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How CBO Adjusts for Survey Underreporting of Transfer Income in Its Distributional Analyses

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Abstract

The Congressional Budget Office's analyses of the distribution of household income rely on the Census Bureau's Current Population Survey (CPS) for information about receipt of government transfers, particularly means-tested transfers. CPS respondents underreport their receipt of those transfers, and that underreporting has increased over the past few decades.

This paper describes CBO's method for adjusting for CPS underreporting in the agency's analyses of the distribution of household income. CBO uses a probit regression to estimate a probability that people receive transfer income. CBO then imputes additional recipients on the basis of those probabilities so that the total number of people receiving a transfer in the model matches the actual number of recipients recorded in administrative program data.

This paper presents the results of CBO's adjustment method for three means-tested transfer programs—Medicaid, the Supplemental Nutrition Assistance Program, and Supplemental Security Income—from 1979 through 2016. The paper examines how that method affects the distribution of household income. The results indicate that correcting for underreporting leads to higher estimates of the level and growth of income at the bottom of the distribution and to larger estimates of the effect of government transfers in reducing income inequality. CBO's results are also compared with those from other methods and are found to be broadly comparable.

Keywords: means-tested transfers, income distribution, poverty and income security

JEL Classification: C81, D31, H20, H50, I38

Contents

1. Introduction

The Congressional Budget Office regularly releases reports analyzing the distribution of household income by income quintile. Those reports also analyze how federal taxes and government transfers affect the distribution of income.

Government transfers significantly affect the distribution of economic resources available to U.S. households, and that effect has increased over the past few decades. Moreover, the transfer and tax systems are increasingly used in tandem in many areas of policymaking. As a result, a complete analysis of the distributional effects of federal policies requires researchers to examine transfers and taxes on par with each other.

CBO has developed a framework for analyzing income distribution that facilitates such an analysis (Perese 2017b). The framework uses *income before transfers and taxes* as the base measure to rank households to create income groups. Government transfers are differentiated into two categories: social insurance benefits, which are included in the base income measure, and means-tested transfers, which are excluded from the base income measure. The distributional effects of means-tested transfers and of federal taxes can therefore be analyzed on a similar basis—that is, with respect to income before transfers and taxes.

Means-tested transfers are cash payments and in-kind services provided through federal, state, and local government assistance programs. Eligibility for such transfers is primarily based on household or family income, which must be below certain thresholds. Three of the largest and most well-known means-tested transfer programs are Medicaid and the Children's Health Insurance Program (CHIP), the Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamp program), and Supplemental Security Income (SSI).

To comprehensively analyze the distribution of means-tested transfers requires high-quality data on which individuals or households are receiving those transfers. CBO's analyses of the distribution of household income rely heavily on administrative tax data from the Internal Revenue Service's Statistics of Income. Those data contain a near-complete accounting of taxable income and federal taxes for individuals who file federal tax returns. However, those data do not contain information about the receipt of means-tested transfers because those transfers are not taxable. For information about means-tested transfers, CBO relies on household survey data from the Annual Social and Economic Supplement (ASEC) of the Census Bureau's Current Population Survey (CPS). CBO statistically matches the Statistics of Income data with the CPS data to create a data set that contains information on both taxable income and means-tested transfers for the entire population, including those who do not file federal tax returns. (For more details on CBO's matching method, see Perese 2017a.)

Using the CPS for distributional analyses has advantages and disadvantages. On the one hand, the survey has a large sample size, a long time series, and a broad set of income and

demographic variables. On the other hand, however, transfer recipients often fail to disclose to survey takers that they are participating in a means-tested transfer program. For each program studied here, both the number of recipients and the total amount of transfer income those recipients report in the CPS fall below the actual totals recorded by the agency that administers the program. That problem is referred to as underreporting.

Three key problems are associated with analyzing means-tested transfers on the basis of household survey data without first correcting for underreporting. First, because means-tested transfers are a key source of income for lower-income households, uncorrected survey data will tend to understate income at the bottom of the distribution and the role of means-tested transfers in reducing income inequality. Second, because underreporting of transfers has increased, uncorrected survey data will tend to underestimate the growth in incomes at the bottom of the distribution. Finally, any analysis of the combined distributional effects of means-tested transfers (from uncorrected survey data) and federal taxes (from administrative tax data) will compare a complete view of federal taxes with an incomplete view of means-tested transfers.

In CBO's most recent report on the distribution of household income (Congressional Budget Office 2018), the agency adopted a regression-based approach to adjust for survey underreporting. CBO uses a probit regression to estimate a probability that people receive transfer income. CBO then imputes additional recipients on the basis of those probabilities so that the total number of reporting and imputed people receiving a transfer matches the actual number of recipients recorded in administrative program data.

So far, the method has been applied to three of the largest means-tested transfer programs—Medicaid and CHIP (which provide assistance with medical costs), SNAP (which provides food-purchasing assistance), and SSI (which provides cash assistance to elderly and disabled individuals).[1] The agency also made adjustments for underreporting of the two largest social insurance transfers: Social Security and Medicare. Those programs require a different analytic method, and the number of imputations needed is smaller. For more details, see Appendix B.

That method uses the characteristics of units (either individuals or households, depending on the transfer program) that report their receipt of a given means-tested transfer to determine which nonreporting units should be assigned receipt.[2] Therefore, the method imputes means-tested transfer income to nonreporting units in such a way that the characteristics of imputed units broadly reflect the characteristics of reporting units. Because most reporting units are toward the bottom of the income distribution, most nonreporting units to whom transfers are assigned also are toward the bottom of the income distribution.

[1] Unless otherwise specified, all references to Medicaid in this paper refer to both Medicaid and CHIP.
[2] Nonreporting units are those who claim that they did not receive transfer income from a given program in the CPS.

In comparison with using unadjusted CPS data, CBO finds that imputing Medicaid, SNAP, and SSI receipt to nonreporting units in the CPS increases the means-tested transfer rate, as measured by the ratio of income from those three transfers to total income received by households. Applying CBO's imputation method increases the means-tested transfer rate in 2016 from 3 percent to 5 percent across the population and from 46 percent to 67 percent in the lowest quintile.

A common metric of income inequality is the Gini coefficient. Imputing additional receipt of those three transfers decreases inequality as measured by the Gini coefficient by 0.6 percent in 1979 and 2.6 percent in 2016, in comparison with using CPS data without adjustments.

This paper documents CBO's imputation method for means-tested transfers. Section 2 discusses the nature of transfer underreporting and outlines the approaches used in the literature to impute transfer receipt to nonreporters in household surveys. Section 3 describes CBO's regression-based imputation approach, and section 4 presents the results of the imputation. Section 5 lays out alternative approaches and tests to evaluate the validity of CBO's method.

Supplemental files containing data and Stata code are available on CBO's website to enable researchers to replicate CBO's imputations for each year of the analysis (1979 to 2016). The data include CPS identifier variables, CBO's estimated probabilities of receipt, and CBO's estimated potential benefit amounts for each unit in the CPS for each transfer program. The Stata code allows researchers to impute receipt and transfer income to units in the CPS on the basis of those estimated probabilities. Researchers interested in using CBO's imputations for their own research should note that those imputations were designed specifically for CBO's quintile-level national analyses of income distribution and should not be used for state-level analyses, causal analyses, or policy simulations.

2. Underreporting in Survey Data

Administrative data, collected by the agency administering a transfer program, and survey data, in which individuals are asked about their transfer income, are the two main sources of information on the receipt of transfers. Administrative data contain accurate estimates of how many units received transfers, but those data often contain limited information about other characteristics of those units. By contrast, survey data usually contain rich information about the characteristics of units reporting transfer receipt, but the data can be incomplete because of underreporting.

Several studies have documented significant misreporting of means-tested transfers. Meyer, Mok, and Sullivan (2009) find that significant underreporting exists in the CPS, as well as in the Survey of Income and Program Participation and the Panel Study of Income Dynamics, which are also often used for policy analysis. Wheaton (2008) finds that the underreporting of transfer programs has increased in both the CPS and the Survey of Income and Program Participation.

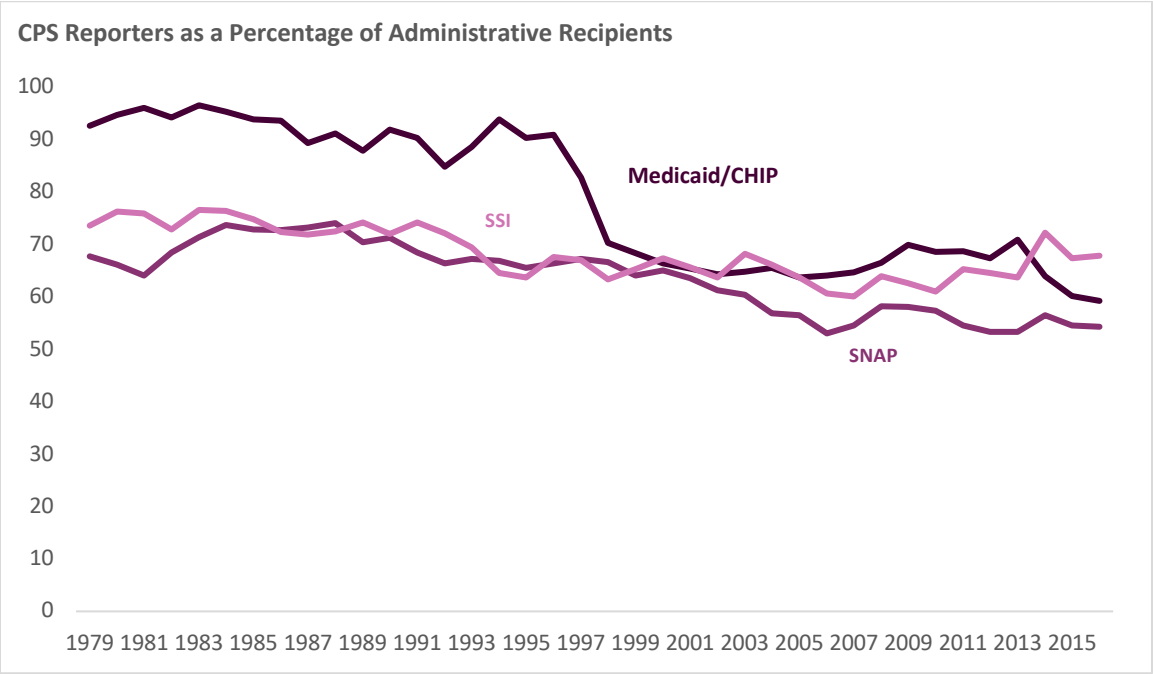
The Extent of Underreporting

Underreporting is usually estimated by comparing the number of units who report receiving transfer income in a household survey with the number of units who actually received transfers, as recorded in the administrative data, after adjustments are made to put the data on a comparable basis. Comparing the data sources in that way allows researchers to determine how many survey respondents have not reported receiving transfer income.

The reporting rates for Medicaid, SNAP, and SSI all decreased between 1979 and 2016 (see Figure 1). Reporting rates are calculated by dividing the number of reporting units in the CPS by the number of recipients in the administrative data.[3] In 1979, the reporting rate for Medicaid was 93 percent; for SNAP and SSI, the reporting rates were 68 percent and 74 percent, respectively. In 2016, 59 percent of Medicaid recipients, 54 percent of SNAP recipients, and 68 percent of SSI recipients reported their receipt of those transfers.

[3] As described in section 3, the number of recipients in the administrative data is adjusted to match the CPS sampling frame. For example, institutionalized individuals are removed from the Medicaid totals.

Figure 1.
Unit Reporting Rates for Means-Tested Transfers, 1979–2016



Source: Congressional Budget Office, using data from the CPS.

CBO gathers recipient totals from the agency administering each transfer and then adjusts those totals to match the CPS sampling frame. See "Developing Administrative Targets" in section 3 for a description of how CBO makes those adjustments. See Appendix C for the totals used to calculate the reporting rates in this figure.

Nonresponding units whose receipt has been allocated or imputed by the Census Bureau are treated as though they were reporting units. For more details on how CBO treats those allocated and imputed recipients in its analyses, see "Survey Nonresponse" in this section and "Census Bureau Allocations and Imputations" in section 5.

CHIP = Children's Health Insurance Program; CPS = Current Population Survey; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

Reporting rates for Medicaid drifted downward throughout the 1980s and early 1990s, declined sharply from 1996 to 2000, remained steady until 2012, and then began to decline again. That sharp decline in the late 1990s was probably due to several significant changes to the program during that period. First, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 changed many of the rules around Medicaid eligibility. Most notably, Medicaid eligibility was decoupled from eligibility for cash assistance (Buchmueller, Ham, and Shore-Sheppard 2015). The number of Medicaid recipients also increased during that time as a result of the creation of a new mandatory eligibility group of low-income families with children and the

emergence of CHIP. Finally, several state Medicaid programs emerged with different names, which may have confused survey respondents.

The decline in the CPS reporting rate for SNAP was gradual through the early years of the period, accelerated between 2000 and 2006, and has stabilized since then. By contrast, reporting rates for SSI were relatively stable. Between 1979 and 1995, the SSI reporting rate dropped gradually from 74 percent to 64 percent and has remained steady since then.

Reasons for Underreporting

Wheaton (2008) and Meyer, Mok, and Sullivan (2009) explore the reasons for survey underreporting. One of the most likely reasons is respondent error. People may simply misremember whether they were enrolled in transfer programs, when they were enrolled, or how much they received.

Program confusion is a potentially important source of respondent error. For example, respondents may not understand the relationship between Medicaid and state-run versions of Medicaid, which sometimes have different names. Program confusion also is likely to occur when program names sound similar—for example, Medicaid and Medicare or Social Security and Supplemental Security Income. That may explain why individuals older than 65 overreport their receipt of Medicaid (that is, more Medicaid recipients over 65 are in the CPS than in the administrative data). Most individuals over 65 are eligible for Medicare and may report instead that they receive Medicaid when in fact they do not.

Respondent error also may arise because surveys are often administered to a single individual who answers questions on behalf of the entire household. The primary respondent may be less able to accurately recall the participation of other members of the household or to appropriately allocate income across members of the household. For example, the CPS did not allow individuals to report SSI receipt for their children until the 2001 survey. That practice appears to have resulted in several nondisabled adult individuals claiming their children's SSI income as their own before 2001.

Finally, survey respondents may worry about social stigma associated with participation in certain means-tested transfer programs, which may make them less likely to discuss participation with a survey taker. Errors also may be due to a desire to shorten the time spent on the interview or the sensitivity of income information.

Survey Nonresponse

In addition to underreporting, mismeasurement of transfer income also occurs because many individuals and households simply do not respond, either to a particular question (known as *item nonresponse*) or to the survey altogether (known as *interview nonresponse*).[4]

The Census Bureau corrects for both types of nonresponse by assigning values to all questions that respondents did not answer. For means-tested transfer receipt, all nonresponding individuals are assigned either receipt or nonreceipt. Although not intended to try to match administrative totals, those corrections do increase the number of recipients by assigning receipt to additional units.

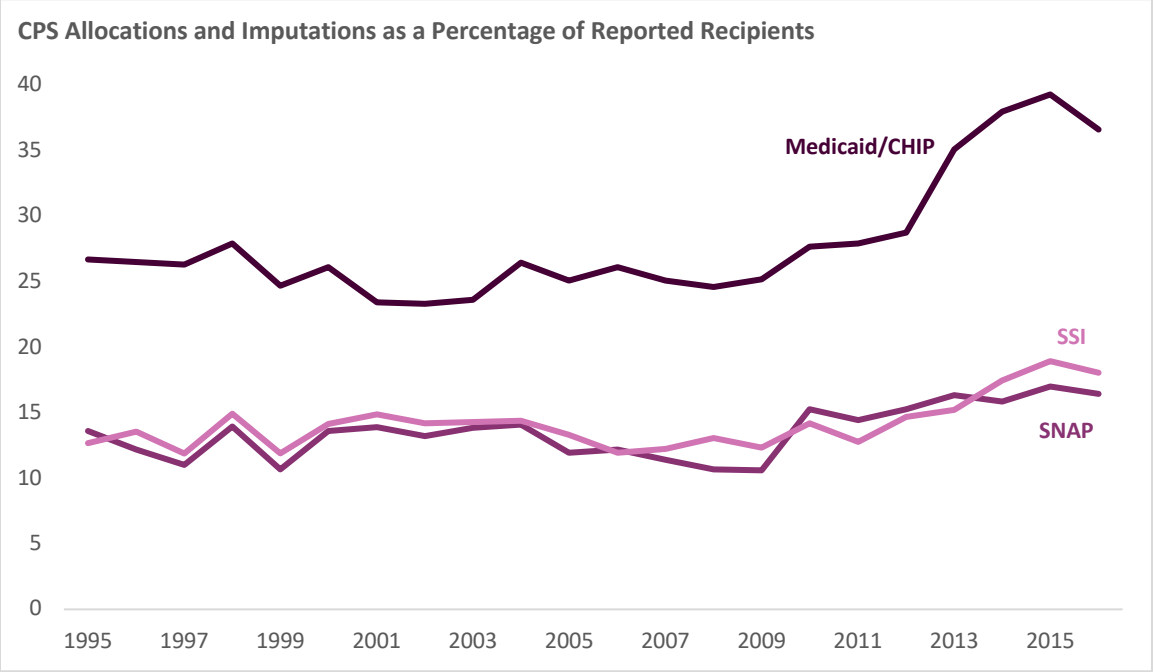
The percentage of reporting recipients who were assigned receipt by the Census Bureau for SNAP and SSI has been relatively stable since 1995; for Medicaid, the rate of imputation has grown significantly since 2009 (see Figure 2). In 2016, 37 percent of Medicaid recipients, 18 percent of SSI recipients, and 16 percent of SNAP recipients were allocated or imputed by the Census Bureau.

Because the Census Bureau's corrections are not designed to match administrative totals, they do not solve the underreporting problem in the CPS. In fact, the reporting rates in Figure 1 above incorporate CPS allocations and imputations as though they were "true" reporters.[5]

[4] Although this analysis uses the more detailed ASEC supplement of the CPS, a basic version of the CPS also is conducted every month. The interview nonresponse described above occurs when a household participates in the basic CPS but not in the ASEC supplement. Yet another type of nonresponse occurs when a household that is chosen to participate in the basic CPS does not. In those cases, an adjustment is typically made to the weights of participating households to make up for the nonresponding household. For more details, see Bureau of Labor Statistics and Census Bureau (2006).

[5] For more details on how CBO treats the Census Bureau's assignments in its method to adjust for underreporting of transfer income, see "Census Bureau Allocations and Imputations" in section 5.

Figure 2.
Census Bureau Allocation and Imputation Rates for Means-Tested Transfers, 1995–2016



Source: Congressional Budget Office, using data from the CPS.

The calculations in this figure include the Census Bureau's allocations and logical imputations for both item nonresponse and interview nonresponse.

The interview nonresponse indicators became available in the 1992 CPS, but the 1995 CPS does not contain indicators for nonresponse. Because this analysis requires both sets of CPS allocations and imputations, the figure is drawn using data starting from CPS 1996 (which refers to calendar year 1995).

CHIP = Children's Health Insurance Program; CPS = Current Population Survey; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

Approaches to Correct for Underreporting

Researchers who correct for underreporting typically use administrative matching, rule-based simulation, or a regression-based method. Although CBO uses the regression-based method, each approach has its advantages and can provide useful information and benchmarking.

Administrative Matching. When administrative microdata are available, researchers can attempt to match those data with the CPS. That matching process can be a direct match, in which identifying information is used to link survey respondents to their actual records in the administrative data. For example, Klerman, Ringel, and Roth (2005) match administrative data from the California Medicaid program, Medi-Cal, to the CPS. Similarly, Davern and colleagues (2009) link the CPS to data from the Medicaid Statistical Information System and then use that match to estimate probabilities of receipt.

More often, probabilistic or econometric methods are used to statistically connect administrative microdata to household survey data because confidentiality rules prevent the Census Bureau from releasing identifying characteristics about individuals. For example, Meyer and Sullivan (2009) deploy a method that uses both the CPS and limited public-use administrative microdata for SNAP (the Food Stamp Quality Control Database). That method exploits the fact that the data sets contain overlapping information about demographic characteristics to compare the characteristics of survey reporters with those of recipients in the administrative data. Mittag (2017) uses linked administrative SNAP records from New York and data from the Census Bureau's American Community Survey to develop a conditional distribution that is then used to make corrections in future iterations of the survey.

The matching method is straightforward to implement and is the most precise method available because researchers tend to get high matching rates between the CPS and administrative data sets. Unfortunately, administrative microdata are rarely available for research use. When they are available, they tend to cover only a few years or just a subset of the population (for example, a single state).

Rule-Based Simulation. In the rule-based method, researchers use income and asset information in household survey data and explicitly model program rules to identify eligible recipients in the survey. The most well-known of such models is the Urban Institute's Transfer Income Model (TRIM), which provides imputations for multiple transfer programs going back many years. Eligibility for a program is determined separately for each unit in accordance with the specific rules of the program in the state in which the unit lives (Zedlewski and Giannarelli 2015). Units that are ineligible but report receiving a transfer are typically switched to nonrecipients. A participation function is then used to assign a probability of receipt to eligible nonreporters, and program receipt is then assigned on the basis of those probabilities to match administrative program totals.

Rule-based simulation models tend to provide reliable estimates at the micro level that are internally consistent across multiple programs. Such models also can serve as a useful tool in policymaking for their ability to simulate different policy scenarios. However, such models tend to be resource intensive because they require modeling specific rules for each program, year, and state combination. Moreover, because eligibility is based on reported income information in the microdata, the reliability of such models depends on the reliability of the reported incomes. For example, if a unit misreports income, the eligibility determination for that unit will be inaccurate.

CBO's Approach: The Regression-Based Method. In the regression-based method, researchers specify a regression equation that predicts transfer receipt as a function of income and demographic characteristics. The dependent variable is a binary variable equal to 1 if a unit reports receipt of transfer income and zero otherwise. Using either a probit or logit regression, researchers estimate a probability of receipt for all units in the survey. They then apply a rule to

assign transfer receipt on the basis of the derived probabilities (see, for example, Scholz, Moffitt, and Cowan 2009; Moffitt and Scholz 2009).

CBO has opted for that method because it offers the best compromise among tractability, scalability, and the level of precision needed for quintile-level distributional analyses. Although the rule-based simulation and administrative matching approaches have many desirable characteristics, implementing either approach for multiple programs over a 38-year period would be difficult. By contrast, CBO's approach is straightforward to implement and easily scalable across multiple transfer programs and years without having to program a specific set of rules for each program and year combination. Moreover, no additional data are required beyond the standard CPS data set and the administrative data on total participation and benefits.

However, CBO's regression-based method has some key limitations. First, the method relies on the assumption that nonreporters and reporters have similar (and observable) characteristics because the regression model will tend to assign higher probabilities to those nonreporters who most closely resemble reporters across multiple dimensions. Without administrative microdata, units that report receipt are the best available proxy for recipients. However, that assumption can lead to inaccuracies at the micro level because according to matching studies, certain groups are less likely to report receipt of certain programs. For example, Meyer and Sullivan (2008) find that males and individuals without high school degrees are less likely to report SNAP receipt in the CPS.

Second, the method uses CPS-reported nontransfer income to determine receipt. Because income is a key independent variable in the regression-based method, any inaccuracies in the income measure will carry through to the imputation of transfer receipt. Many studies have documented significant underreporting for income sources other than means-tested transfers (for example, Roemer 2000; Czajka and Denmead 2008; Bee and Mitchell 2017). Moreover, CPS income is reported on an annual basis, which can mask monthly volatility in income that could affect program participation across the year. That relatively long time frame also could affect an individual's ability to recall his or her annual income accurately.

Third, all units that report receipt are treated as though they were reporting accurately. In other words, adjustments are not made for "false positives." However, the results of matching studies suggest that that approach is unlikely to bias the results much. Both Meyer and Goerge (2011) and Pascale, Roemer, and Resnick (2009) find that false reporting in the CPS is rare.

Finally, the method is not well suited to simulate policy changes. Because the method does not precisely determine a unit's eligibility for receipt or apply a specific benefit formula, any policy change that affects eligibility criteria or benefit levels cannot be precisely modeled.

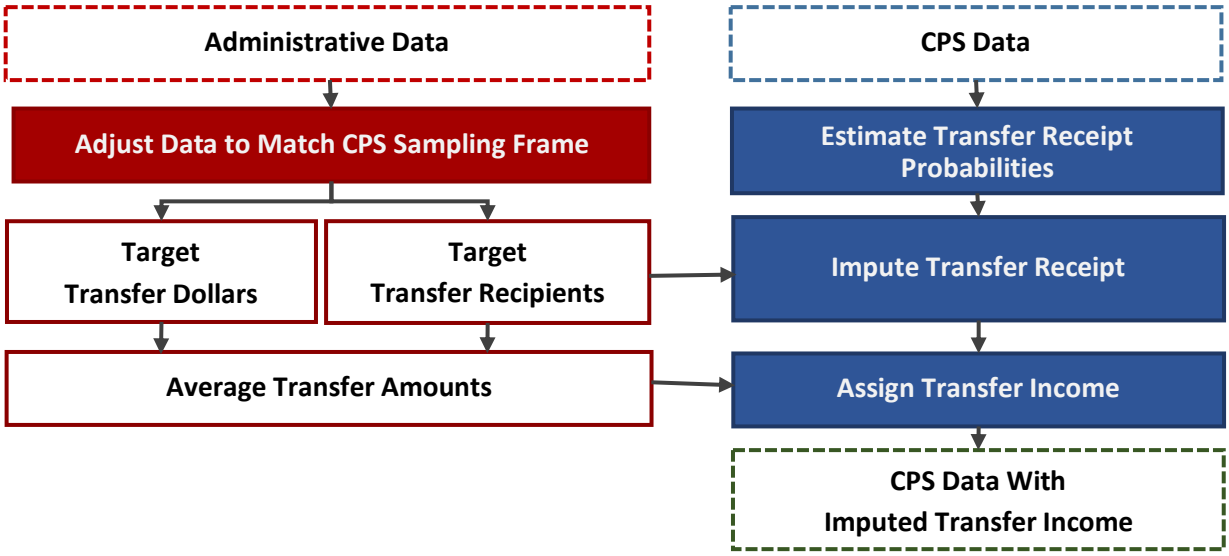
Although the person-by-person receipt assignment may differ among the three approaches, the results obtained from CBO's method are broadly similar to those obtained by both administrative matching and rule-based simulations, as described in section 5. That finding suggests that the method is an appropriate way to develop inputs for CBO's distributional analyses, which typically divide households into income quintiles—a much broader grouping.

3. CBO's Implementation of the Regression-Based Method

The CPS provides detailed income and demographic information about means-tested transfer recipients. However, the total number of recipients in the CPS falls short of the number of recipients recorded by agencies that administer the programs. CBO's regression-based method imputes receipt to nonreporting units in the CPS until the number of reporting and imputed recipients equals the target number of recipients in the administrative data.

CBO uses a multistep method for each program in each year of the analysis (see Figure 3). Two data sources are taken as starting inputs: the CPS and the administrative data on the program being analyzed. Ultimately, the method produces a CPS data set with imputed transfer income that reflects the level of transfer income in the administrative data that will be used for CBO's quintile-level distributional analyses.[6]

Figure 3.
CBO's Regression-Based Model to Impute Means-Tested Transfers in the CPS



Source: Congressional Budget Office.

CPS = Current Population Survey.

[6] Supplemental files containing data and Stata code are available on CBO's website to enable researchers to replicate CBO's imputations for each year of the analysis (1979 to 2016). The data include CPS identifier variables, CBO's estimated probabilities of receipt, and CBO's estimated potential benefit amounts for each unit in the CPS for each transfer program. The Stata code allows researchers to impute receipt and transfer income to units in the CPS on the basis of those estimated probabilities. Researchers interested in using CBO's imputations for their own research should note that those imputations were designed specifically for CBO's quintile-level national analyses of income distribution and should not be used for state-level analyses, causal analyses, or policy simulations.

Developing Administrative Targets

CBO begins by developing estimates of the actual number of recipients. That process involves collecting administrative data for each program and year (1979 to 2016). Those data are then adjusted to better align conceptually with the universe of people who could potentially report transfer receipt in the CPS (Table 1 summarizes the data sources and adjustments for each program).

CBO first gathers data from the agency administering each transfer. For each program and year, the data include information on how many units received transfers within the year and the total value of the benefits awarded to those units. Those values reflect benefit payments only and do not include the costs associated with administering the program.

The unit of analysis differs by program. Eligibility for Medicaid and SSI is based on the characteristics of individuals. SNAP benefits, however, are awarded to what are called food assistance units, which are groups of people living together—no familial relationship is required—and sharing the purchase, preparation, and consumption of food. CBO considers those units households.

For Medicaid and SSI, CBO develops targets, and performs its analysis, on disaggregated subgroups of the population. That choice reflects the fact that factors predicting eligibility or the cost of providing benefits can differ substantially among subgroups. For example, each member of a family consisting of a nondisabled adult, a disabled adult, and a child could be subject to different criteria for Medicaid eligibility.

CBO then adjusts the administrative data to match the CPS sampling frame. The CPS excludes certain types of individuals, such as institutionalized individuals and people living overseas or in U.S. territories, from its set of potential respondents, so CBO subtracts those people from the administrative targets. Most important, institutionalized individuals make up a significant proportion of Medicaid recipients.

CBO makes a second adjustment to match the reporting period of the CPS. The CPS asks individuals to report whether they were recipients at any point during the year for any length of time. Administrative totals for Medicaid are available on that basis, and so no adjustments are made. SNAP and SSI data, however, are available on a monthly and point-in-time basis, respectively. As a result, CBO adjusts the administrative totals for those programs to reflect "ever on" receipt.

Table 1.
Data Sources and Methods for Developing Administrative Targets

Program	Unit	Subgroups	Source of Targets	Adjustments
Medicaid/CHIP	Individual	Children (age 0–18) Adults (age 19–64) Seniors (age 65 and above) Blind or disabled individuals (age 15–64)	CMS Statistical Supplement (before 2012) CBO's Medicaid baseline projections (2012 onward) Data on Medicaid expansion come from CBO's analysis of CMS-64 expenditure reports	Totals for institutionalized individuals and benefits are available by subgroup in the CMS Supplement for 1979 to 2011. For 2012 onward, CBO holds the proportion of institutionalized individuals and benefits within each group constant at 2011 levels. The number of institutionalized individuals and benefits is subtracted from the administrative totals to create the targets.
SNAP	Household	None	Food and Nutrition Service at the Department of Agriculture	Administrative data are available on a monthly basis. The CPS contains information on the number of months a household participated in SNAP during the year. To obtain the number of households "ever on" SNAP during the year, the average monthly participation is calculated and divided by the average fraction of the year that a household was enrolled.
SSI	Individual	Children (age 0–17) Adults (age 18–64) Seniors (age 65 and above)	*Annual Statistical Report on the Social Security Disability Insurance Program*	Ever-on totals are available for 2003 onward. For earlier years, only totals as of December 31 are available. The ratios of December 31 totals to ever-on totals are calculated for each group from 2003 onward. The average ratio for each group is then applied to the December 31 totals for 1979 to 2002 to obtain ever-on estimates.

Source: Congressional Budget Office.

CHIP = Children's Health Insurance Program; CMS = Centers for Medicare & Medicaid Services; CPS = Current Population Survey; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

Estimating Transfer Receipt Probabilities

CBO uses a regression-based method to impute receipt to nonreporting units in the CPS. The method uses reported information on income and demographics in the CPS to estimate the probability that a unit receives means-tested transfers from each program. Those probabilities are obtained by estimating a probit regression with reported receipt as the dependent variable in the model.[7] The equations produce an estimated a probability of receipt for each unit.

[7] Reported receipt is not overwritten by the model, with one exception. If an adult (age 18–64) reports receiving SSI but does not report being disabled, does not have a disabled spouse, and has children, CBO treats that individual as though he or she is reporting on behalf of one of his or her children. SSI receipt is then assigned to one of his or her children at random because disability information is not available for children under 15 in the CPS. In some years, that approach leads to slight "overreporting" of SSI among children, in which case the probabilistic assignment method described in "Imputing Transfer Receipt" is used to remove child recipients from the reporting pool.

Table 2.
Independent Variables Used in Regressions to Estimate Probabilities of Means-Tested Transfer Receipt

Income	Individual characteristics[a]	Household or family Characteristics
Household or family income, computed as linear piecewise splines on the ratio of income to the federal poverty guidelines	Age	Number of adults, children, and disabled people in the household or family
Percentage of household or family income that comes from assets or investments	Race and ethnicity	State or census division[c]
Receipt of other means-tested transfers[b]	Marital status	Urban or rural location
	Citizenship status	
	Education	
	Labor force status	
	Weeks worked during the year	

Source: Congressional Budget Office.

CMS = Centers for Medicare & Medicaid Services; CPS = Current Population Survey; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

a. For SNAP imputations, which are conducted at the household level, the individual characteristics of the household head are used as the independent variables in the regression equation. When estimating the eligibility of children for Medicaid or SSI, many of the individual characteristics of the adults in the family are used, such as employment status or education.
b. Each regression equation is estimated using the original CPS-reported data—that is, CBO's imputed recipients from one program (for example, Medicaid) are not considered reporting recipients in the regression equation for another program (for example, SNAP). That approach allows CBO to impute receipt for a given program without also having to estimate every other program.
c. For certain combinations of programs, subgroups, and years, some categorical variables correlate perfectly with either receipt or nonreceipt in the reported data. In those cases, the categories are combined to make larger categories for the purposes of the regression. For example, because very few children receive SSI benefits, no children in the CPS report SSI receipt in some states. The categorical variable for "state" is then replaced with a categorical variable for "census division" in the regression equation.

The regressions are performed separately for each year and population subgroup (for example, children or seniors) to capture differences in patterns of receipt across time and between types of recipients with different eligibility requirements. The set of independent variables in the regression model varies slightly based on the program, subgroup, and year (see Table 2 for a representative set of the variables used).

Typically, the regression equations assign higher probabilities of receipt to individuals and households with lower incomes and lower levels of education. Single parents and unemployed individuals also are assigned higher probabilities across all three programs. The effects of other variables differ depending on the program and subgroup.

The income variable used for a given unit is the income-to-poverty ratio, which is that unit's family or household income as a percentage of the federal poverty guidelines (commonly known

as the federal poverty level [FPL]).[8] The calculation of that ratio differs by program to better reflect the eligibility criteria for that program. Household income (including all people who live together) is used for SNAP imputations because the household most closely matches the unit of eligibility. Family income (including only related individuals) is used for Medicaid and SSI imputations because that is typically how eligibility is determined. For SSI, any reported SSI amounts are subtracted from family income because those amounts would be excluded when determining an individual's eligibility for the program.

Imputing Transfer Receipt

Once the targets have been set, an algorithm is used to assign receipt to nonreporting units. The receipt status of reporting units is not changed except in the rare cases in which transfer benefits are overreported in the CPS.[9]

The goal of the algorithm is to assign receipt to units in proportion to their predicted probability of receipt. Each unit is assigned a random number, which is compared with the predicted probability of receipt. If a unit's random number falls below its probability of receipt, it is assigned to be a transfer recipient. Adjustments are made to the receipt assignment process so that the ultimate number of recipients matches the administrative data. Using random numbers in the process ensures that units with higher probabilities are selected more often while maintaining the heterogeneity among transfer recipients that is observed in the underlying reported data. Section 5 includes a discussion of an alternative assignment approach.

Assigning Transfer Income

After receipt has been imputed to nonreporting units, CBO assigns transfer income amounts to each recipient. The income assignment process is different for each program, and for the subgroups within a program, largely because of differences in how each program administers benefits (Table 3 summarizes the process for each program).

For SNAP and SSI, CBO assigns values to imputed units on the basis of those of reported units and on information in the administrative data. The relative values of reporting units are preserved, although they may be scaled. The exception is elderly SSI recipients, who tend to overreport SSI benefits, probably because they are confusing the program with Social Security.[10]

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[8] The FPL is calculated using the poverty guidelines from the Department of Health and Human Services, which are generally used to determine eligibility for federal programs. In 2016, the FPL was $24,300 for a family (or household) of four.

[9] Elderly individuals tend to overreport Medicaid (probably because they confuse it with Medicare). Here, the same assignment algorithm is applied, but receipt is removed from reporting units until the target is reached, instead of imputing receipt to nonreporting units.

[10] The postscaling value is not allowed to exceed 133 percent of the maximum SSI benefit in a year to account for state supplementation of SSI benefits. Nonelderly individuals who report amounts greater than 133 percent of the maximum amount are reassigned amounts equal to 133 percent of the maximum. Elderly individuals who report amounts greater than 133 percent of the maximum amount are removed from the SSI reporting pool and assigned Social Security receipt for the probit model.

Table 3.
Transfer Income Assignment Method by Program

Program	Method
Medicaid/CHIP	CBO derives the average cost to the government per recipient from administrative data by dividing the total Medicaid payments made to a subgroup by the number of people in the subgroup. All individuals are assigned the average for their subgroup.
SNAP	Each imputed household is assigned the average benefit of reporting households with the same household size and income-to-poverty ratio. Benefit amounts for imputed households are then scaled to match administrative targets.
SSI	The average SSI income for nonelderly reporting individuals is computed and assigned to imputed individuals.[a] The benefit amounts for all individuals are scaled to match the administrative targets.
	All elderly individuals (reporting and imputed) are assigned an average benefit calculated from the administrative data.

Source: Congressional Budget Office.

CHIP = Children's Health Insurance Program; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

a. The administrative data do not contain historical data on total benefits awarded to children and adults separately. As a result, all nonelderly individuals are combined in the income assignment step.

Assigning a value to health insurance provided by Medicaid is difficult because how much a recipient would be willing to pay for that insurance is unclear. CBO calculates the average cost to the government by subgroup and assigns that cost to each reporting and imputed recipient as the value of that individual's Medicaid benefits.[11] However, some recipients of health insurance might prefer to receive a cash payment equal to the government's cost of that insurance because then they could choose whether to use that entire cash payment to purchase insurance on their own or to use some or all of it for other purposes. Therefore, the value of the health insurance to some recipients is lower than the cost of providing it, particularly for some low-income recipients, whose lack of resources constrains consumption of other goods and services (Finkelstein, Hendren, and Luttmer 2015). For other recipients, though, the value of health insurance is higher than the cost of providing it because an individual household often cannot buy the bundle of services provided through insurance at a price equal to the government's cost. Determining how much the value of the insurance to recipients differs from the cost of providing it is impossible without knowing the preferences of individual recipients. For more details on how CBO values government-provided health insurance in its distributional analyses, see Congressional Budget Office (2012).

[11] Before 2014 the CPS included the person market value of Medicaid, which was the average cost to the government by subgroup and state (for more details, see www.census.gov/cps/data/fungible.html). That value is used as the "reported" value of Medicaid in Figures 6 and 7 for 1979 to 2013. For 2014 to 2016, the average values calculated by CBO are used as the reported values.

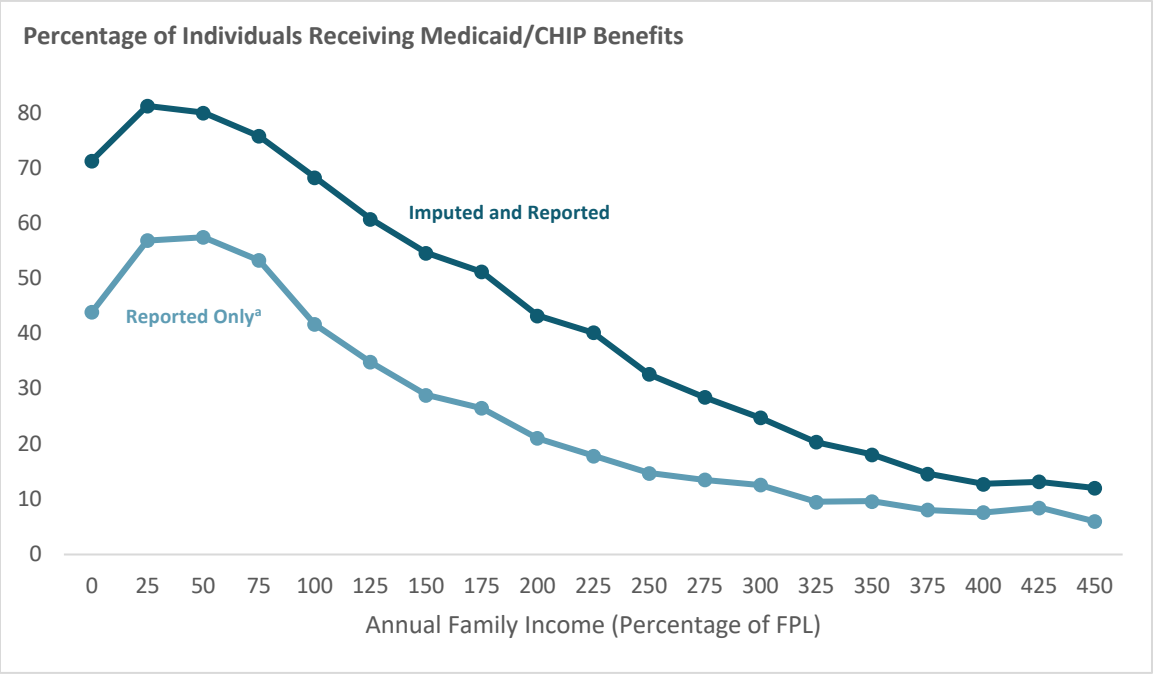
4. Results

Like the units who report receiving transfers, the units imputed by CBO are typically concentrated toward the bottom of the distribution. The distribution of reporting and imputed transfer recipients affects the post-transfer distribution of income. In general, imputing additional transfers to the bottom of the distribution increases means-tested transfer rates for lower-income households and decreases income inequality for the entire period studied (1979 to 2016).

Transfer Receipt Imputations

CBO's imputations increase the estimated percentage of units receiving transfers at all levels of income, measured here as the ratio of income to the federal poverty level (see Figure 4). Across the three programs considered, the increases are largest at the bottom of the income distribution. For example, among units with income equal to 25 percent of the FPL, 57 percent report Medicaid receipt, 50 percent report SNAP receipt, and 6 percent report SSI receipt. After CBO's imputation method is applied, those reporting rates increase to 82 percent, 74 percent, and 9 percent, respectively.

Figure 4.
Recipiency Rates by Income, 2016



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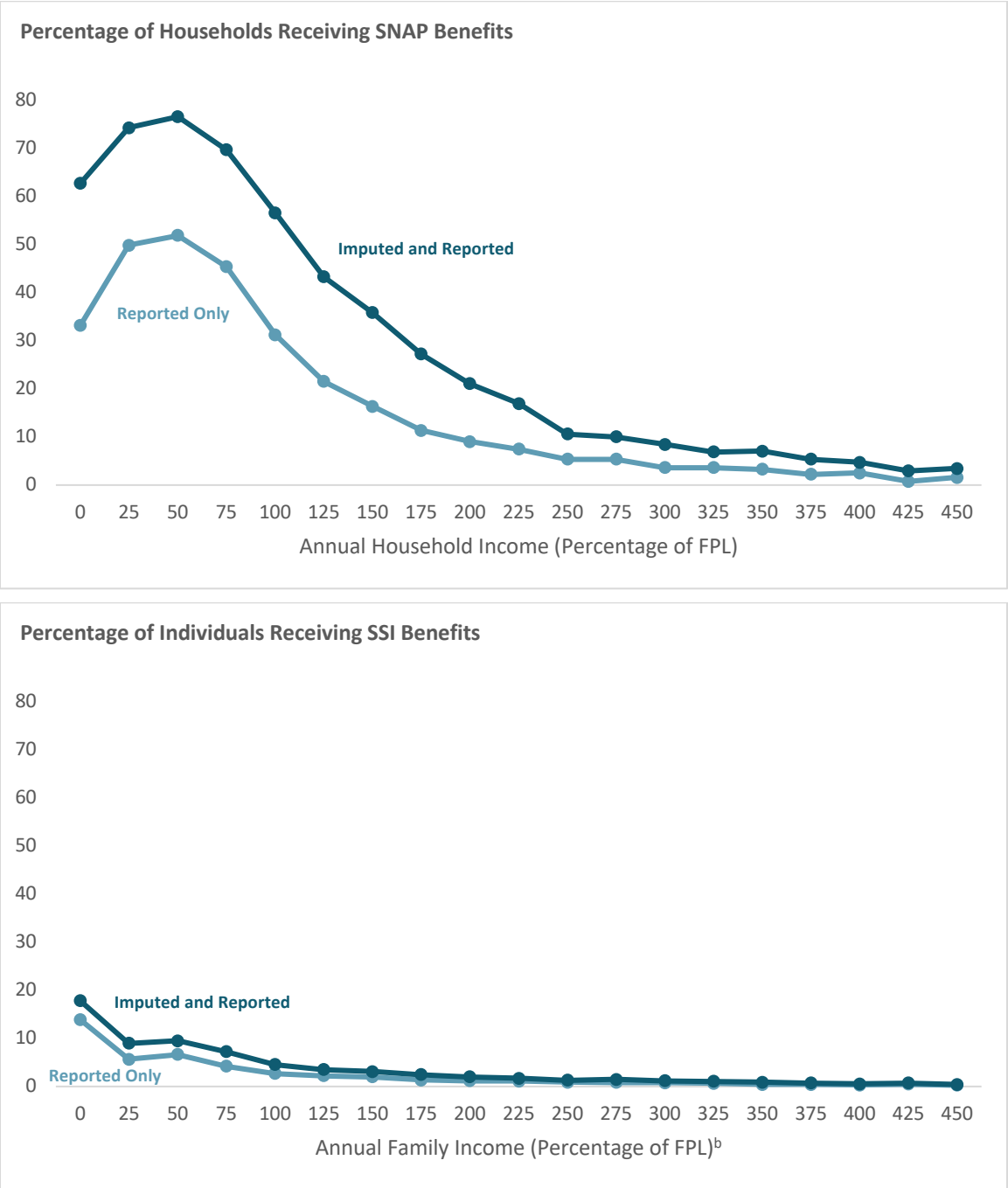
(Figure 4 continued)



Source: Congressional Budget Office, using data from the CPS.

The income definition used here is money income from all sources reported in the CPS and totaled for all individuals in a family (For Medicaid and SSI) or household (for SNAP). Negative income amounts are not included.

A family is a group of people living together who are related by birth, marriage, or adoption. A household is a group of people living together who may or may not be related.

The FPL is calculated using the poverty guidelines from the Department of Health and Human Services.

CHIP = Children's Health Insurance Program; CPS = Current Population Survey; FPL = federal poverty guidelines; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

a. Reported-only recipients in this figure include Census Bureau allocations and logical imputations as though they were reported values, even though CBO excludes Medicaid allocations in its Medicaid imputations (see "Census Bureau Allocations and Imputations" in section 5 for details).
b. For the SSI analysis in this figure, SSI income is first subtracted from family income.

Although lower-income units receive most means-tested transfers, some units with relatively high incomes report receipt of means-tested transfers in the CPS. Units with annual income levels above the eligibility criteria for a means-tested transfer program sometimes report receiving that transfer. Because CBO's imputation method is based on reported receipt in the CPS, it also imputes some receipt to higher-income units and sometimes to units with annual income above the eligibility threshold.

Higher-income units may report receipt of transfer income for several reasons. Their income may vary during the year, allowing them to qualify for benefits in some months when their monthly income is low despite high annual income.[12] In addition, some people qualify for benefits on the basis of their own income, despite living in higher-income families or households. Finally, some households may misreport their income or transfer benefits in the survey data or misreport their income to program administrators to be deemed eligible to receive means-tested transfers.

How Imputations Affect the Distribution of Transfer Receipt

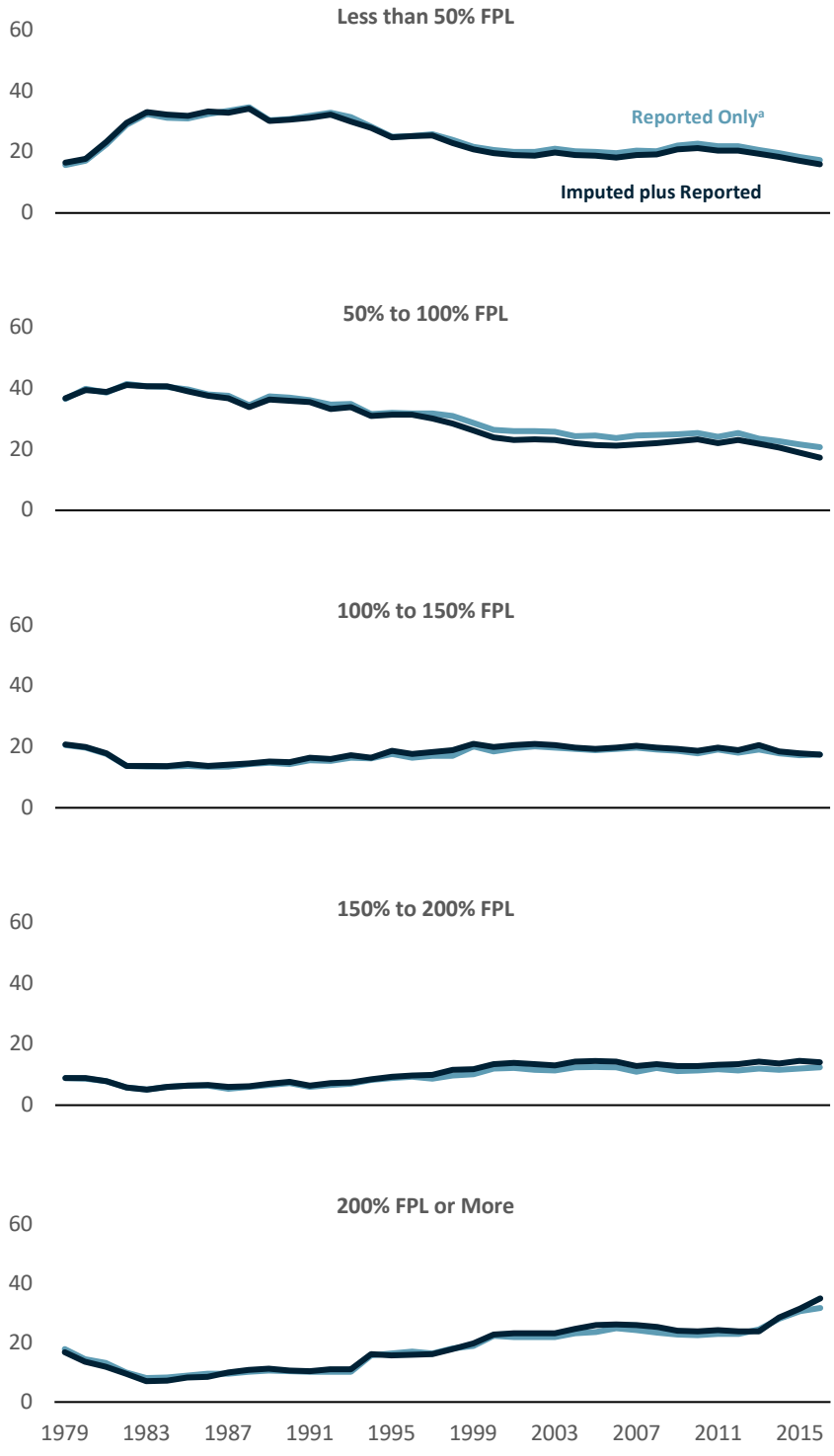
For all three programs, the final distribution of combined reporting and imputed recipients closely resembles that of reporting recipients over the 38-year period from 1979 to 2016 (see Figure 5). That result has a few exceptions. A smaller proportion of individuals with FPL ratios of 50 to 100 tends to be imputed SNAP and Medicaid receipt by the method, but a slightly larger proportion of individuals with FPL ratios of more than 150 are imputed SNAP receipt, especially after 2003. For SSI, the largest discrepancy is for individuals with FPL ratios below 50, for which the method imputes a smaller proportion of individuals than in the underlying reporting distribution.

For both Medicaid and SNAP, a larger share of both reporting and imputed recipients have been higher-income individuals over time. That finding is consistent with that of Ben-Shalom, Moffitt, and Scholz (2011), who find that over time, expenditures on antipoverty programs have shifted from individuals with the lowest incomes to higher-income individuals.

[12] Dahl, DeLeire, and Schwabish (2011) estimate the percentage of households in each income quintile that experience high levels of income volatility between 1985 and 2005, as defined by a change in household income of more than 50 percent from one year to the next. They find that although the percentage of households experiencing that level of volatility is largest in the lowest income quintile (22 percent on average), some households in all quintiles experience high income volatility, including 4 percent of households in each of the top two quintiles.

Figure 5.
Distribution of Recipients by Income, 1979–2016

Shares of Medicaid/CHIP Recipients (Percent)



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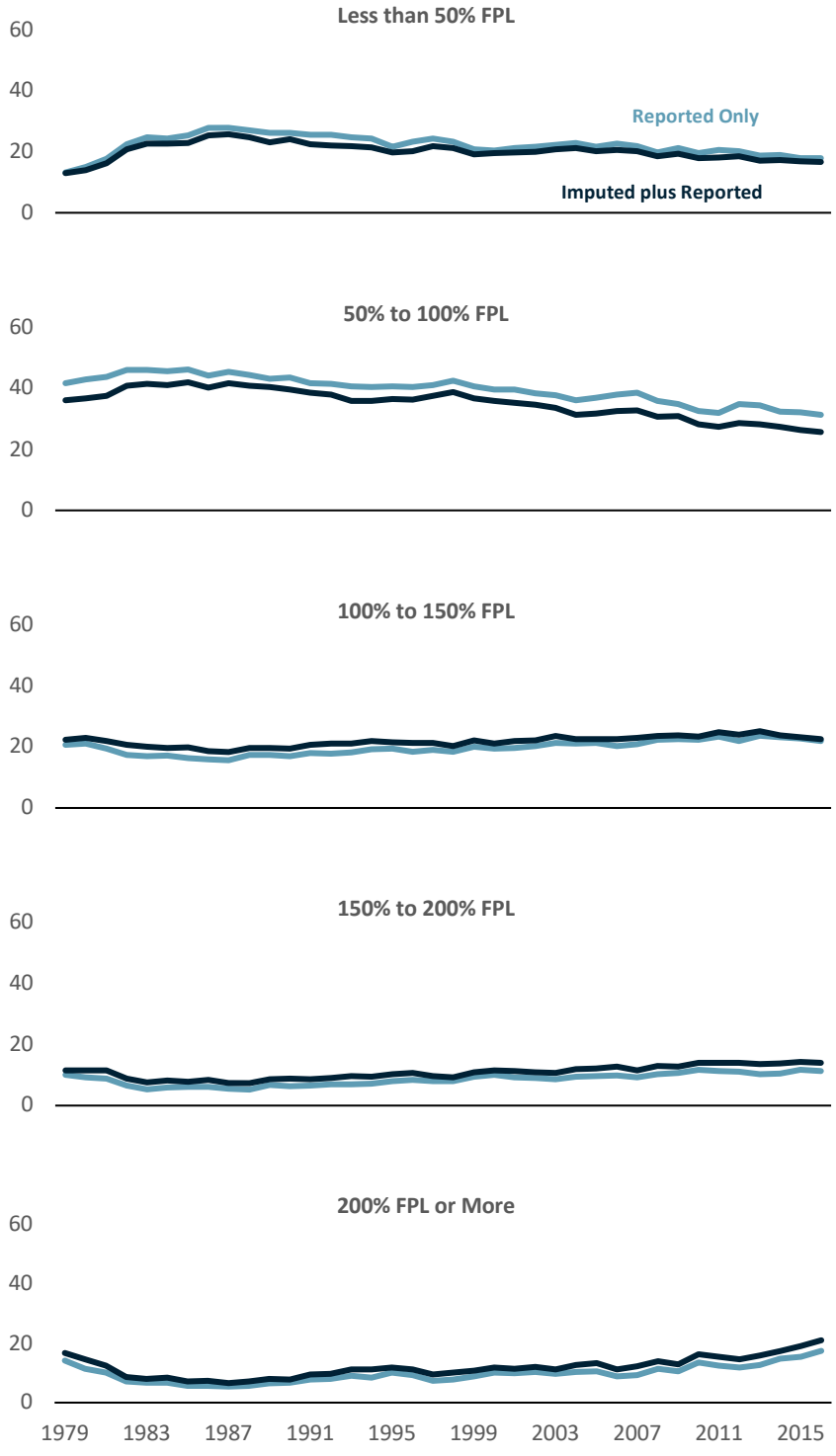
(Figure 5 continued)

Shares of SNAP Recipients (Percent)



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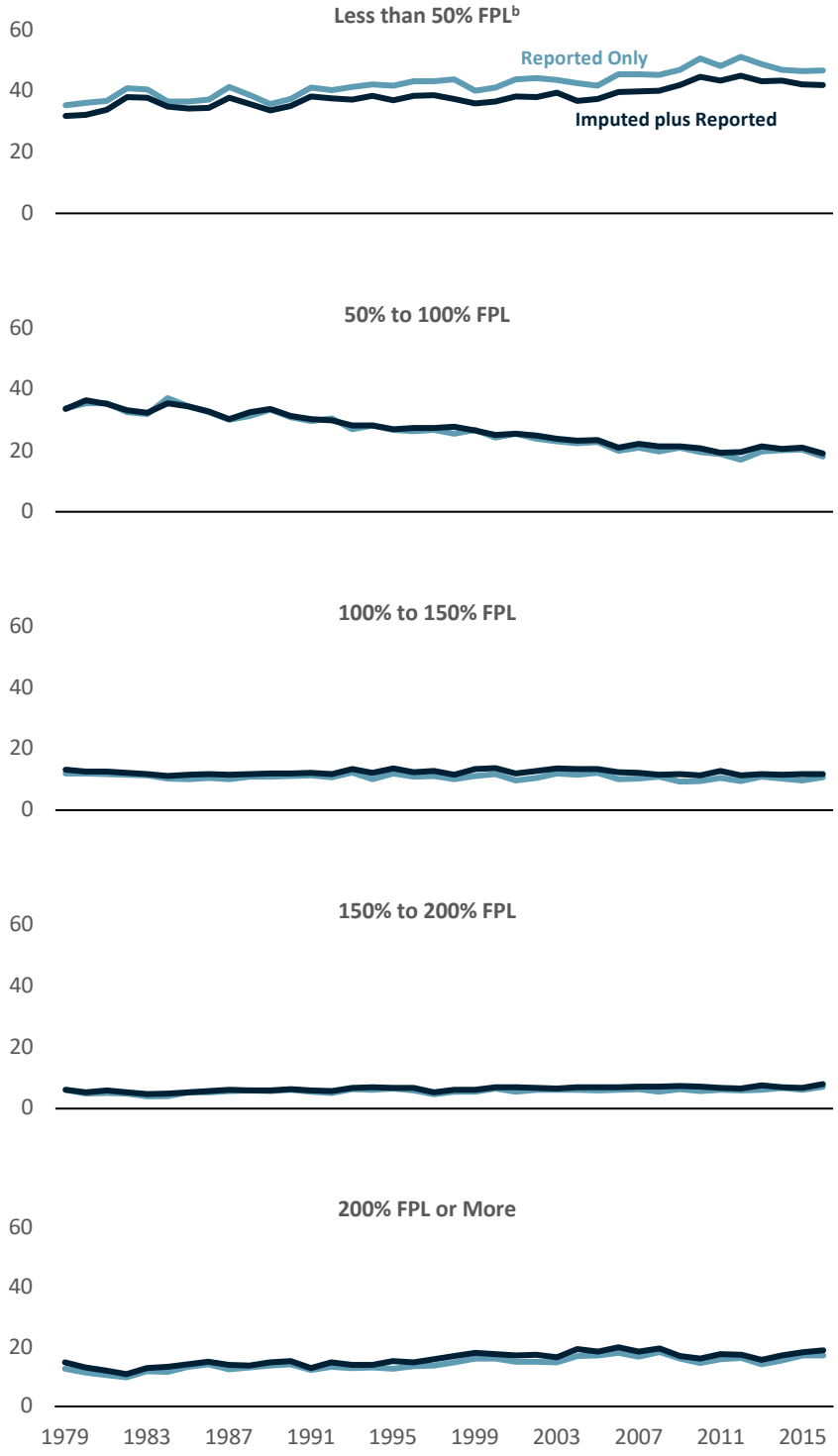
(Figure 5 continued)

Shares of SSI Recipients (Percent)



Source: Congressional Budget Office, using data from the CPS.
The income definition used here is money income from all sources reported in the CPS and totaled for all individuals in a family (for Medicaid and SSI) or household (for SNAP). Negative income amounts are not included.

A family is a group of people living together who are related by birth, marriage, or adoption. A household is a group of people living together who may or may not be related.

The FPL is calculated using the poverty guidelines from the Department of Health and Human Services.

CHIP = Children's Health Insurance Program; CPS = Current Population Survey; FPL = federal poverty guidelines; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

a. Reported-only recipients in this figure include Census Bureau allocations and logical imputations as though they were reported values, even though CBO excludes Medicaid allocations in its Medicaid imputations (see "Census Bureau Allocations and Imputations" in section 5 for details).
b. For the SSI analysis in this figure, SSI income is first subtracted from family income.

Means-Tested Transfer Rates

A measure of the importance of transfer income is the means-tested transfer rate—that is, the ratio of income from the three means-tested transfers to income before transfers and taxes.

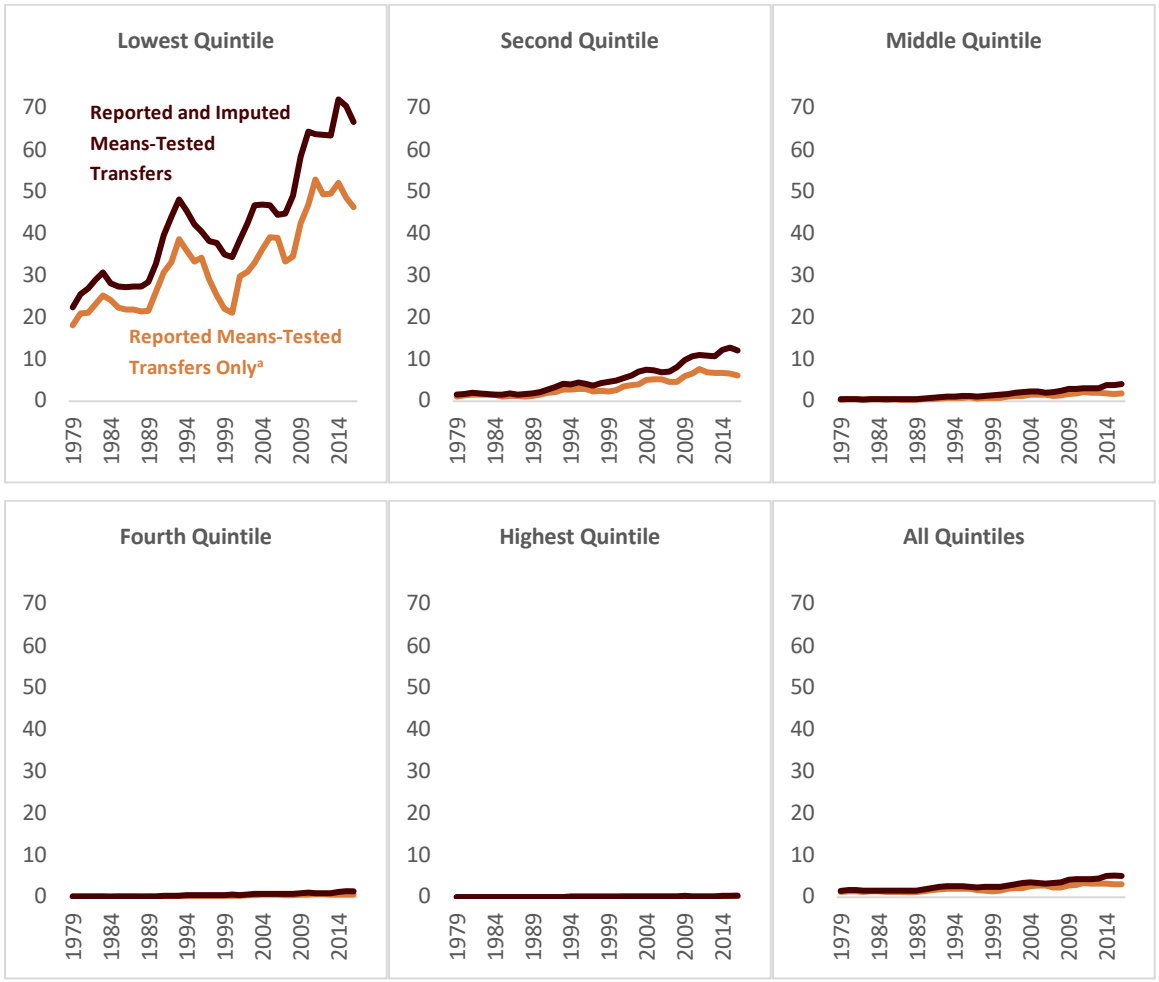
Households in the lowest quintile had the highest and most volatile means-tested transfer rate (see Figure 6; for more on trends in the levels of means-tested transfers, see Congressional Budget Office 2013a). Typically, the rate increased during economic downturns, when household incomes fell and more individuals became eligible for means-tested transfers. As Figure 6 shows, the recessions in the early 1990s and the early 2000s and the Great Recession of 2008 are all correlated with increases in the means-tested transfer rate. The rate also increased during legislative expansions of means-tested transfers, such as the 2014 expansion of Medicaid under the Affordable Care Act.

Correcting for the underreporting of transfer income increases the means-tested transfer rate for all income groups in all years. Because means-tested transfers largely go to low-income households, the lowest quintile has the highest means-tested transfer rates, as measured by both the reporting-only series and the reporting and imputed series. On average, in the lowest income quintile in 2016, households reported having received benefits equivalent to 46 percent of their income before transfers and taxes. Adding the imputed benefits increases that rate to 67 percent. For the second quintile, the rates are much lower, but the relative increase is higher: 6 percent for reported means-tested transfers and 12 percent after imputed transfers are added. The rates are below 5 percent for each of the other three quintiles. When calculated across all households, the means-tested transfer rate increases from 3 percent for reported transfers to 5 percent when adding the imputed transfers.

Most of the total amount of means-tested transfer income is derived from Medicaid and CHIP. CBO estimates that in 2016, the total value of the three means-tested transfers—Medicaid/CHIP, SNAP, and SSI—going to noninstitutionalized households within the United States (excluding U.S. territories) was $615 billion. Medicaid and CHIP alone, when measured as the total cost to the government of providing those benefits, accounted for $495 billion, or more than 80 percent of that total. SNAP accounted for 11 percent, and SSI accounted for the remaining 9 percent.

Between 1979 and 2016, the means-tested transfer rate increased substantially, especially for households in the lowest two quintiles of income before transfers and taxes. That growth was even larger after corrections were made for underreporting. Moreover, the corrections have a larger effect in later years because as underreporting increases, more imputations are required to meet the administrative targets.

Figure 6.
Means-Tested Transfer Rates by Quintile, 1979–2016



Source: Congressional Budget Office, using data from the CPS.

Means-tested transfer rates are calculated as total means-tested transfers received divided by total income before transfers and taxes in each income group.

Means-tested transfers are cash payments and in-kind transfers from federal, state, and local governments. The means-tested transfers shown in this analysis are Medicaid and the Children's Health Insurance Program (measured as the average cost to the government of providing those benefits), the Supplemental Nutrition Assistance Program (formerly known as the Food Stamp program), and Supplemental Security Income.

Income before transfers and taxes is market income plus social insurance benefits. Market income consists of labor income, business income, capital income (including capital gains), income received in retirement for past services, and other nongovernmental income sources. Social insurance benefits consist of benefits provided through Social Security (Old-Age, Survivors, and Disability Insurance), Medicare (measured as the average cost to the government of providing those benefits), unemployment insurance, and workers' compensation.

Income groups are created by ranking households by income before transfers and taxes, adjusted for household size. Quintiles (fifths) contain an equal number of people. The lowest quintile does not include households with negative income. For details on how CBO constructs quintiles for its distributional analysis, see Congressional Budget Office (2018).

The means-tested transfer rates shown here are identical in concept to the measure in Congressional Budget Office (2018). However, the results here differ from those in that report, largely because the report used income data drawn from both tax returns and the CPS, whereas this analysis uses CPS data only. That difference in income measurement affects both the ranking of households to create quintiles and the measure of income before taxes and transfers used in calculating the means-tested transfer rate.

CPS = Current Population Survey.

a. Reported-only recipients in this figure include Census Bureau allocations and logical imputations as though they were reported values, even though CBO excludes Medicaid allocations in its Medicaid imputations (see "Census Bureau Allocations and Imputations" in section 5 for details). For 1979 to 2013, the "reported" values of Medicaid in the figure are the person market values of Medicaid in the CPS. For 2014 to 2016, the reported values are the average cost to the government as calculated by CBO (see "Assigning Transfer Income" in section 3 for details).

Effects on Income Inequality

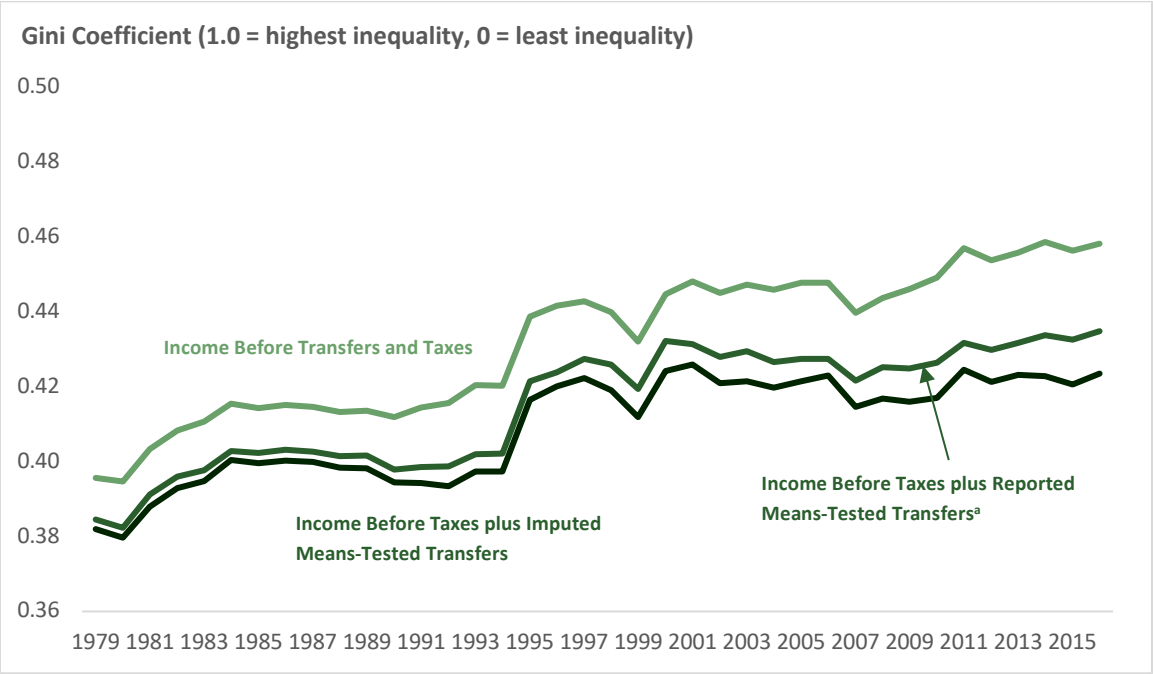
Correcting for the underreporting of means-tested transfers increases total means-tested transfer income allocated to households in CBO's analyses. Because means-tested transfers flow predominantly to low-income households, incomes at the bottom of the distribution increase more than those at the top. That change decreases measured income inequality.

A standard measure of income inequality is the Gini coefficient, which summarizes how equally income is distributed across the population. A Gini coefficient can range from zero to 1. A value of zero means that income is distributed equally among all income groups, whereas a value of 1 indicates that all the income is received by the highest-income group, and none is received by any of the lower-income groups (for a summary of various inequality metrics, see Jenkins 2009).

The Gini coefficient based on income before transfers and taxes is higher than one with Medicaid, SNAP, and SSI benefits added in (see Figure 7). In 2016, the Gini coefficient based on income before transfers and taxes (0.458) was significantly higher than that for income after reported means-tested transfers (0.435). Means-tested transfers decreased inequality by more in 2016 than in 1979, largely because income from means-tested transfers grew faster than income before those transfers.

Corrections for underreporting of means-tested transfers further reduces measures of inequality. The effect of those corrections increases significantly, from 0.002 in 1979 to 0.011 in 2016. That increase is due to the decline in reporting rates of means-tested transfers over the period. When underreporting is high, imputing additional receipt to the reported transfers will add more income to the bottom of the distribution than when it is low, thereby reducing income inequality.

Figure 7.
Income Inequality by Income Measure, 1979–2016



Source: Congressional Budget Office, using data from the CPS.

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

Income before transfers and taxes is market income plus social insurance benefits. Market income consists of labor income, business income, capital income (including capital gains), income received in retirement for past services, and other nongovernmental income sources. Social insurance benefits consist of benefits provided through Social Security (Old-Age, Survivors, and Disability Insurance), Medicare (measured as the average cost to the government of providing those benefits), unemployment insurance, and workers' compensation.

Means-tested transfers are cash payments and in-kind transfers from federal, state, and local governments. The means-tested transfers shown in this analysis are Medicaid and the Children's Health Insurance Program (measured as the average cost to the government of providing those benefits), the Supplemental Nutrition Assistance Program (formerly known as the Food Stamp program), and Supplemental Security Income.

Many researchers use an edited version of the CPS when computing measures of income inequality. That edit corrects for a Census Bureau procedure that imprecisely capped the income of all individuals with high incomes before the 1996 CPS (see Larrimore et al. 2008). To maintain consistency with the standard CPS data sets that most other researchers use, this figure does not use that correction. Although changes in the income caps will affect the level of the Gini coefficient, they will not change the relationship between the Gini coefficients derived from the three income measures.

Starting with the 1996 CPS (corresponding to calendar year 1995), the Census Bureau began to make its own corrections to the income caps, which explains the significant increase in the Gini coefficient in 1995 in this figure.

CPS = Current Population Survey.

a. Reported-only recipients in this figure include Census Bureau allocations and logical imputations as though they were reported values, even though CBO excludes Medicaid allocations in its Medicaid imputations (see "Census Bureau Allocations and Imputations" in section 5 for details). For 1979 to 2013, the "reported" values of Medicaid in the figure are the person market values of Medicaid in the CPS. For 2014 to 2016, the reported values are the average cost to the government as calculated by CBO (see "Assigning Transfer Income" in section 3 for details).

5. Evaluating the Validity of CBO's Approach

As described in section 2, three general approaches exist to correct for underreporting of transfers in survey data. Even within a particular approach, researchers can make several choices that affect the outcome. This section describes how CBO's regression-based approach compares with other methods of correcting for underreporting and discusses some of the more significant choices the agency made when designing its approach.

Comparisons With Other Methods

One way to evaluate the validity of CBO's method of adjusting for underreported means-tested transfer income in the CPS is to compare results with those obtained by other researchers trying to solve similar problems (using both matching and rule-based simulation approaches). This section compares CBO's distributional results with those of two other methods: an administrative matching study on Medicaid by Davern and colleagues (2009) and the Urban Institute's Transfer Income Model (TRIM). The comparisons are made for specific programs and periods depending on the available data.

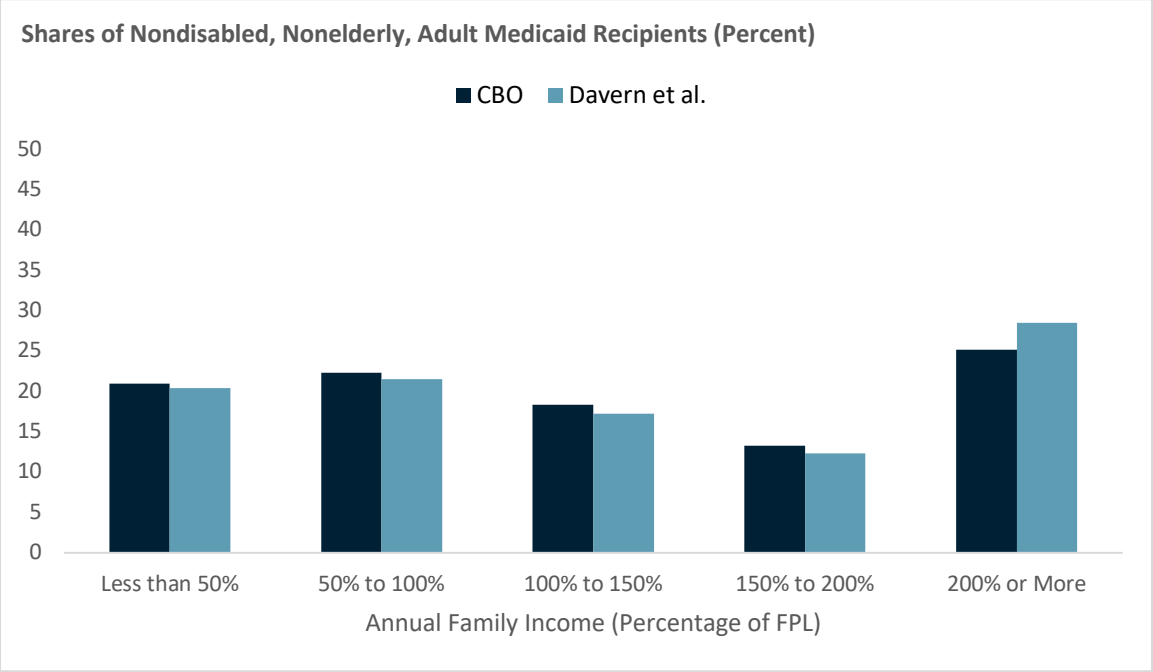
Davern and colleagues (2009) linked administrative data from the Medicaid Statistical Information System to data from CPS in 2001 and 2002. They estimated a regression equation that predicted Medicaid receipt on the basis of the socioeconomic characteristics of individuals, separately for people who reported receiving Medicaid and people who did not.

CBO used the results of those equations to examine the distribution of Medicaid benefits in a way comparable to the results of CBO's imputation method. Although Davern and colleagues (2009) did not publish a data set with receipt status for each type of individual, CBO used the coefficients of those regression equations to estimate the probability of receiving Medicaid for all individuals in the 2001 CPS (corresponding to calendar year 2000). CBO then used those probabilities to impute new recipients, using the same selection algorithm and administrative targets as in its primary imputation method (as described in section 3).

The distribution of Medicaid recipients imputed on the basis of coefficients from Davern and colleagues (2009) is similar to the distribution of reporting and imputed recipients generated by CBO's adjustment method (see Figure 8).[13] CBO's method tends to impute slightly more receipt to individuals with FPL ratios of 50 to 200, whereas the matching method used by Davern and colleagues (2009) tends to impute more receipt to individuals at FPL ratios of 200 percent or more.

[13] Davern and colleagues (2009) exclude CHIP recipients from their analysis, but CBO does not. For consistency, the comparison here is made for nondisabled, nonelderly adult Medicaid recipients only.

Figure 8.
Distribution of Imputed and Reported Recipients by Income, 2000



Source: Congressional Budget Office, using data from the CPS and the State Health Access Data Assistance Center (2018).

Regression coefficients and most of the code used to convert those coefficients to probabilities of Medicaid receipt were downloaded from the State Health Access Data Assistance Center in June 2018. Those probabilities are used to impute new recipients as described in section 3.

The income definition used here is money income from all sources reported in the CPS and totaled for all individuals in a family (for Medicaid and SSI) or household (for SNAP). Negative income amounts are not included.

A family is a group of people living together who are related by birth, marriage, or adoption. A household is a group of people living together who may or may not be related.

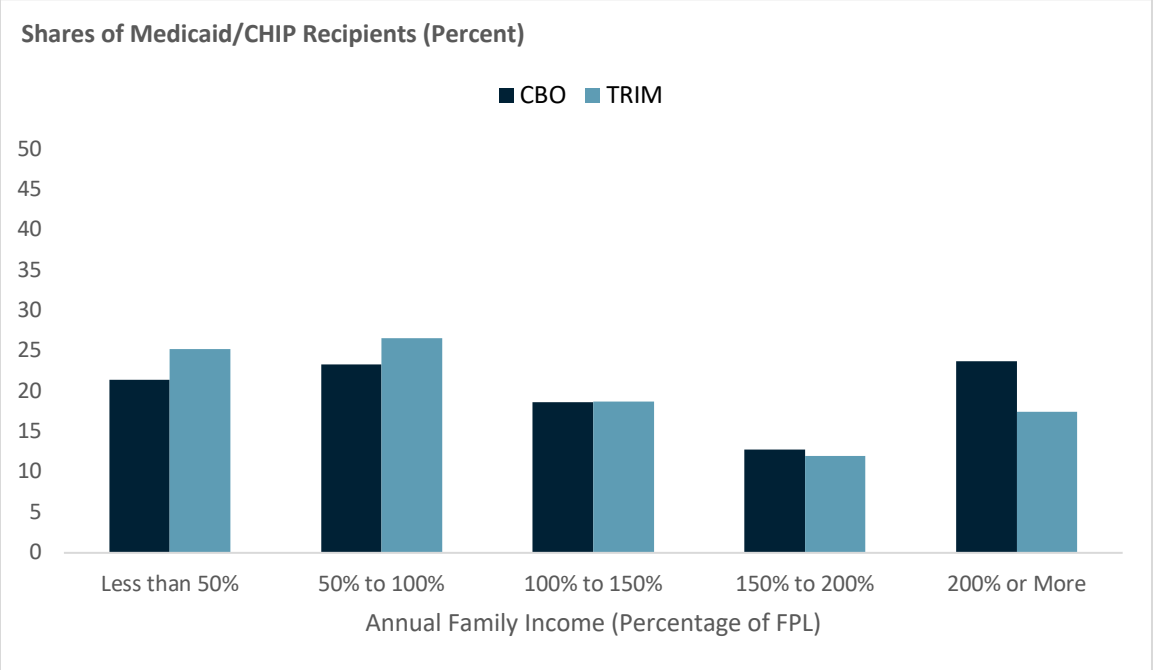
The FPL is calculated using the poverty guidelines from the Department of Health and Human Services.

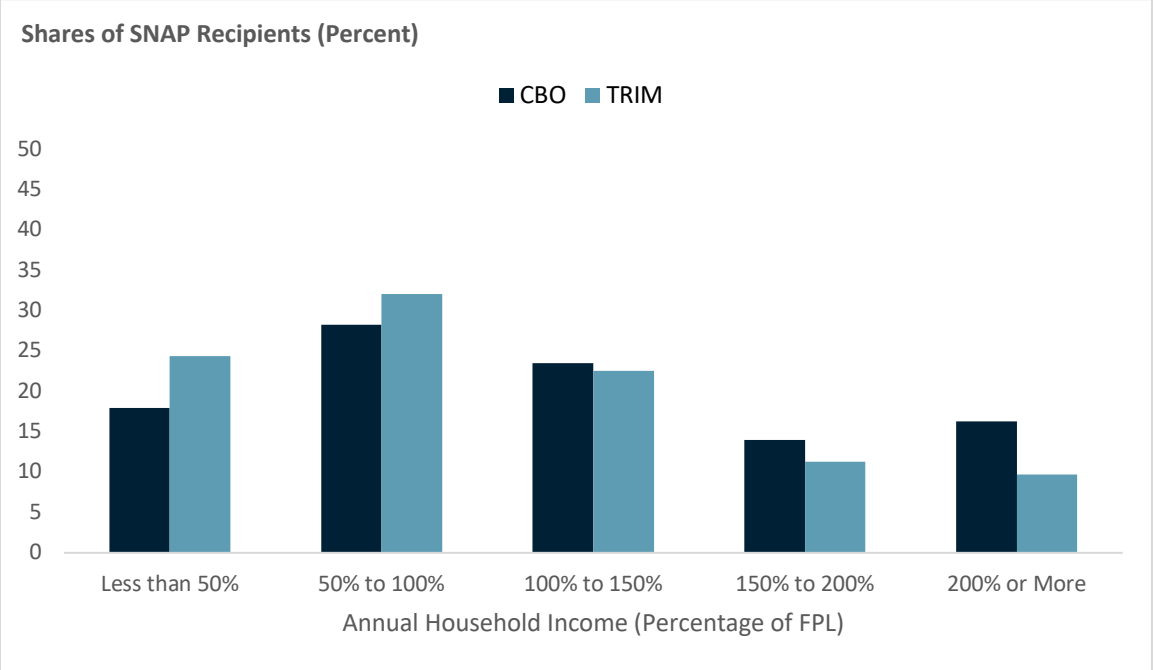
CPS = Current Population Survey; FPL = federal poverty guidelines.

CBO also compared results from its imputation method to results from the Urban Institute's TRIM for 2010. TRIM applies program rules to demographic, income, and asset information in the CPS to identify eligible recipients. TRIM then creates a participation function to assign a probability of receipt to eligible nonreporters, and program receipt is then assigned on the basis of those probabilities to match administrative program totals.

A different pattern emerges when comparing CBO's approach to results from TRIM (see Figure 9). For all three programs, CBO imputes receipt to more higher-income individuals (those with FPL ratios of more than 100) and fewer lower-income individuals (those with FPL ratios less than 100) than TRIM.

Figure 9.
Distribution of Imputed and Reported Recipients by Income, 2010





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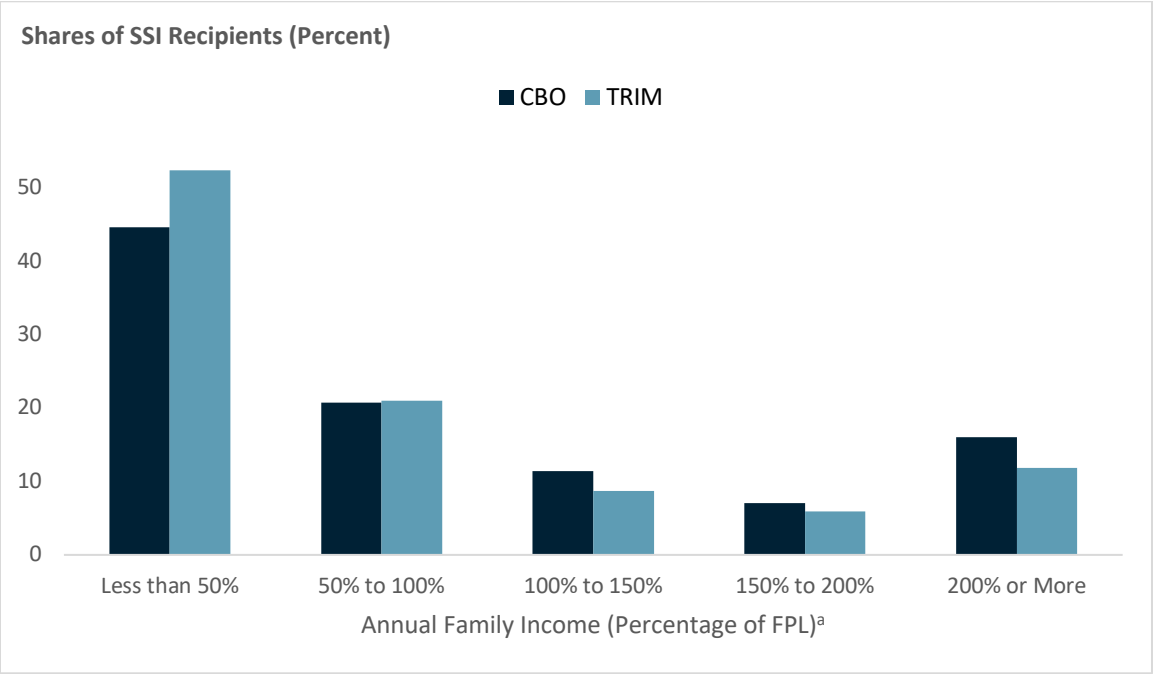

Source: Congressional Budget Office, using data from the CPS and the Urban Institute.

The data used here were downloaded from an interactive tool on the Transfer Income Model, Version 3 (TRIM3) project website (see Urban Institute 2017) in June and July 2017.

The information is derived in part from the TRIM3 and associated databases. TRIM3 requires users to input assumptions, interpretations, or both about economic behavior and the rules governing federal programs. Therefore, the conclusions presented here are mine alone.

The income definition used here is money income from all sources reported in the CPS and totaled for all individuals in a family (for Medicaid and SSI) or household (for SNAP). Negative income amounts are not included.

A family is a group of people living together who are related by birth, marriage, or adoption. A household is a group of people living together who may or may not be related.

The FPL is calculated using the poverty guidelines from the Department of Health and Human Services.

CHIP = Children's Health Insurance Program; CPS = Current Population Survey; FPL = federal poverty guidelines; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income; TRIM = Transfer Income Model of the Urban Institute.

a. For the SSI analysis in this figure, SSI income is first subtracted from family income.

The reason for that difference is that TRIM uses CPS-reported income to determine eligibility for receipt and then assigns receipt only to those individuals who meet eligibility criteria. (Zedlewski and Giannarelli 2015).[14] In fact, TRIM sometimes overrides individuals who report receipt if those individuals appear to be ineligible for receipt. By contrast, CBO's model does not determine each unit's eligibility for a given program and generally does not override reported receipt. Instead, the regression equation estimates the probability of receipt for each unit, and receipt is assigned to each unit on the basis of that probability. Because CBO's imputation method is based on reported receipt in the CPS—and sometimes units with annual income levels above the eligibility criteria for a means-tested transfer program report receiving that transfer—CBO also imputes some receipt to higher-income units that TRIM would deem ineligible.

Broadly, CBO's imputed recipients tend to be higher in the income distribution than TRIM's but lower in the income distribution than the recipients generated on the basis of the coefficients in Davern and colleagues (2009). That finding is consistent with the results of Fox and colleagues (2017) and Mittag (2017); according to both studies, TRIM's imputations tend to be skewed to the bottom of the income distribution in comparison with data from administrative matches.

An Alternative Method for Transfer Receipt Imputation

Multiple ways exist to translate estimated probabilities of receipt into an imputation of whether a given unit received a particular means-tested transfer. Before deciding to use the probabilistic algorithm described in section 3, CBO also considered a deterministic algorithm. In the deterministic algorithm, all nonreporting units are ranked by their estimated probabilities. Transfer receipt is then assigned to the highest-ranked units until the total number of units matches the total in the administrative data.

That approach is similar to the one used in Moffitt and Scholz (2009), who developed the regression-based method. Although more straightforward, the regression-based method tends to create stronger relationships between transfer receipt and the variables used to predict receipt, such as the unit's income, than exist in the underlying reported data. As a result, the distribution of transfer receipt is more skewed toward the bottom of the distribution than in the underlying reported data.

After considering both methods, CBO chose the probabilistic algorithm on the view that such an algorithm will produce a distribution of imputed recipients that better matches the one observed in the underlying survey data. That finding is supported by Mittag (2017), who compares the results of the two assignment methods with the administrative data. He finds that the results better match the patterns in the administrative data when probabilistic assignment is used.

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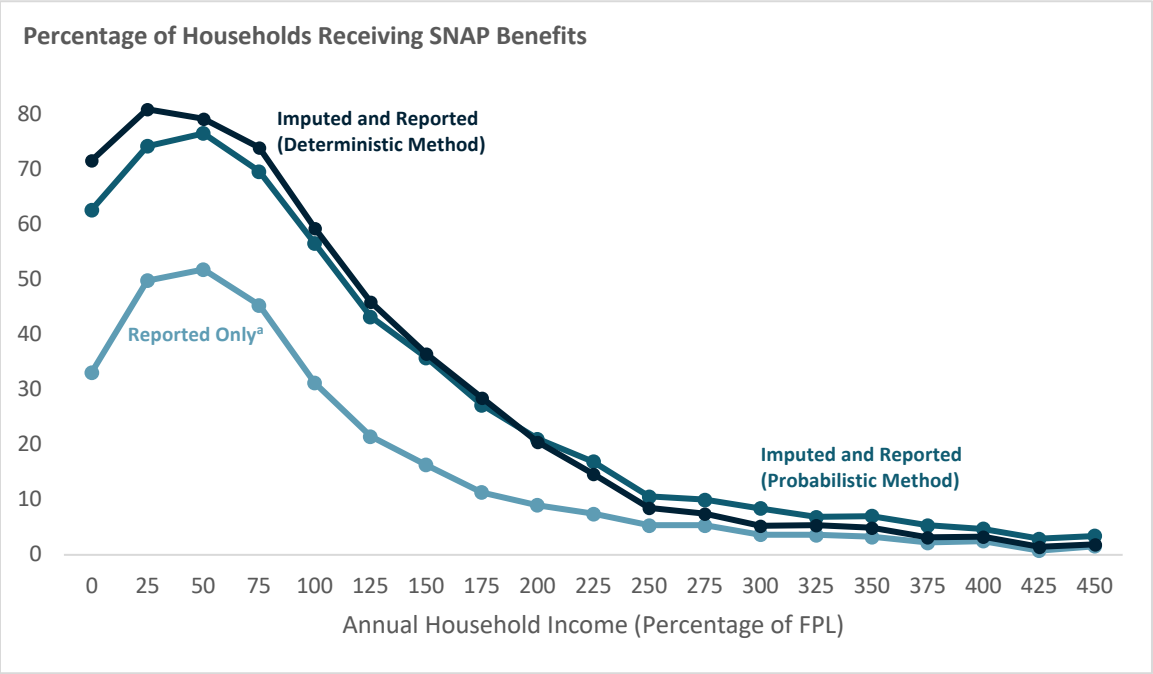
[14] TRIM imputations are computed on a monthly basis to better capture income volatility across the year, and the model targets administrative totals for average monthly receipt (Giannarelli et al. 2005). By contrast, CBO's model computes receipt on an annual basis and therefore targets administrative totals for receipt at any point during the year—referred to as "ever on" receipt. In any given year, more ever-on recipients than average monthly recipients tend to exist, as a result of volatility in participation across the year. Therefore, TRIM tends to target lower administrative totals than CBO's method and ends up with fewer imputed recipients.

Figure 10.
SNAP Recipiency Rates by Income, 2016



Source: Congressional Budget Office, using data from the CPS.

The income definition used here is money income from all sources reported in the CPS and totaled for all individuals in a family (for Medicaid and SSI) or household (for SNAP). Negative income amounts are not included.

A family is a group of people living together who are related by birth, marriage, or adoption. A household is a group of people living together who may or may not be related.

The FPL is calculated using the poverty guidelines from the Department of Health and Human Services.

CPS = Current Population Survey; FPL = federal poverty guidelines; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program).

a. Reported-only recipients in this figure include Census Bureau allocations and logical imputations as though they were reported values, even though CBO excludes Medicaid allocations in its Medicaid imputations (see "Census Bureau Allocations and Imputations" in section 5 for details).

For example, the probabilistic algorithm produces a distribution of SNAP recipients by income that is more proportionate to the reported data, whereas the deterministic algorithm produces a distribution more skewed toward the bottom of the distribution (see Figure 10). For households with an FPL ratio of less than 150, the deterministic algorithm produces higher recipiency rates than the probabilistic one, and that pattern flips for households at higher FPL ratios.

Census Bureau Allocations and Imputations

As described in section 2, the Census Bureau makes assignments to correct for responses missing in the CPS because of either interview nonresponse or item nonresponse. CBO's distributional analysis treats most variables assigned by the Census Bureau to nonresponding units as though they were reported values, including program receipt, income, and demographic variables included in the regression models.

The Census Bureau makes two main types of assignments to correct for nonresponse. Interview nonresponse is typically corrected for by *allocation*, using what is referred to as a "hot deck" method. The data for the missing household are replaced with data from another household with a similar set of characteristics, known as the donor. The set of households from which the donor is chosen is referred to as the hot deck. Usually, item nonresponse is corrected for similarly. For example, an individual who has responded to some interview questions but not to the question about SSI receipt is assigned a value (either receipt or nonreceipt) based on the value of a donor with similar observed characteristics. For more details on the hot-deck method, see Andridge and Little (2010).

For the Medicaid receipt variable, another correction method is used in addition to hot-deck allocation. That method, known as *logical imputation*, uses the eligibility criteria for a given program to make informed assumptions about the receipt of nonresponding individuals. It is typically done by assigning receipt to an individual according to whether that individual or relevant family members received Medicaid, SSI, or other means-tested transfers (Bureau of Labor Statistics and Census Bureau 2006).

CBO's method treats most of those assignments as reported values because the Census Bureau's allocations and logical imputations usually preserve the relationship between income and program receipt that exists in the reported data. That relationship is particularly important for CBO's distributional analyses. Using the CPS imputations and allocations in such a way instead of replacing them allows CBO to apply its method with fewer departures from the standard CPS data that most other researchers use.

However, Medicaid receipt allocations by the Census Bureau are exceptions to that rule. The hot-deck allocation algorithm used to allocate Medicaid receipt does not use income as a determinant in compiling the hot deck. As a result, the relationship between income and program receipt is not preserved, and allocated Medicaid recipients tend to have significantly higher incomes than do "true" reporters.[15] If those units are treated as reporting recipients in the regression equations,

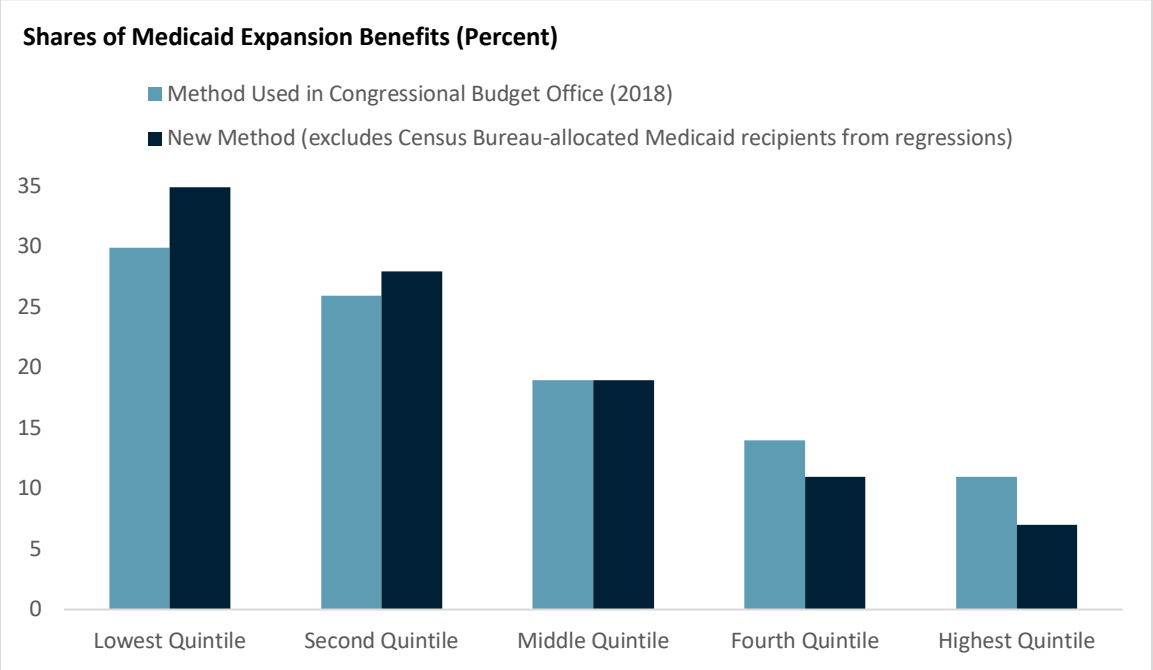
[15] The logical imputations for Medicaid, which are typically based on receipt of other means-tested transfers and family relationships, also tend to be assigned to individuals with slightly higher incomes than those of reporters. However, because those imputations are consistent with Medicaid program rules and are less disruptive to the relationship between income and receipt, CBO treats them as true reporters as well.

the model will tend to assign higher probabilities to individuals at higher levels of income than are warranted by the underlying data for "true" reporters.

CBO therefore excludes individuals with Medicaid receipt allocated by the Census Bureau from the estimation of its Medicaid regression models. CBO then replaces the allocated Medicaid receipt with estimates from its imputation model. Those individuals are assigned a probability of receipt by applying the regression coefficients to their income and demographic characteristics. Those probabilities are then used to assign receipt and incomes as described in section 3.

In its report on the 2014 distribution of household income, CBO treated Medicaid receipt allocated by the Census Bureau identically to "true" reporters. As a result, the distribution of reporting and imputed recipients used in that report is slightly more skewed toward the top three quintiles than is the distribution of recipients shown here (see Figure 11).[16] That result applies to the Medicaid population as a whole, as well as to the subgroup affected by the Affordable Care Act's Medicaid expansion.

Figure 11.
Distribution of Medicaid Expansion Benefits by Quintile, 2014



Source: Congressional Budget Office, using data from the Current Population Survey and the Internal Revenue Service's Statistics of Income.

[16] For more details on how CBO estimates the distribution of Medicaid expansion benefits, see Appendix A.

Quintiles (fifths) are created by ranking households by income before transfers and taxes, adjusted for household size. Quintiles contain an equal number of people. The lowest quintile does not include households with negative income.

Income before transfers and taxes is market income plus social insurance benefits. Market income consists of labor income, business income, capital income (including capital gains), income received in retirement for past services, and other nongovernmental income sources. Social insurance benefits consist of benefits provided through Social Security (Old-Age, Survivors, and Disability Insurance), Medicare (measured as the average cost to the government of providing those benefits), unemployment insurance, and workers' compensation.

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Appendix A: CBO's Method for Estimating the Distribution of Medicaid Expansion Benefits

In 2014, 25 states and the District of Columbia implemented the Affordable Care Act's Medicaid expansion, which resulted in 9.4 million people receiving Medicaid coverage in 2014 who were not eligible in prior years. An additional $38 billion was spent on those newly eligible individuals.

Medicaid expansion was designed to target low-income, nondisabled, childless adults. Specifically, eligibility was expanded to include individuals under the age of 65 with federal poverty guidelines (commonly known as the federal poverty level [FPL]) ratios of up to 133.

The Current Population Survey (CPS) shows an increase in Medicaid reporting of adults between 2013 and 2014 but does not identify which reporters were part of the newly eligible population. Moreover, the CPS shows some nondisabled, childless adults as reporting Medicaid receipt even in prior years. As a result, the Congressional Budget Office cannot use its regression-based method to separately model the group of newly eligible adults at the micro level.

Instead, CBO estimates the distribution of Medicaid expansion benefits by income quintile. CBO first imputes new recipients to the 2015 CPS data set.[1] The method is the same as the one described above, except that an interaction term for childless adults in expansion states is added to the regression to try to capture more of the newly eligible population.[2] CBO then uses the data set with newly imputed recipients to estimate the distribution—by household income quintiles—of Medicaid benefits among nondisabled, childless adults living in states that chose to expand Medicaid coverage. The additional transfers of $38 billion are then distributed across the household quintiles in the same proportions.

[1] Each CPS data set contains data from the prior calendar year. For example, the 2015 CPS data set asks respondents to answer questions about their incomes and program participation in calendar year 2014.

[2] Although CPS data are typically not detailed enough for state-level analysis, the interaction term is intended to capture differences in reporting between two broad groups of expansion state residents and non–expansion state residents, each representing approximately half the population in the CPS in 2014.

Appendix B: CBO's Method for Imputing Social Insurance Transfers

Although this paper focuses on means-tested transfers, underreporting also occurs for social insurance transfers. As a result, the Congressional Budget Office also adjusts for the two largest social insurance transfers: Social Security and Medicare. In CBO's analytical framework, those two programs are included in the base income measure and are therefore not analyzed on par with federal taxes. In addition, both transfer programs tend to be well reported in the Current Population Survey (CPS). However, because they are the two largest government transfer programs, CBO makes some adjustments to the underlying data to ensure that they are not mismeasured in a way that affects the income distribution.

Social Security. An individual can receive Social Security income for one of three reasons: retirement, disability, and survivorship of a Social Security recipient. Retirement benefits constituted 71 percent of total Social Security benefits in 2016. The reporting rates for Social Security income through retirement and disability are relatively high in the CPS (96 percent and 77 percent, respectively, in 2016). Survivors' benefits are less well reported (45 percent) because many of the recipients of those benefits are children, and the CPS does not assign income to children younger than 15 years.

The reporting rates are better in the data sets that CBO uses for its distributional analyses, which are created by statistically merging administrative tax data from the Internal Revenue Service's Statistics of Income (SOI) with the CPS. The SOI data contain a near-complete accounting of taxable income, and reporting rates for Social Security have increased in more recent years. However, some underreporting still occurs because some Social Security recipients do not earn enough income to file their taxes.

Using a regression to model Social Security receipt in the CPS is difficult for three reasons. First, receipt depends on income across the individual's life cycle rather than in a given year. Second, receipt is not means-tested, which makes examining program rules and entering relevant variables into a regression model difficult. Finally, without an income variable for survivor children, constructing a meaningful dependent variable for that population is difficult.

Although scope for further research does exist here, CBO now uses a simpler approach, which ensures consistency across years in the base income measure. On average, in recent years, 94 percent of total Social Security benefits are reported in the merged CPS-SOI data set. For earlier years, CBO uses an individual's reported Social Security income and multiplies it by a factor that ensures that 94 percent of total Social Security benefits are accounted for.

Medicare. Medicare is almost perfectly reported in the CPS. For example, the reporting rate for Medicare in 2006 was 93 percent before adjustment for the institutionalized population. In Congressional Budget Office (2013b), the agency used data from the Medicare Current

Beneficiary Survey to find that 6 percent of Medicare recipients in 2006 were institutionalized. As a result, no new recipients are imputed beyond those reported in the CPS.

However, as for Medicaid, a dollar value for the amount of Medicare that an individual received is difficult to determine. (For more details, see "Assigning Transfer Income" in section 3.) CBO uses a similar method to that used for Medicaid. An average is calculated by taking the total (noninstitutionalized) Medicare benefits and dividing that number by the number of reporters in the CPS. That average is then assigned to all reporting recipients.

Medicare has a program within it, called the Low-Income Subsidy for Medicare Prescription Drug Coverage (LIS). That program is available only to low-income individuals and therefore works more like a means-tested transfer than a social insurance program.

CBO removes LIS benefits from its total Medicare benefits and assigns them separately. The CPS does not identify which Medicare recipients also receive LIS. A pool of eligible recipients is created by identifying Medicare recipients who also receive at least one means-tested transfer—specifically, they report receipt of Medicaid, SNAP, or SSI; have been imputed by CBO to receive any of those programs; or report receipt of Temporary Assistance for Needy Families, General Assistance programs, or public housing. Recipients are chosen at random from that pool until the total LIS population is accounted for, and an average LIS benefit is assigned to each imputed recipient.

Appendix C: Administrative Targets

The following tables include the administrative targets that the Congressional Budget Office developed for use in its adjustment method. The targets were developed as described in section 3. The data shown below are also available as Excel spreadsheets and Stata files on CBO's website.

Adjusted Total Recipients for Means-Tested Transfers, 1979–2016

	Medicaid/CHIP (Millions of individuals)					SNAP (Millions of households)	SSI (Millions of individuals)			
Year	Adults	Children	Seniors	Disabled	Total	Total	Adults	Children	Seniors	Total
1979	5.0	9.9	2.6	2.6	20.0	9.0	2.0	0.2	2.5	4.6
1980	5.2	9.8	2.5	2.7	20.2	10.3	2.0	0.2	2.4	4.6
1981	5.4	9.9	2.3	2.7	20.3	11.1	1.9	0.2	2.3	4.5
1982	5.5	9.8	2.2	2.6	20.1	10.5	1.9	0.2	2.2	4.3
1983	5.6	9.6	2.2	2.6	20.0	10.1	1.9	0.2	2.2	4.3
1984	5.6	9.8	2.1	2.6	20.1	9.6	2.0	0.2	2.2	4.5
1985	5.7	10.0	2.0	2.7	20.4	9.3	2.1	0.2	2.2	4.6
1986	5.8	10.3	2.0	2.9	21.1	9.1	2.3	0.3	2.2	4.8
1987	5.8	10.5	2.1	3.1	21.5	8.7	2.4	0.3	2.2	4.9
1988	5.7	10.4	2.0	3.3	21.4	8.8	2.5	0.3	2.2	5.0
1989	6.0	10.9	2.0	3.4	22.3	9.3	2.6	0.3	2.2	5.1
1990	6.5	12.1	2.1	3.6	24.3	10.1	2.8	0.3	2.3	5.4
1991	7.0	13.9	2.3	3.9	27.1	11.5	3.0	0.4	2.3	5.7
1992	7.3	15.8	2.5	4.4	30.0	12.9	3.3	0.6	2.3	6.2
1993	7.7	16.9	2.6	4.9	32.1	13.6	3.6	0.8	2.3	6.7
1994	7.8	17.7	2.8	5.3	33.6	13.3	3.8	0.9	2.3	7.0
1995	7.8	17.8	3.0	5.8	34.5	12.8	4.0	1.0	2.3	7.3
1996	7.4	17.4	3.1	6.2	34.1	12.5	4.1	1.0	2.3	7.4
1997	7.6	17.7	2.9	6.3	34.5	10.8	4.0	0.9	2.3	7.3
1998	8.4	20.9	2.9	6.8	39.0	9.6	4.1	1.0	2.2	7.3
1999	8.5	22.2	2.9	7.0	40.6	9.1	4.2	0.9	2.2	7.3
2000	9.9	24.2	2.9	7.2	44.2	8.9	4.3	0.9	2.2	7.4
2001	11.1	26.6	3.0	7.4	48.1	9.3	4.3	1.0	2.2	7.5
2002	12.2	29.1	3.1	7.6	52.0	10.2	4.4	1.0	2.2	7.6
2003	12.7	31.1	3.3	7.9	55.0	11.5	4.2	1.0	2.1	7.4
2004	13.3	32.8	3.5	8.3	57.9	12.7	4.6	1.1	2.2	7.9
2005	13.7	33.8	3.6	8.6	59.7	13.6	4.7	1.1	2.2	8.0
2006	13.6	34.0	3.5	8.6	59.7	13.7	4.7	1.2	2.2	8.1
2007	13.6	34.5	3.3	8.8	60.2	14.0	4.8	1.2	2.2	8.2
2008	14.5	35.8	3.4	9.1	62.9	15.6	4.9	1.2	2.2	8.4
2009	15.9	37.8	3.5	9.4	66.6	19.0	5.1	1.3	2.2	8.6

2010	16.9	39.4	3.6	9.8	69.7	22.4	5.5	1.4	2.3	9.2
2011	17.7	41.2	3.6	10.1	72.6	24.4	5.6	1.4	2.3	9.3
2012	18.1	42.1	3.7	10.4	74.3	25.6	5.5	1.4	2.3	9.2
2013	17.4	42.9	3.7	10.2	74.2	25.6	5.5	1.4	2.3	9.3
2014	33.1	46.5	5.1	10.0	94.7	25.7	5.5	1.4	2.3	9.3
2015	37.8	47.8	5.3	10.0	100.9	25.6	5.5	1.4	2.4	9.2
2016	38.4	48.1	5.5	9.9	101.8	24.6	5.4	1.4	2.4	9.2

Source: Congressional Budget Office, using data from the Centers for Medicare & Medicaid Services, the Department of Agriculture, and the Social Security Administration.

Adjustments are made to administrative totals to make them compatible with how data are reported in the Current Population Survey. For details on how those adjustments are made, see Table 1.

CHIP = Children's Health Insurance Program; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

Adjusted Total Benefits for Means-Tested Transfers, 1979–2016

	Medicaid/CHIP (Billions of dollars)					SNAP (Billions of dollars)	SSI (Billions of dollars)		
Year	Adults	Children	Seniors	Disabled	Total	Total	Adults and Children	Seniors	Total
1979	3.2	3.0	1.9	4.1	12.2	7.1	5.6	1.0	6.7
1980	3.4	3.3	2.5	4.7	14.0	9.0	6.4	1.1	7.5
1981	3.9	3.6	3.0	5.4	15.9	11.0	6.9	1.2	8.1
1982	4.3	3.6	3.3	5.7	17.0	10.4	7.2	1.3	8.4
1983	4.6	4.0	3.9	6.0	18.5	11.1	7.6	1.4	8.9
1984	4.6	4.2	4.4	6.4	19.5	10.7	8.3	1.5	9.8
1985	4.9	4.7	4.8	7.3	21.8	10.7	8.8	1.6	10.4
1986	5.2	5.4	5.2	8.4	24.2	10.6	9.6	1.7	11.3
1987	5.8	5.7	5.5	9.7	26.8	10.6	10.3	1.9	12.2
1988	6.3	6.3	5.8	11.1	29.4	11.3	11.0	2.0	12.9
1989	7.5	7.6	6.3	12.8	34.2	12.3	11.9	2.1	14.1
1990	9.2	9.9	7.2	15.6	42.0	14.7	13.2	2.4	15.6
1991	11.1	12.6	8.5	19.1	51.3	18.3	15.2	2.7	18.0
1992	12.9	15.4	9.5	23.6	61.4	21.3	18.3	3.3	21.6
1993	13.8	16.9	10.3	27.8	68.8	22.2	20.3	3.7	23.9
1994	13.8	17.8	11.2	32.1	74.8	22.9	21.3	3.8	25.1
1995	13.5	18.3	12.6	36.8	81.2	22.6	22.8	4.2	27.0
1996	12.6	18.0	12.8	39.6	82.9	22.0	24.0	4.3	28.3
1997	13.2	19.3	13.5	42.3	88.3	18.7	24.1	4.3	28.4
1998	15.5	24.2	15.5	48.6	103.7	16.5	25.2	4.2	29.4
1999	16.9	26.9	16.9	54.8	115.5	15.5	25.7	4.4	30.1
2000	19.1	31.7	18.7	61.7	131.2	14.9	26.1	4.5	30.7
2001	21.9	37.5	20.9	69.6	150.0	16.2	27.5	4.7	32.2
2002	25.5	44.0	23.8	80.2	173.6	18.9	28.9	4.8	33.7
2003	29.0	49.0	26.4	89.5	193.9	22.3	29.8	4.9	34.7
2004	32.6	53.8	29.5	98.6	214.4	25.9	31.2	4.9	36.1
2005	33.8	57.2	29.3	102.0	222.2	29.6	32.3	5.0	37.2
2006	34.4	60.8	24.1	99.2	218.4	29.5	33.8	5.1	38.9
2007	36.6	65.8	24.1	105.0	231.5	31.1	35.9	5.3	41.2
2008	41.2	71.3	27.0	114.1	253.6	37.2	37.7	5.4	43.0
2009	47.6	77.8	29.0	123.9	278.3	54.9	41.0	5.6	46.6
2010	51.4	82.2	30.7	130.6	294.9	66.8	42.7	5.5	48.2
2011	52.5	81.3	29.5	131.1	294.4	73.0	44.1	5.4	49.5
2012	57.4	84.7	30.5	137.0	309.6	75.2	46.6	5.5	52.1
2013	61.4	91.3	31.0	142.7	326.4	75.0	48.3	5.6	53.9
2014	110.9	117.3	36.9	158.6	423.7	69.7	49.0	5.7	54.7
2015	142.1	126.9	37.6	165.4	471.9	69.0	49.2	5.7	55.0
2016	151.1	135.3	39.1	169.2	494.7	65.7	49.0	5.8	54.8

Source: Congressional Budget Office, using data from the Centers for Medicare & Medicaid Services, the Department of Agriculture, and the Social Security Administration.

Adjustments are made to administrative totals to make them compatible with how data are reported in the Current Population Survey. For details on how those adjustments are made, see Table 1.

CHIP = Children's Health Insurance Program; SNAP = Supplemental Nutrition Assistance Program (formerly the Food Stamp program); SSI = Supplemental Security Income.

Adjusted Total Recipients and Benefits for Medicare, 1979–2016

Year	Medicare Benefits (except LIS) (Billions of dollars)	LIS Recipients (Millions of individuals)	LIS Benefits (Billions of dollars)
1979	28.9		
1980	35.2		
1981	42.9		
1982	50.5		
1983	56.8		
1984	62.3		
1985	69.8		
1986	75.3		
1987	79.6		
1988	85.2		
1989	94.6		
1990	106.2		
1991	115.5		
1992	128.4		
1993	142.4		
1994	153.0		
1995	170.0		
1996	182.3		
1997	192.8		
1998	191.7		
1999	193.3		
2000	199.8		
2001	220.0		
2002	237.9		
2003	252.4		
2004	276.2		
2005	300.0		
2006	352.4	8.3	10.3
2007	370.5	8.3	11.5
2008	401.0	8.6	11.6
2009	435.2	8.7	14.4
2010	445.1	8.9	14.8
2011	463.3	9.5	16.3
2012	490.7	9.9	16.3
2013	498.2	10.2	17.2
2014	522.9	10.4	19.4
2015	550.8	10.7	22.6
2016	574.7	11.1	26.5

Source: Congressional Budget Office, using data from the Centers for Medicare & Medicaid Services (CMS).

Medicare benefits data are from the *Medicare Trustees Report*. LIS recipient data are from the CMS website (downloaded in June 2018). LIS benefits data are from published CBO baseline projections.

Premiums paid for Medicare Part A (Hospital Insurance) coverage by individuals who choose to purchase coverage are subtracted from total Medicare benefits.

CBO estimates the number of institutionalized recipients and the benefits going to those recipients and removes those from the administrative totals to make the data compatible with how data are reported in the Current Population Survey. The percentage of non-LIS Medicare benefits going to institutionalized people is estimated using data from the Medicare Current Beneficiary Survey and the CMS Statistical Supplement. Data in that supplement are available through 2012. For 2013 onward, CBO holds that proportion constant at 2012 levels. The percentage of institutionalized LIS recipients and the benefits going to those recipients are estimated using data from the Master Beneficiary Summary File.

LIS = Low-Income Subsidy for Medicare Prescription Drug Coverage.