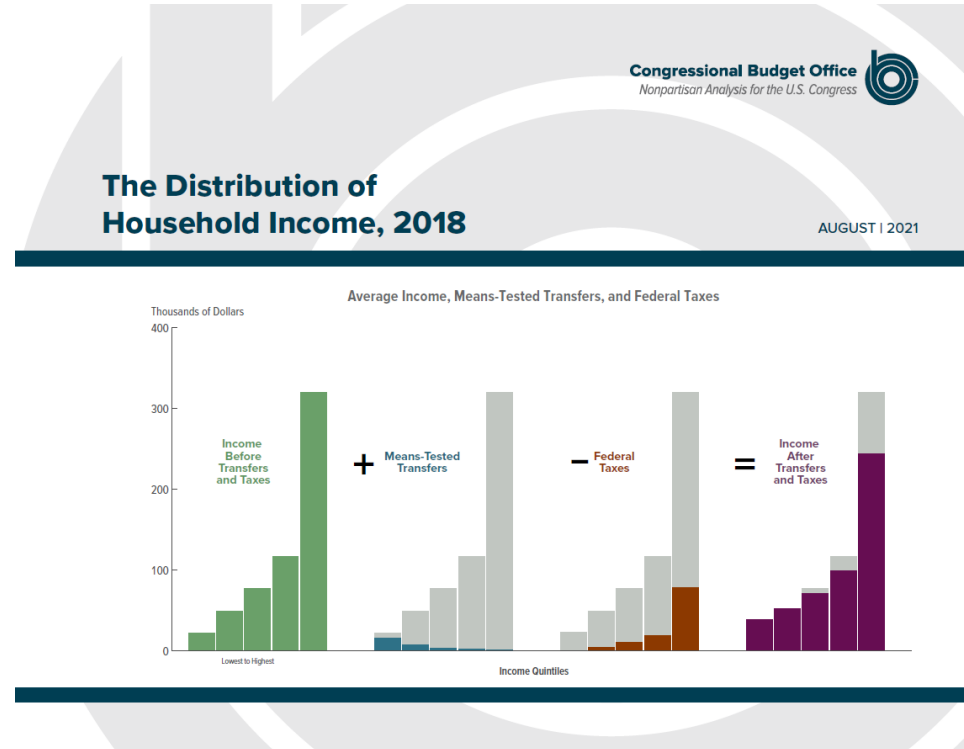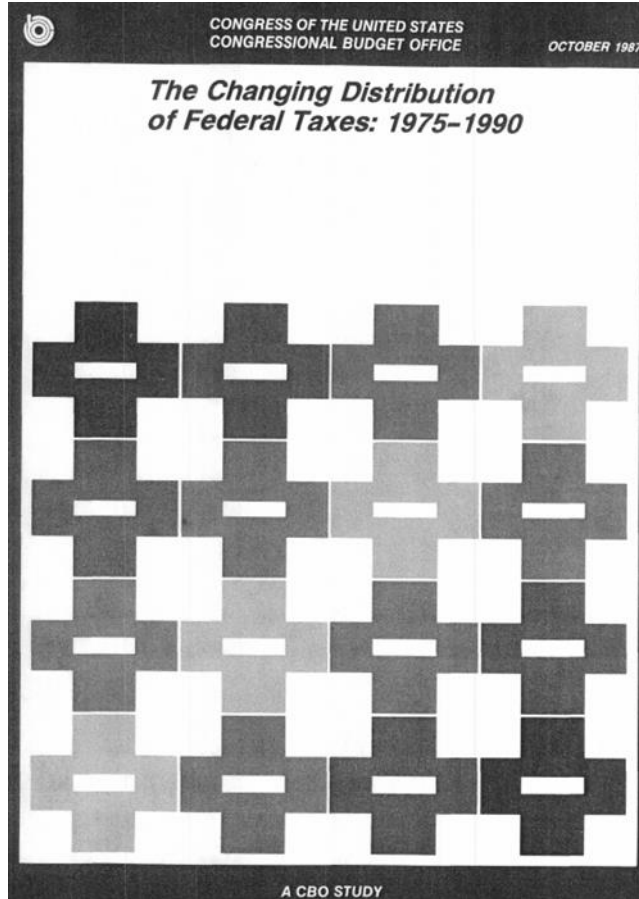
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CBO's Distributional Analyses

Over 30 Years of Distributional Analyses

The Congressional Budget Office regularly produces a report on the distribution of household income, means-tested transfers, and federal taxes.

The most recent version produces those distributions for 1979 to 2018.

CBO's Income Measures

Income Before Transfers and Taxes = Market Income + Social Insurance Benefits

- Market income consists of the following:
  - Labor income,
  - Business income,
  - Capital income (including realized capital gains),
  - Income received in retirement for past services, and
  - Income from other nongovernmental sources.

- Social insurance benefits consist of benefits provided through the following:
  - Social Security,
  - Medicare,
  - Unemployment insurance, and
  - Workers' compensation.
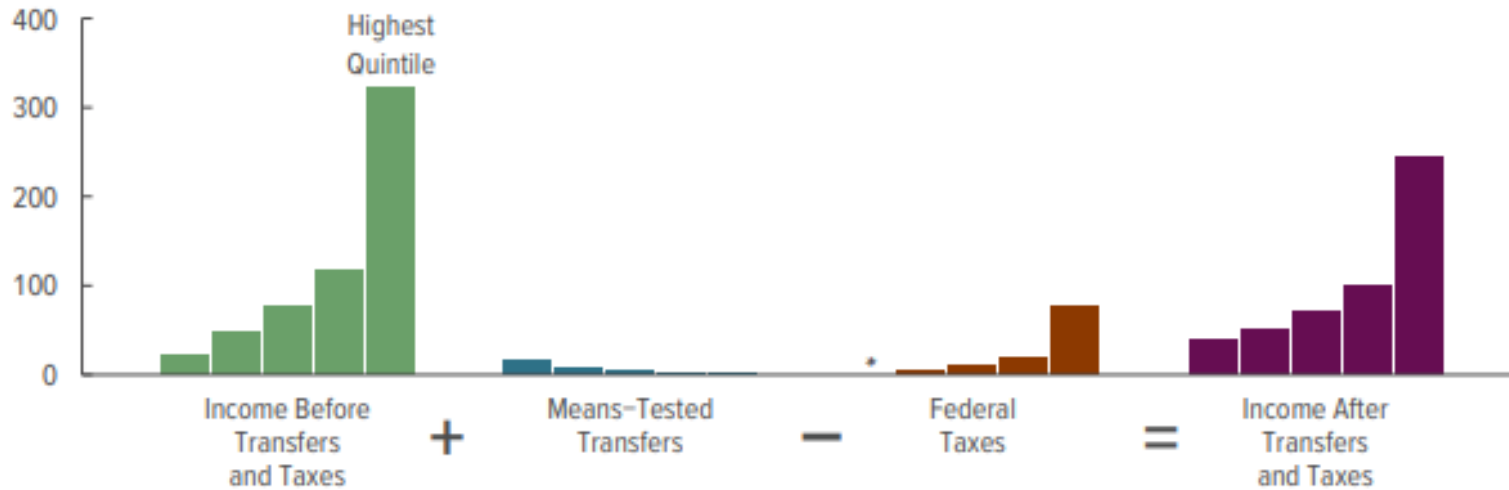
CBO's Income Measures (Continued)

$$\text{Income After Transfers and Taxes} = \text{Income Before Transfers and Taxes} + \text{Means-Tested Transfers} - \text{Federal Taxes}$$

- Means-tested transfers are cash payments and in-kind services provided through federal, state, and local government assistance programs.[1] The largest such programs include the following:
  - Medicaid,
  - Supplemental Nutrition Assistance Program (SNAP),
  - Supplemental Social Insurance (SSI), and
  - Housing Assistance.

- Federal taxes consist of the following:
  - Individual income taxes,
  - Payroll taxes,
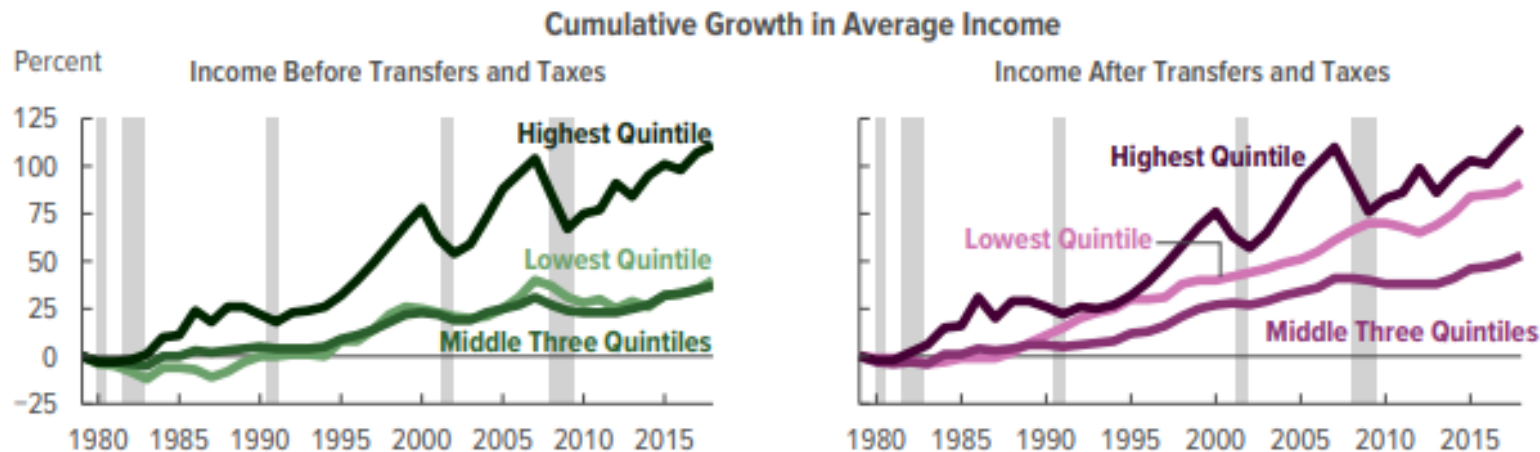 - Corporate income taxes, and
  - Excise taxes.

[1] Eligibility to receive means-tested transfers is determined primarily on the basis on income, which must be below certain thresholds.

Average Income, Means-Tested Transfers, and Federal Taxes, 2018, and Cumulative Growth in Average Income, 1979 to 2018

CBO reports household income, means-tested transfers, and federal taxes by quintile.

Means-tested transfers and federal taxes significantly increase the cumulative growth of income after transfers and taxes among households in the lowest quintile.

Source: Congressional Budget Office, *The Distribution of Household Income, 2018* (August 2021), www.cbo.gov/publication/57061.

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Data Sources

CBO's distributional analyses are based on annual, cross-sectional data, which are drawn from two sources.

- Administrative tax data from the **Statistics of Income (SOI)** provide information about:
  - Market income and Social Security for tax filers, and
  - Federal taxes.

- The annual March Supplements of the **Current Population Survey (CPS)** provide information about:
  - Market income and Social Security for non-filers,
  - Medicare, and
  - Means-tested transfers.

The SOI and CPS are statistically matched to produce a single data set. Tax units are created in the CPS, matched with their counterparts on the SOI on the basis of total income, and then reconstructed into households.

Methodological Choices

- Information from the SOI is used to estimate federal taxes using CBO's microsimulation tax model.

- Determining administrative totals for certain sources of income (such as means-tested transfers) requires calculations by CBO experts.

- CBO must also assign incidence to certain sources of income and taxes. For example:
  - CBO assigns 25% of the corporate tax to labor income and 75% to capital income.
  - The full cost of benefits is assigned to recipients of in-kind transfers, such as those for SNAP, Medicaid, and Medicare.

- Excise taxes are allocated to households on the basis on information reported in the Consumer Expenditure Survey.

Recent Expansions of CBO's Analyses of the Distribution of Household Income

In recent years, CBO has expanded the scope of its analyses of the distribution of household income in various ways, including the following:

- In 2018, CBO removed means-tested transfers from its base income measure and began adjusting CPS data for underreporting in the four largest means-tested transfer programs.

- In 2019, CBO developed a method to make projections of the distribution of household income in accordance with its baseline projections for federal revenue and spending.

- In 2021, CBO published its estimates of the distributional effects of the 2017 tax act.

CBO's Other Distributional Analyses

In addition to its analyses of the distribution of household income, CBO also undertakes a broad array of distributional analyses that use a variety of data sources. For example:
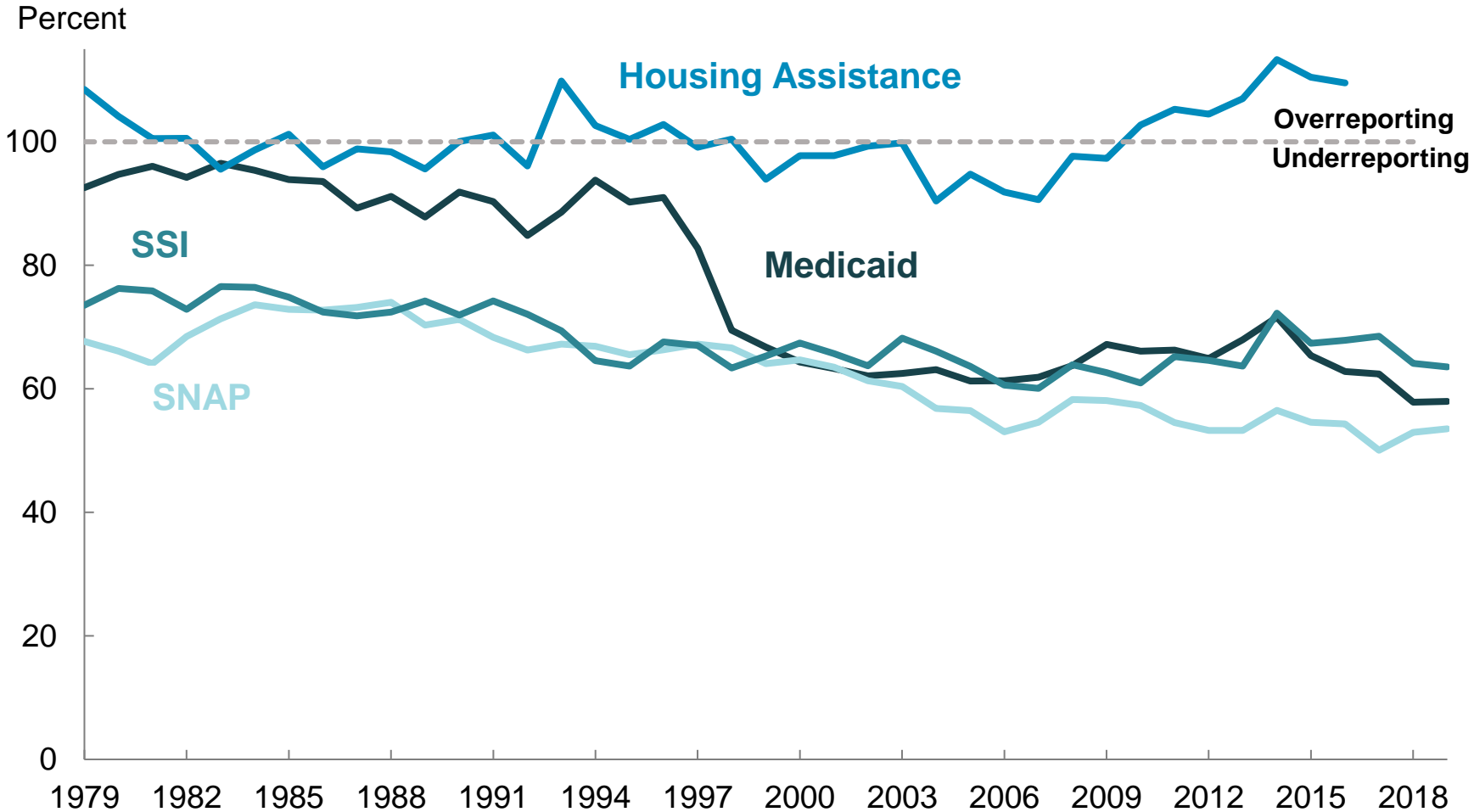
- In 2019, the agency used administrative data on earnings to produce an interactive tool that allows users to estimate the effect of various policy options related to Social Security on beneficiaries and the system's finances.[1]

- In 2021, the agency used survey data on consumption to estimate the distributional effects of implementing a tax on carbon dioxide emissions.[2]

- Currently, the agency is preparing a report on trends in the distribution of household wealth by wealth, income, education, race and ethnicity, and age. That report uses survey data on consumer finances.

[1] See Congressional Budget Office, *How Changing Social Security Could Affect Beneficiaries and the System's Finances*, www.cbo.gov/publication/54868.
[2] See Dorian Carloni and Terry Dinan, *Distributional Effects of Reducing Carbon Dioxide Emissions With a Carbon Tax*, Working Paper 2021-11 (Congressional Budget Office, September 2021), www.cbo.gov/publication/57399.

Adjustments to
Means-Tested Transfers

Recipients Reporting Means-Tested Transfers in the CPS as a Share of Recipients in the Administrative Data, 1979 to 2019

The underreporting of means-tested transfers in the CPS has increased over time.

Without adjustment, CPS-based analyses would understate income growth at the bottom of the distribution and the role of means-tested transfers in reducing income inequality.

Common Approaches to Adjusting for Underreporting

- Administrative matching
  - This method offers near-perfect accounting, but administrative microdata are not widely available.

- Rules-based simulation
  - This approach offers precise estimates at the micro level but requires a significant research investment.

- Regression-based estimation (CBO's approach)
  - This method offers tractability for multiple programs over a long time series but is less precise at the micro level.
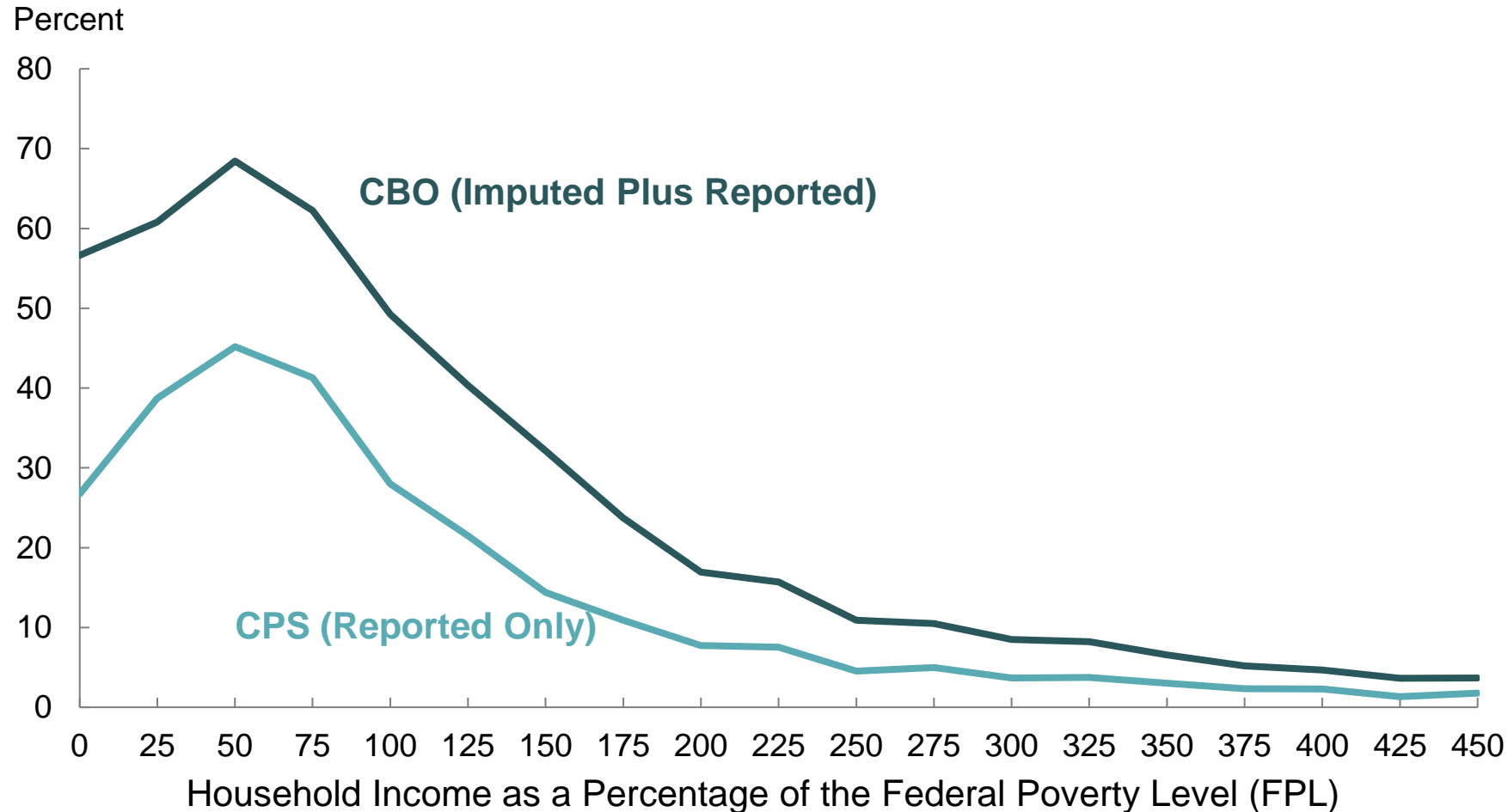
CBO's Regression-Based Imputation Method

- First, CBO uses administrative data to set targets that are consistent with the CPS sampling frame by
  - Subtracting program participants who are institutionalized, and
  - Converting average monthly receipt and point-in-time receipt to "ever-on" receipt.[1]

- Then, CBO uses CPS data to estimate the probability of receipt.
  - It uses a separate probit regression for each year and population subgroup.
  - Independent variables include income level and composition, labor force participation, demographics, and household characteristics.

- Finally, CBO imputes transfer receipt on the basis of estimated probabilities until the target is reached.
  - An algorithm assigns receipt to individuals or households in proportion to their predicted probability of receipt.

[1] Average monthly receipt refers to the average number of households or individuals who receive benefits in a month, point-in-time receipt refers to the number of households or individuals who receive benefits on a particular day, and ever-on receipt refers to the number of households or individuals who receive benefits at any point during a given year. Because many people receive benefits for only part of the year, point in time and average monthly totals are typically lower than ever-on totals.

Share of Households Receiving SNAP Benefits, by Income, 2019

Percent

CBO (Imputed Plus Reported)

CPS (Reported Only)

Household Income as a Percentage of the Federal Poverty Level (FPL)

Most CPS households reporting SNAP benefits are below 150 percent of the Federal Poverty Line, and most of the households that CBO imputes as being SNAP recipients have similar incomes.

Assigning Benefit Amounts

After the total number of recipients matches the administrative targets, each recipient is assigned a benefit amount.

- **SNAP and SSI:** CBO determines the average benefit per recipient on the basis of income and demographic groups and assigns those averages to new recipients.

- **Medicaid:** CBO determines the average cost to the government per recipient from administrative data (by eligibility category) and assigns those averages to all recipients.

- **Housing assistance:** CBO estimates benefits for each reporting household on the basis of location, household size and structure, and fair-market rents determined by the Department of Housing and Urban Development. (No additional households are imputed to be recipients.)

Strengths of CBO's Adjustment Method

- The method is straightforward to implement, and it doesn't require a team of researchers to code specific program rules over the entire time series.

- It is easily scalable across multiple programs over a 40-year time series, and it can be extended to other transfer programs, such as the National School Lunch Program.

- At the quintile level, the distributional results of CBO's method are similar to those of other methods, including Davern (Medicaid) and TRIM (SNAP).[1]
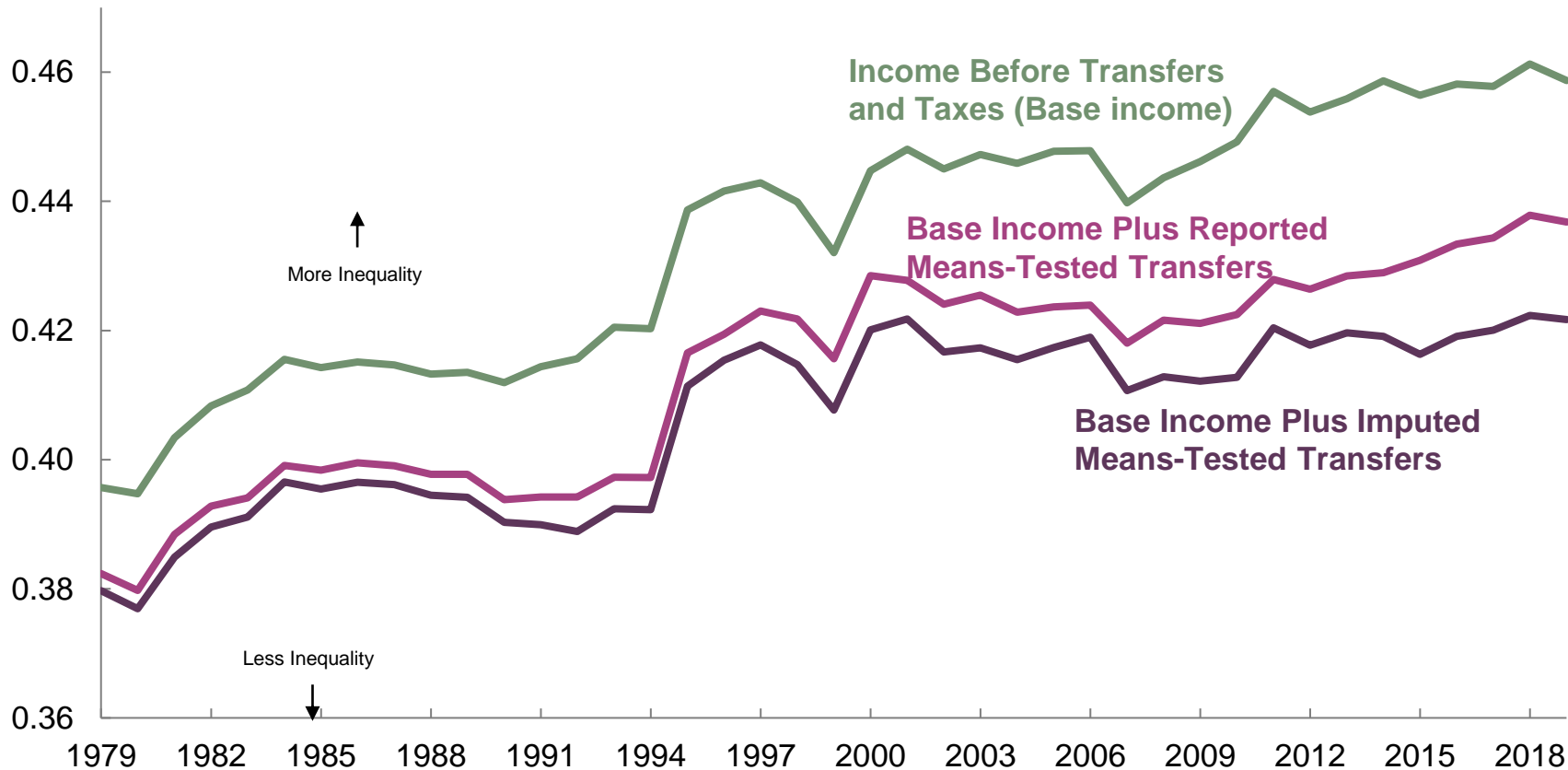
[1] See Michael Davern and others, "A Partially Corrected Estimate of Medicaid Enrollment and Uninsurance: Results From an Imputational Model Developed Off Linked Survey and Administrative Data," *Journal of Economic and Social Measurement*, vol. 34, no. 4 (2009), pp. 219–240, http://doi.org/10.3233/JEM-2009-0324; and Sheila Zedlewski and Linda Giannarelli, *TRIM: A Tool for Social Policy Analysis* (Urban Institute, May 2015), https://tinyurl.com/TRIMurban2015 (PDF, 729 KB).

Limitations of CBO's Adjustment Method

- In CBO's imputations, individuals and households who receive means-tested transfer benefits but who do not report those benefits have the same characteristics as those who do report those benefits.

- CBO's method does not account for false positives: Although it assigns benefits to high-probability individuals who do not report receiving benefits, it does not remove benefits reported by low-probability individuals and households.

The Effects of CBO's Transfer Adjustments on CPS Measures of Income Inequality, 1979 to 2019

Gini Index

Adding imputed transfers significantly reduced income inequality in CBO's analysis in 2019.

The effects on inequality of imputing transfers have increased over time as reporting rates have decreased.

These results differ from those published in CBO's *Distribution of Household Income* reports because they use CPS data only, whereas those reports use a combination of CPS and SOI data.

The Gini coefficient is a measure of income inequality that ranges from zero (the most equal distribution of income) to one (the least equal distribution of income).

Public Release of CBO's Means-Tested Transfer Imputations

In 2018, CBO released a working paper describing its method for imputing means-tested transfers, which included CPS extracts and Stata code to allow researchers to replicate CBO's results for 1979 through 2016.

Since then, CBO has released new versions of the data and code with the following updates:

▪ CBO released imputations for additional years (currently through 2019), and

▪ CBO made methodological improvements to imputations and target totals.

In 2020, CBO moved data and code to Github to facilitate public access.[1]