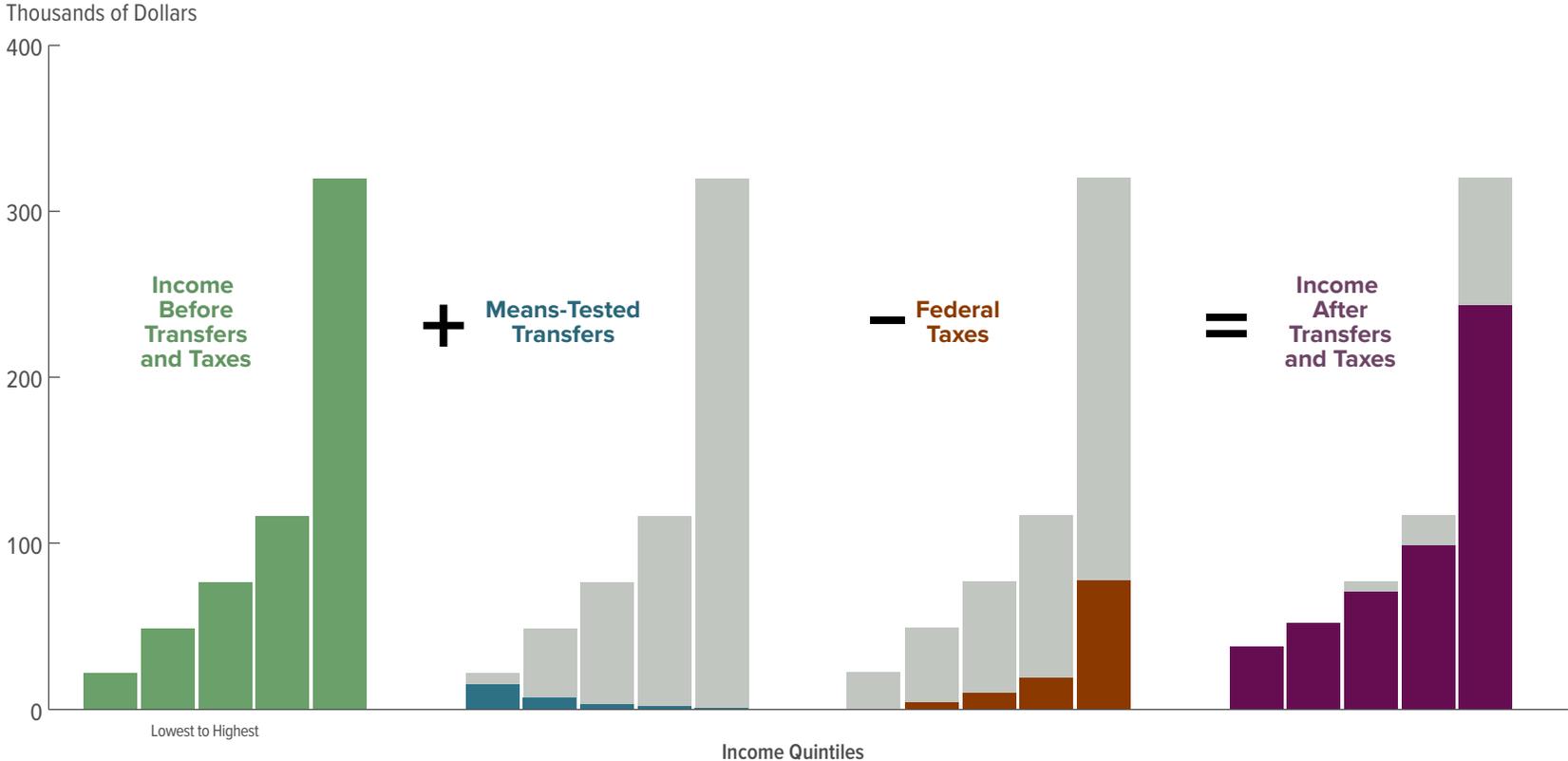


The Distribution of Household Income, 2018

AUGUST | 2021

Average Income, Means-Tested Transfers, and Federal Taxes



At a Glance

The Congressional Budget Office regularly analyzes the distribution of income in the United States and how it has changed over time. This report presents the distributions of household income, means-tested transfers, and federal taxes between 1979 and 2018 (the most recent year for which tax data were available when this analysis was conducted).

- **Income.** Households at the top of the income distribution received significantly more income than households at the bottom. Between 1979 and 2018, average income, both before and after means-tested transfers and federal taxes, grew for all quintiles (or fifths) of the distribution, but it increased most among households in the highest quintile.
- **Means-Tested Transfers.** Means-tested transfers are cash payments and in-kind benefits from federal, state, and local governments that are designed to assist individuals and families who have low income and few assets. Between 1979 and 2018, households in the lowest quintile received more than half of all means-tested transfers. As a percentage of income before transfers and taxes, means-tested transfers rose over the 40-year period, primarily driven by an increase in Medicaid spending.
- **Federal Taxes.** In general, higher-income households paid a higher average federal tax rate than lower-income households. Average federal tax rates fell between 1979 and 2018 across the income distribution, with the sharpest decline in the lowest quintile.
- **Changes Attributable to the 2017 Tax Act.** Provisions included in the 2017 tax act reduced average federal tax rates among all quintiles in 2018. Provisions relating to individual income taxes (excluding those solely affecting pass-through businesses) reduced average federal tax rates to a similar extent in each quintile, whereas the corporate tax and pass-through business provisions reduced average tax rates most among households in the highest quintile.
- **Income Inequality.** Income inequality, as measured by the Gini coefficients for income both before and after transfers and taxes, rose between 1979 and 2018. (The Gini coefficient is a standard measure of income inequality that summarizes an entire distribution in a single number that ranges from zero to one.) The degree to which transfers and taxes reduced income inequality over that same period increased.

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Notes

Numbers in the text, tables, and exhibits may not add up to totals because of rounding.

Unless this report indicates otherwise, all years referred to are calendar years.

All dollar amounts are in 2018 dollars and are rounded to the nearest hundred. To convert dollar amounts, the Congressional Budget Office used the price index for personal consumption expenditures from the Bureau of Economic Analysis.

Some of the exhibits and the figures have shaded vertical bars that indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

Unless this report indicates otherwise, “income” refers to household income before accounting for means-tested transfers and federal taxes, “transfers” refers to means-tested transfers, and “taxes” refers to federal taxes. See Appendix C for additional definitions.

Before Public Law 115-97 (referred to as the 2017 tax act throughout this report) was enacted, most taxpayers could claim personal exemptions on behalf of themselves, their spouses, and their dependents. In this report, “taxpayer exemptions” refers to personal exemptions claimed on behalf of taxpayers or their spouses, and “dependent exemptions” refers to personal exemptions claimed on behalf of dependents.

Specific colors have been used to represent certain income concepts in the exhibits and the figures: Green denotes income before transfers and taxes, blue denotes means-tested transfers, orange denotes federal taxes, and purple denotes income after transfers and taxes.

Supplemental data, additional data for researchers, and a table builder are posted along with this report on CBO’s website (www.cbo.gov/publication/57061#data). The supplemental data and the additional data for researchers present detailed information on income, means-tested transfers, federal taxes, and household types.

Summary

In 2018, household income was unevenly distributed among the roughly 129 million households in the United States, which received a total of about \$14.8 trillion in annual income, the Congressional Budget Office estimates.¹ The agency also estimates that the average income among households in the highest quintile (or fifth) of the distribution was more than 14 times the average income of households in the lowest quintile:

- Average income before means-tested transfers and federal taxes among households in the lowest quintile of the income distribution was about \$22,500.
- Average income before transfers and taxes among households in the highest quintile was about \$321,700.

Furthermore, income *within* the highest quintile was skewed toward the very top of the distribution: Average income before transfers and taxes among households in the bottom half of the highest quintile (the 81st to 90th percentiles) was about \$172,400; average income among the

1. In this report, CBO estimates that 316 million people lived in those households. The agency's estimate of the U.S. population excludes members of the armed forces on active duty and people in institutions such as prisons or nursing homes.

1.2 million households in the top 1 percent of the distribution was about \$2.0 million; and average income among the approximately 13,000 households in the top 0.01 percent of the distribution was about \$44.5 million.²

Income before transfers and taxes consists of market income and social insurance benefits (such as benefits from Social Security and Medicare) and excludes means-tested transfers and federal taxes.³ Means-tested transfers are cash payments and in-kind benefits from federal, state, and local governments that are designed to assist individuals and families who have low income and few assets. They include benefits from government programs such as 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). Federal taxes consist of individual income taxes (net of refundable tax credits, such as the earned income

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2. Each quintile (or fifth) of the distribution contains approximately the same number of people but slightly different numbers of households.
3. Market income comprises labor income (including cash wages, employers' contributions for health insurance premiums, and payroll taxes paid by employers), business income, capital income (including realized capital gains), and income from other nongovernmental sources.

tax credit and the child tax credit), payroll taxes, corporate income taxes, and excise taxes.

For this report, CBO focused on the distribution of household income in 2018 because that is the most recent year for which relevant data from tax returns were available.⁴ In addition, CBO assessed trends in household income, means-tested transfers, federal taxes, and income inequality over the 40-year period beginning in 1979 and ending in 2018.⁵

In 2018, most of the provisions of Public Law 115-97 (referred to here as the 2017 tax act)

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4. Although data from tax returns include information on tax filers' family structure and age, they do not include information about their race, ethnicity, or education. The supplemental data posted along with this report include additional distributional data for three types of households: elderly-headed households, households with children, and nonelderly childless households. The additional data, broken out by household type, are reported for each income group. The supplemental data are available at www.cbo.gov/publication/57061#data.
5. Annual income is only one measure of economic well-being. In this report, CBO does not assess trends in the distributions of other measures of economic well-being, such as household income measured over a longer period, household consumption, or household wealth. Nor does this report analyze the considerable variation in income, taxes paid, and tax rates within each income group, which cannot be captured by calculating averages alone.

came into effect. The law's provisions can affect households differently depending on the households' characteristics, but, on net, the 2017 tax act reduced average federal tax rates among all five quintiles. Reductions in tax rates resulting from the individual income tax provisions (excluding provisions solely affecting income from pass-through businesses) were similar across the income distribution, whereas reductions in tax rates resulting from changes to corporate taxes and pass-through business taxes were greatest among households in the highest quintile. Overall, including those effects from the 2017 tax act, the average federal tax rate among households in the highest quintile was 1.7 percentage points lower in 2018 than it was in 2017. Despite that reduction, the highest quintile's share of federal taxes was 0.5 percentage points higher in 2018 than in 2017.

Many households experience changes in their income, transfers, taxes, or household composition from year to year. As a result, the households in any given group of the income distribution in 2018 do not necessarily represent the same households in that group in prior years.⁶ Therefore,

6. Much research has been conducted on the related topic of economic mobility. For a comprehensive overview of that research, see Federal Reserve Bank of St. Louis and the Board of Governors of the Federal Reserve System, *Economic Mobility: Research and Ideas on Strengthening Families, Communities, and the Economy* (2016), <https://tinyurl.com/ycykrhvb>. See also Katharine Bradbury, *Family Characteristics and Macroeconomic Factors in U.S. Intragenerational Family Income Mobility, 1978–2014*, Opportunity and Inclusive Growth Institute System Working Paper 19-08 (Federal Reserve Bank of Minneapolis, October 2019), <https://tinyurl.com/y2wrztu6> (PDF, 2.45 MB).

this analysis focuses on the changes in the overall distribution of household income rather than the experiences of particular households.

How Did Means-Tested Transfers and Federal Taxes Affect Household Income in 2018?

Federal fiscal policies have significant effects on the economic resources available to U.S. households.⁷ Before means-tested transfers and federal taxes are taken into account, average income among all households in 2018 was \$115,300, CBO estimates. Means-tested transfers provided households an additional \$5,600 in income, on average, that year. Federal taxes amounted to \$22,300 per household, on average. The net effect of means-tested transfers and federal taxes was to decrease household income by \$16,700, on average, bringing average household income after transfers and taxes to \$98,600 in 2018.

Those averages, however, obscure a significant amount of variation in household income and in how means-tested transfers and federal taxes affect income. In 2018, means-tested transfers and federal taxes caused household income to be more evenly distributed (see Figure S-1, upper panel). For example, those transfers and taxes had these effects:

7. Federal monetary, regulatory, and trade policies also affect the distribution of household income. The direct distributional effects of those federal policies, however, are not examined in this report. Although some state-level means-tested transfers are included in this analysis, most state and local fiscal policies are not examined here.

- They increased income among households in the lowest quintile by \$15,200 (or 68 percent), on average, to \$37,700; and
- They decreased income among households in the highest quintile by \$77,800 (or 24 percent), on average, to \$243,900.

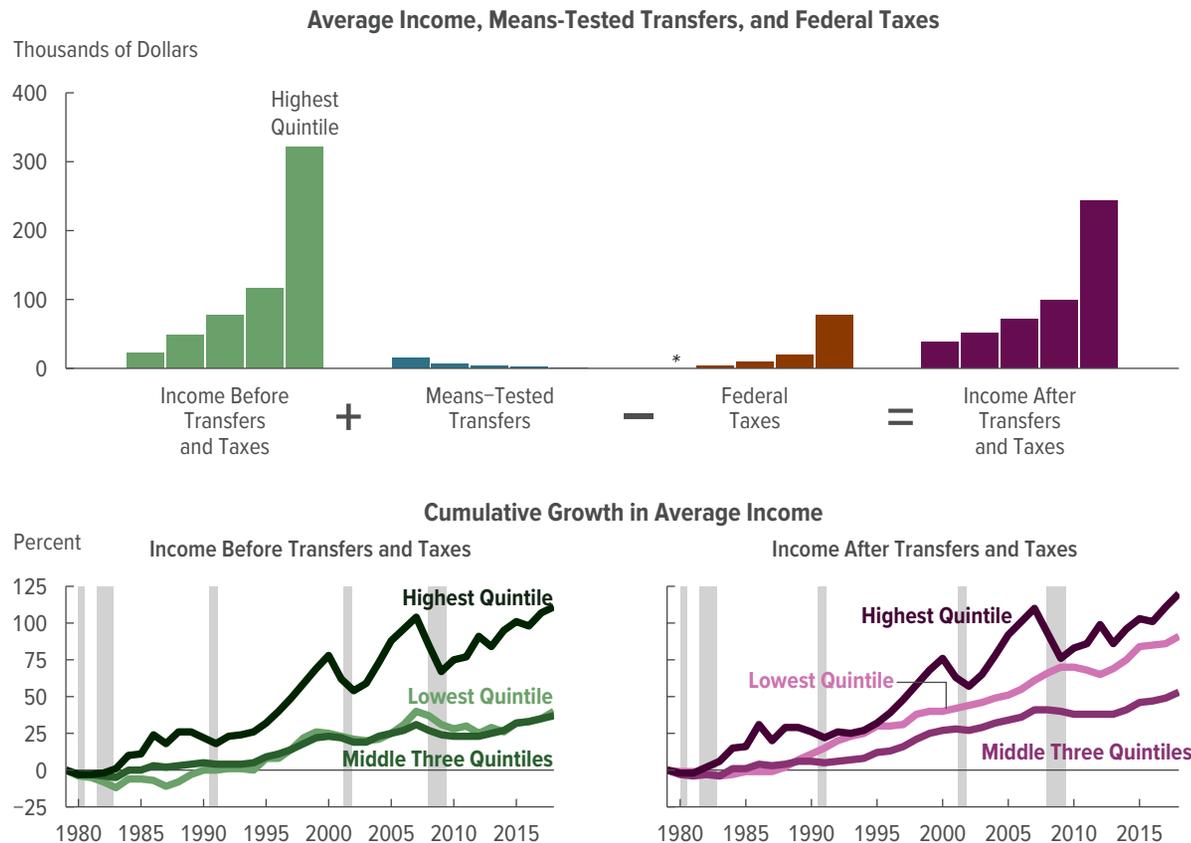
Furthermore, within that highest quintile, income after transfers and taxes was skewed toward the top of the distribution. Among households in the 81st to 90th percentiles, transfers and taxes reduced income by \$33,500, on average, to \$138,800. They decreased income by about \$600,000, on average, in the top 1 percent of the distribution, to \$1.4 million. Among households in the top 0.01 percent of the distribution, they reduced income by \$13.5 million, on average, to \$31.0 million.

How Were Means-Tested Transfers and Federal Taxes Distributed in 2018?

In 2018, the average means-tested transfer rate among all households was about 5 percent, CBO estimates—that is, in total, means-tested transfers received by households were equal to 5 percent of all income before transfers and taxes. However, the average rate varied significantly by income group. Among households in the lowest quintile of the income distribution (ranked by income before transfers and taxes), the average means-tested transfer rate was about 68 percent; among households in the middle quintile, the average rate was about 4 percent; and among households in the highest quintile, the average rate was less than one-half of one percent.

Figure S-1.

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



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

All dollar amounts are in 2018 dollars.

To calculate growth rates, CBO first converted all dollar amounts to 2018 dollars using the Bureau of Economic Analysis's price index for personal consumption expenditures.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

* = between zero and \$500.

In 2018, the average federal tax rate (based on tax liabilities incurred during that calendar year) also varied significantly by income group. Among all households it was about 19 percent, CBO estimates. Among households in the lowest quintile, the average rate was less than 0.1 percent, on net; in the middle quintile it was about 13 percent; and in the highest quintile it was about 24 percent. The average federal tax rate among households in the top 1 percent of the income distribution in 2018 was about 30 percent.

Means-tested transfers and federal taxes are thus both progressive—that is, low-income households receive a larger share of their income as means-tested transfers than high-income households do, and high-income households pay a larger share of their income in federal taxes than low-income households do. In 2018, means-tested transfers went overwhelmingly to low-income households—just over half of such transfers went to households in the lowest income quintile, and more than three-quarters went to households in the lowest two quintiles.

Not all households receive means-tested transfers, but virtually all households pay federal taxes in some form (that is, individual income taxes, payroll taxes, corporate taxes, or excise taxes).⁸ Households at the top of the income distribution pay the majority of federal taxes. Households in

8. Some households near the lower end of the income distribution have net negative average federal tax rates—that is, refundable tax credits exceed the payroll taxes, corporate taxes, and excise taxes paid by those households.

the highest income quintile, which received about 55 percent of all income, paid more than two-thirds of all federal taxes in 2018, CBO estimates. In contrast, households in the lowest quintile, which received about 4 percent of all income, paid about 0.01 percent of federal taxes, on net, in that year.

Because of the progressive structure of means-tested transfers and federal taxes, the distribution of income *after* transfers and taxes was more even than the distribution of income *before* transfers and taxes. In 2018, those transfers and taxes boosted the lowest quintile's share of total income by nearly 4 percentage points, CBO estimates. In contrast, among households in the highest quintile, the share of income after transfers and taxes was roughly 6 percentage points lower than the share of income before transfers and taxes.

What Were the Distributional Effects of the 2017 Tax Act in 2018?

The 2017 tax act made significant changes to tax rules affecting individuals, owners of pass-through businesses, and corporations, which, on net, reduced overall average federal tax rates. Combined, the tax reductions resulting from the 2017 tax act were greatest among households in the highest quintile.

The tax act altered tax rules for individual income taxes, which reduced overall average federal tax rates. The act reduced statutory income tax rates and the amount of income subject to the alternative minimum tax; repealed the personal exemption; expanded the child tax credit; increased the standard deduction; and made several changes

to certain itemized deductions. On net, those provisions decreased average tax rates to a similar extent among all five quintiles, ranging from 1.0 percentage point among households in the lowest quintile to 1.3 percentage points among those in the highest quintile.

The tax act also changed tax rules for the corporate income tax and for certain owners of pass-through businesses. Those changes included a reduction in statutory corporate tax rates and a new deduction for pass-through businesses. As a result of the corporate tax provisions and the pass-through business provisions included in the 2017 tax act, average federal tax rates fell in each quintile, but they fell most among households in the highest quintile.

What Are the Trends in Household Income and Income Inequality?

According to CBO's estimates, between 1979 and 2018, average household income before transfers and taxes grew more among households at the top of the income distribution than among those at the bottom. Among households in the highest quintile, average real (inflation-adjusted) income in 2018 was 111 percent higher than it was in 1979. In comparison, among households in the lowest quintile, average income before transfers and taxes was 40 percent greater in 2018 than in 1979, and among households in the middle three quintiles, it was 37 percent greater in 2018 than in 1979 (see Figure S-1, lower panel, on page 3). Because of those differences in cumulative growth rates, income inequality was greater in 2018 than it was in 1979.

From 1979 to 2018, among households in the lowest income quintile, cumulative growth in income *after* transfers and taxes was greater than cumulative growth in income *before* transfers and taxes—91 percent versus 40 percent. That faster growth is attributable both to an increase in means-tested transfers (especially Medicaid) and to a reduction in federal taxes—the latter largely the result of increased refundable tax credits provided through the individual income tax.

The expansion of means-tested transfers, particularly Medicaid, further up the income scale and generally declining average federal tax rates in the middle three income quintiles (the 21st to 80th percentiles) had a similar effect: Cumulative growth in income after transfers and taxes was larger for those groups than it was before transfers and taxes—53 percent versus 37 percent.

In the highest quintile, income after transfers and taxes grew more than income before transfers and taxes—120 percent versus 111 percent, respectively. Households in the top 1 percent of the income distribution experienced the largest cumulative growth in income after transfers and taxes. In 2018, real income after transfers and taxes for that income group was 268 percent greater than it was in 1979, CBO estimates.

Overall, the transfer programs and the tax system reduced income inequality by more in 2018 than they did in 1979. Consequently, inequality of income after transfers and taxes increased by less than inequality of income before transfers and taxes.

Income Before Transfers and Taxes

Income before transfers and taxes consists of market income plus social insurance benefits. Market income comprises wages and other forms of labor income (including cash wages, employers' contributions for health insurance premiums, and payroll taxes paid by employers), business income, capital income (including capital gains), and other income sources. Social insurance benefits include Social Security and Medicare benefits, unemployment insurance, and workers' compensation. Notably, income before transfers and taxes excludes the effects of governmental policies carried out through means-tested transfer programs or the federal tax system.

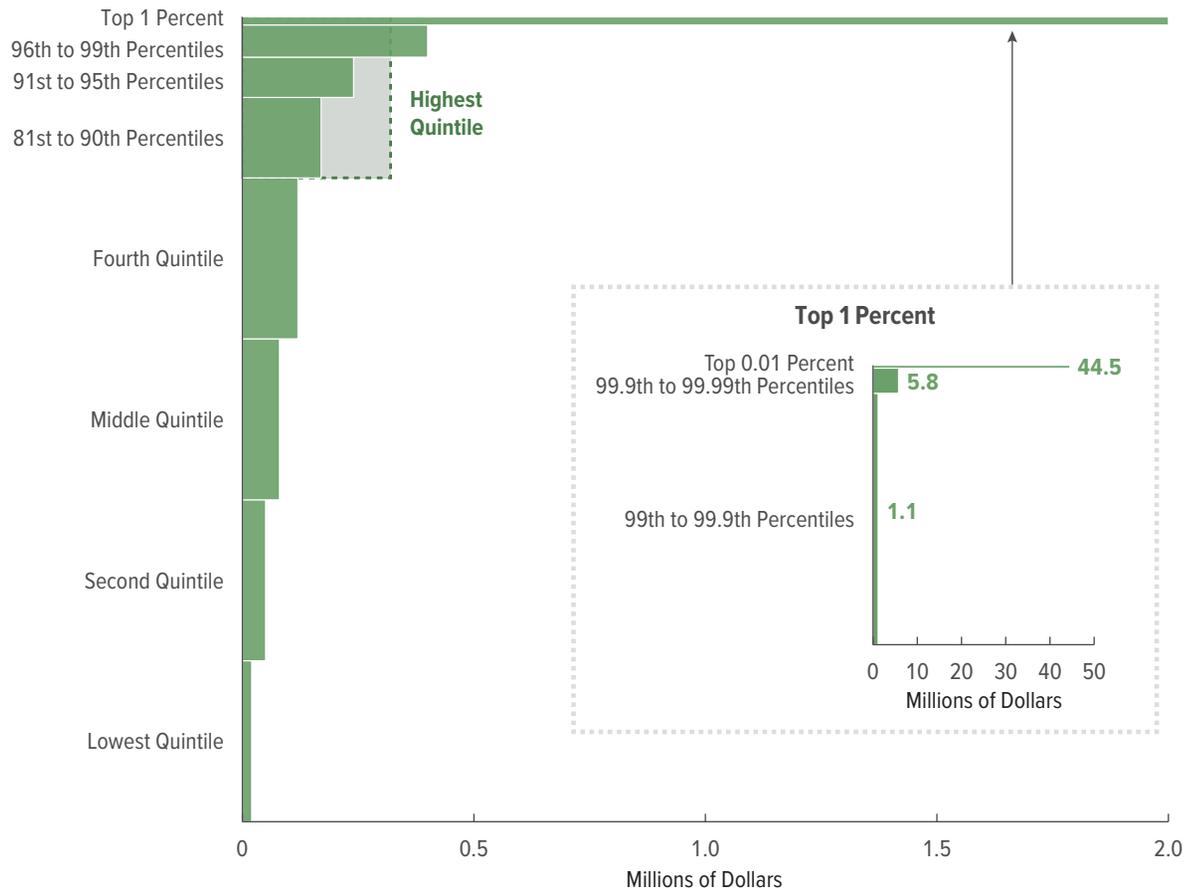
Income before transfers and taxes is skewed toward households at the top of the income distribution. As a result, those households receive a substantial share of income before transfers and taxes.

The composition of income before transfers and taxes varies throughout the distribution. For most households, labor income is the majority of income before transfers and taxes. But among households at the top of the income distribution, capital income constitutes a greater portion of income before transfers and taxes than it does for the rest of households. Additionally, as income rises, social insurance benefits tend to decline as a share of income.

Between 1979 and 2018, income before transfers and taxes grew faster in real (inflation-adjusted) terms among households in the highest quintile of the distribution than households in the lower quintiles. As a result, the share of income before transfers and taxes received by the highest income quintile increased over that 40-year period.

Exhibit 1.

Average Household Income Before Transfers and Taxes, 2018



Income before transfers and taxes was skewed toward the top of the income distribution in 2018. Among households in the highest quintile, average income before transfers and taxes was \$321,700 that year, compared with \$77,500 among households in the middle quintile and \$22,500 among those in the lowest quintile.

Moreover, income before transfers and taxes was skewed toward the very top of the distribution *within* the highest quintile. Average income before transfers and taxes among households in the 81st to 90th percentiles (the lower half of the highest quintile) was \$172,400 in 2018, whereas income among households in the top 1 percent of the distribution (1.2 million households) averaged \$2 million.

Income within the top 1 percent also varied widely: Average income before transfers and taxes among the approximately 13,000 households in the top 0.01 percent was \$44.5 million in 2018, compared with \$5.8 million among households in the 99.9th to 99.99th percentiles and \$1.1 million among those in the 99th to 99.9th percentiles.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

All dollar amounts are in 2018 dollars.

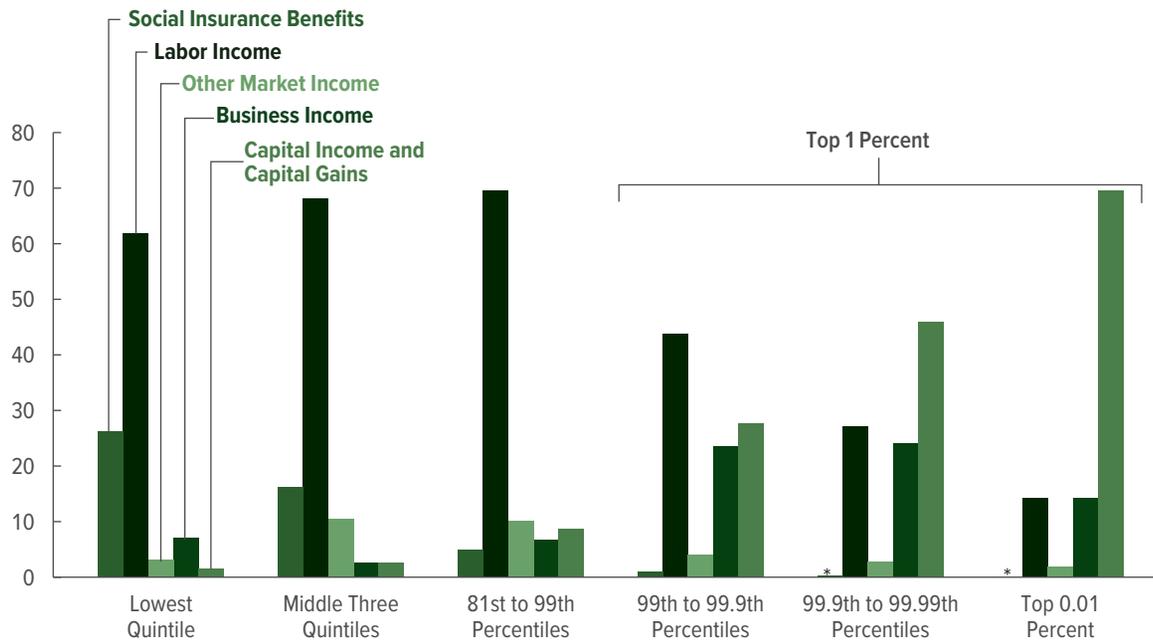
Income groups are created by ranking households by income before transfers and taxes, adjusted for household size. Each quintile (fifth) contains approximately the same number of people. The lowest quintile does not include households with negative income.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Exhibit 2.

Composition of Income Before Transfers and Taxes, 2018

Percent



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Other market income includes income received in retirement for past services and other nongovernmental sources of income.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

* = between zero and 0.5 percent.

The composition of income before transfers and taxes varied throughout the distribution in 2018. Labor income constituted the majority of income for most income groups, except the top 1 percent.

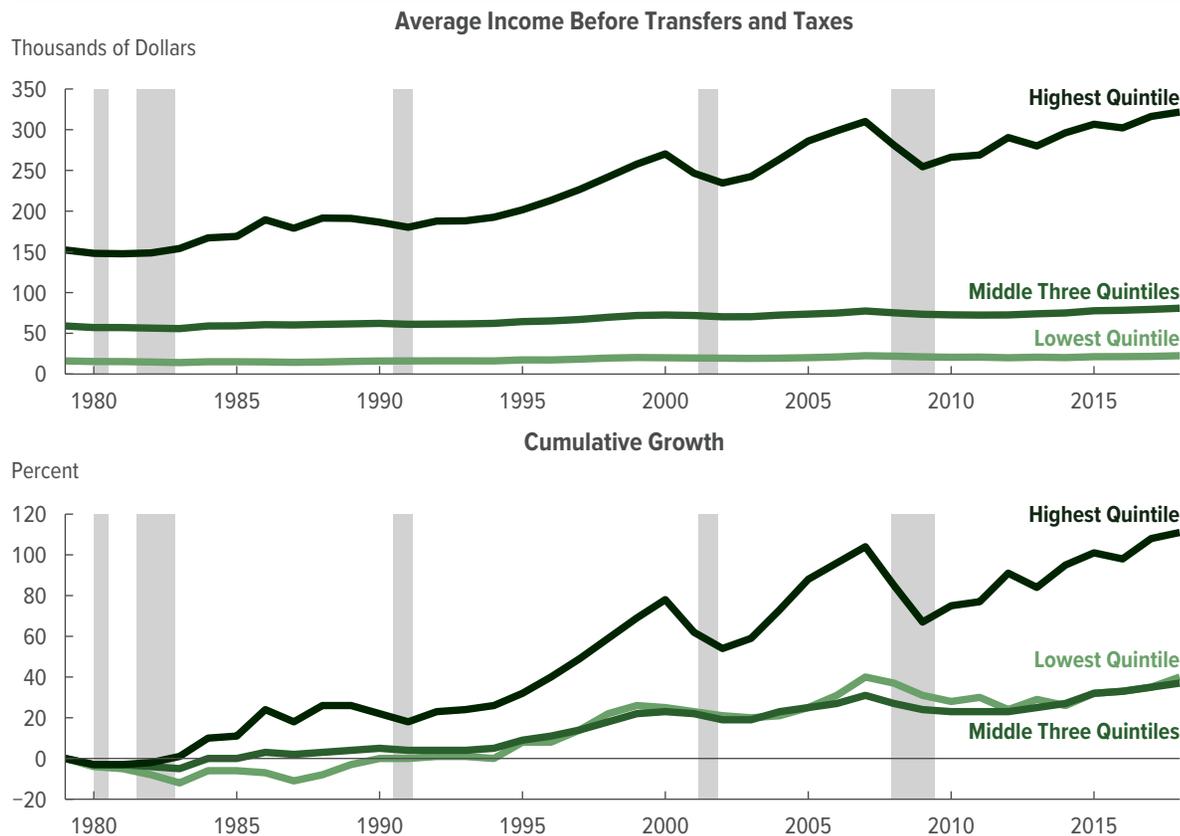
Labor income was a smaller proportion of average income before transfers and taxes among households in the lowest quintile and in the top 1 percent of the distribution than among those in between. In the lowest quintile, labor income was 62 percent of income before transfers and taxes in 2018, compared with 68 percent among households in the middle three quintiles and 70 percent among those in the 81st to 99th percentiles. Within the top 1 percent, labor income was, on average, just one-third of income before transfers and taxes in 2018.

Among the top 1 percent of the distribution, business income and capital income (including capital gains) were, on average, a larger percentage of income than in lower income groups. Among households in the top 0.01 percent, capital income was an average of 70 percent of income before transfers and taxes in 2018.

On average, social insurance benefits were a greater portion of income before transfers and taxes among households in the lowest quintile than among higher-income households. Social insurance benefits were more than one-quarter of income before transfers and taxes among households in the lowest quintile, compared with 4 percent among households in the highest quintile.

Exhibit 3.

Trends in the Distribution of Income Before Transfers and Taxes, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

All dollar amounts are in 2018 dollars.

To calculate growth rates, CBO first converted all dollar amounts to 2018 dollars using the Bureau of Economic Analysis’s price index for personal consumption expenditures.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

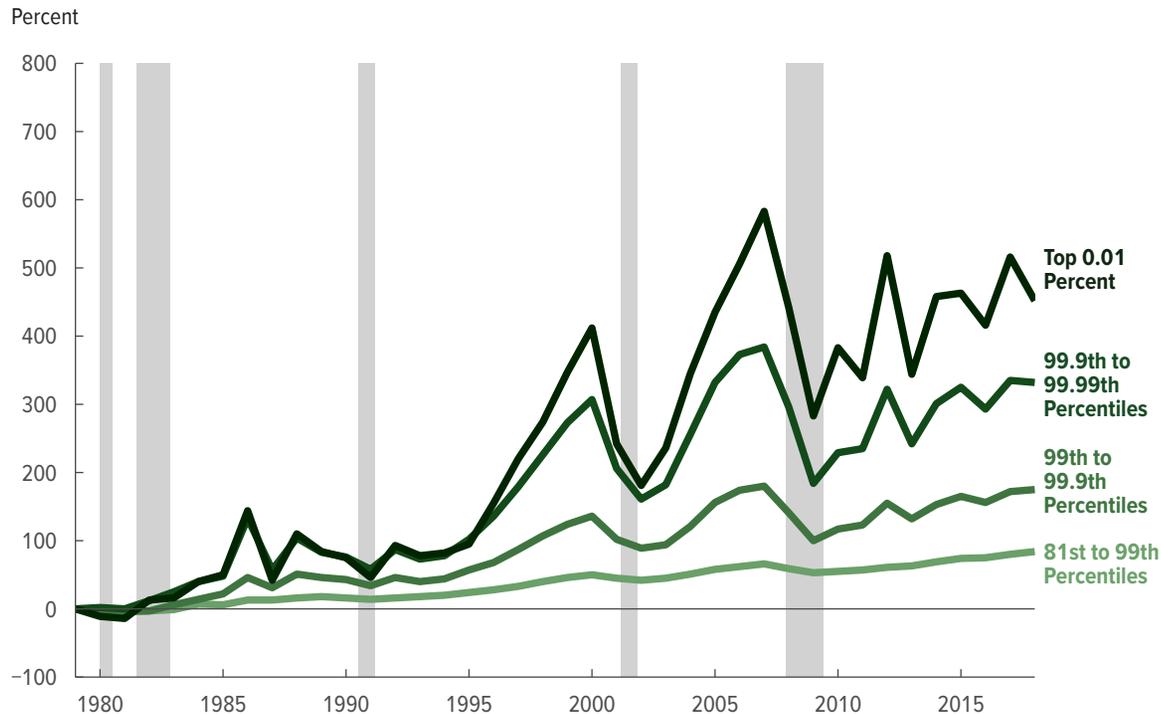
Average income before transfers and taxes grew in real terms between 1979 and 2018 among households in each quintile. That growth was, however, unevenly distributed. Among households in the highest quintile, average income before transfers and taxes increased by 111 percent over the 40-year period (or at an average annual rate of 1.9 percent), from \$152,300 in 1979 to \$321,700 in 2018 (in 2018 dollars). By comparison, average income before transfers and taxes grew by a cumulative 40 percent among households in the lowest quintile (from \$16,100 in 1979 to \$22,500 in 2018, or at an average annual rate of 0.9 percent) and 37 percent among those in the middle three quintiles (from \$59,000 in 1979 to \$80,800 in 2018, or at an average annual rate of 0.8 percent).

Compared with the rest of the distribution, households in the highest quintile received a larger share of their income as capital income, which tends to rise or fall more with the economy than other forms of income. As a result, that quintile experienced the largest relative swings in income before transfers and taxes over economic cycles. For example, during the 2007–2009 recession, the highest quintile’s average income before transfers and taxes fell by 18 percent, compared with 5 percent among households in the middle three quintiles and 6 percent among those in the lowest quintile.

In the years following that recession, income before transfers and taxes began to grow for all quintiles, though more rapidly for some groups than others. In 2018, the top four quintiles each reached their highest average income before transfers and taxes for the entire 40-year period, and the lowest quintile matched its high set in 2007.

Exhibit 4.

Cumulative Growth in Income Before Transfers and Taxes Among Households in the Highest Quintile, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

To calculate growth rates, CBO first converted all dollar amounts to 2018 dollars using the Bureau of Economic Analysis's price index for personal consumption expenditures.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Average income before transfers and taxes more than doubled for households in the highest quintile between 1979 and 2018. It grew faster among households at the very top of the distribution than among others in that quintile. From 1979 to 2018, income before transfers and taxes grew by the following amounts:

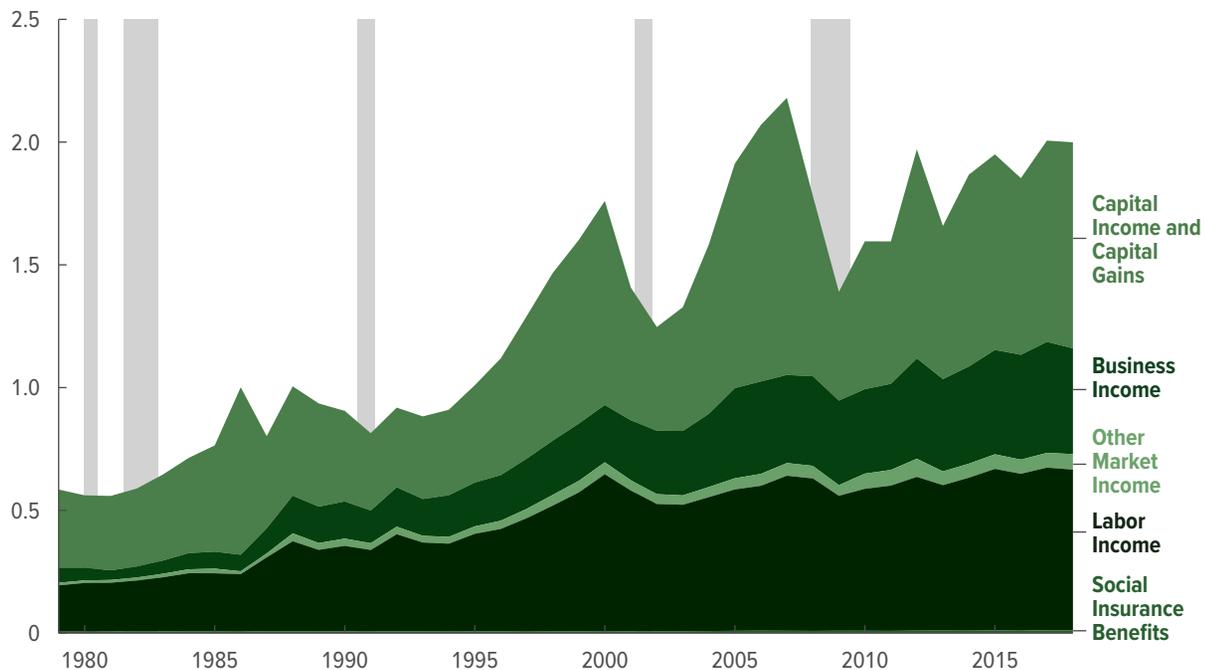
- 84 percent among households in the 81st to 99th percentiles, or at an average annual rate of 1.6 percent, from \$128,800 to \$236,600;
- 175 percent among households in the 99th to 99.9th percentiles, or at an average annual rate of 2.6 percent, from \$416,100 to \$1.1 million;
- 332 percent among households in the 99.9th to 99.99th percentiles, or at an average annual rate of 3.8 percent, from \$1.3 million to \$5.8 million; and
- 452 percent among households in the top 0.01 percent of the distribution, or at an average annual rate of 4.5 percent, from \$8.1 million to \$44.5 million.

Income volatility tends to be greater among higher-income groups because households in such groups derive a large portion of their income from capital income, which fluctuates more in response to economic conditions than labor income does. Those fluctuations affect the income of individual households, contributing to the year-to-year changes in the set of households included in higher-income groups.

Exhibit 5.

Composition of Income Before Transfers and Taxes Among Households in the Top 1 Percent, 1979 to 2018

Millions of Dollars



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

All dollar amounts are in 2018 dollars.

Other market income includes income received in retirement for past services and other nongovernmental sources of income.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

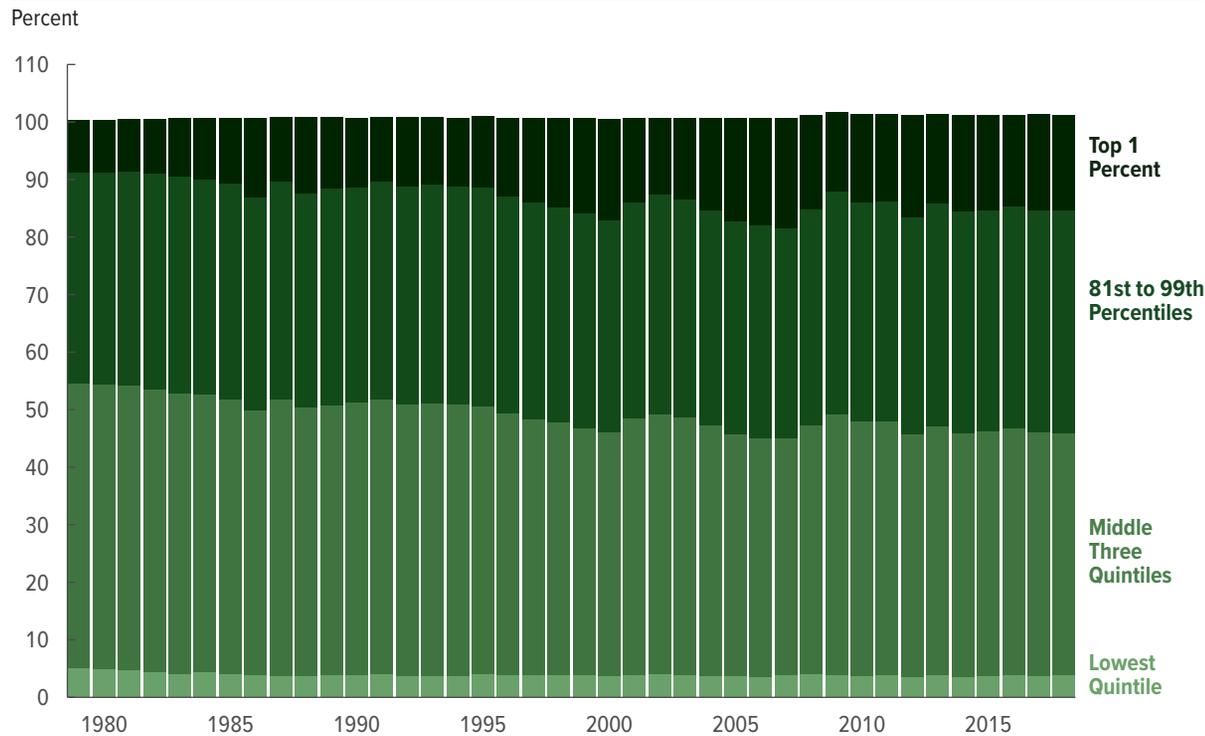
Between 1979 and 2018, the composition of income before transfers and taxes changed among households in the top 1 percent of the distribution, as different forms of income grew at different rates. (Additionally, changes in tax laws affected how certain forms of income were categorized over the period.)

Of the five components of income before transfers and taxes, business income expanded fastest, growing sevenfold over the 40-year period. As a share of income among households in the top 1 percent, business income rose from 11 percent in 1979 to 22 percent in 2018. Meanwhile, average capital income (including capital gains) grew at a slower pace than other forms of income. As a result, it declined as a share of income among households in the top 1 percent of the distribution, from 54 percent in 1979 to 42 percent in 2018. Labor income remained roughly constant at about one-third of income among such households from 1979 to 2018. Within that same group, other market income and social insurance benefits together made up, on average, just 4 percent of income during the period.

Over economic cycles, capital income was more volatile than other forms of income. Much of that volatility is attributable either to behavioral responses to changes in tax laws (in 1986 and 2012, for example) or to significant increases and decreases of asset prices (in 2001 and 2007, for example).

Exhibit 6.

Shares of Income Before Transfers and Taxes, 1979 to 2018



Between 1979 and 2018, the highest quintile’s share of income before transfers and taxes increased. In total, that group received more than half of all income before transfers and taxes in 2018, whereas the lowest quintile received 4 percent. The share of income before transfers and taxes among households in the top 1 percent of the distribution was 17 percent in 2018, CBO estimates.

Between 1979 and 2018, the share of income among the top 1 percent increased by 8 percentage points. Meanwhile, the share of income among the middle three quintiles fell by 7 percentage points, and the lowest quintile’s share fell by 1 percentage point.

The share of income before transfers and taxes among the top 1 percent of the distribution tended to increase during economic expansions and fall during economic downturns. That group’s share of income in 2018 remained below its 2007 peak of 19 percent.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shares do not add up to 100, because households with negative income are not shown.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Means-Tested Transfers

Means-tested transfers are cash payments and in-kind benefits from federal, state, and local governments that are designed to assist individuals and families who have low income and few assets. This analysis focuses on the average means-tested transfer rate, which is the ratio of average means-tested transfers to average income before transfers and taxes in a given income group.

Means-tested transfers go overwhelmingly to households near the bottom of the income distribution.⁹ In 2018, more than half of means-tested transfers went to households in the lowest quintile.¹⁰ Between 1979 and 2018, means-tested

transfer rates doubled among households in that quintile—growth that is attributable both to increases in the number of people receiving benefits and increases in the average cost of those benefits per recipient.

Eligibility for some means-tested transfer programs has expanded since 1979. Consequently, means-tested transfers provided to individuals and families in the second and the middle income quintiles increased over the 1979–2018 period.

Over that 40-year period, growth in means-tested transfer rates was primarily driven by spending

on Medicaid, which was the largest—and fastest growing—means-tested transfer program. During that time, the number of people enrolled in Medicaid or the Children’s Health Insurance Program (CHIP) increased almost fivefold, from about 20 million in 1979 to 93 million in 2018.¹¹ Furthermore, the average benefit per recipient (in 2018 dollars) increased from \$1,800 in 1979 to \$5,700 in 2018.¹²

9. In this analysis, CBO classified means-tested transfers in four categories: Medicaid and the Children’s Health Insurance Program, the Supplemental Nutrition Assistance Program, Supplemental Security Income, and other means-tested transfers. The other means-tested transfers that are analyzed in this report are housing assistance programs, low-income subsidies for Part D of Medicare (which covers prescription drugs), Temporary Assistance for Needy Families, child nutrition programs, cost-sharing reductions under the Affordable Care Act, the Low Income Home Energy Assistance Program, and state and local government general assistance programs.

10. Although means-tested transfers are designed to assist people with low income, the data indicate that some high-income households receive benefits from the transfer programs. That may happen for several reasons. For example, some people have income that varies during the

year and may therefore qualify for benefits on the basis of low monthly income even though their annual income is high. In addition, some people who qualify for benefits because their own income is low live in high-income households. Finally, a portion of the benefits reported as going to higher-income households probably reflects some misreporting of income, program participation, and benefit amounts in the survey data that underlie CBO’s estimates.

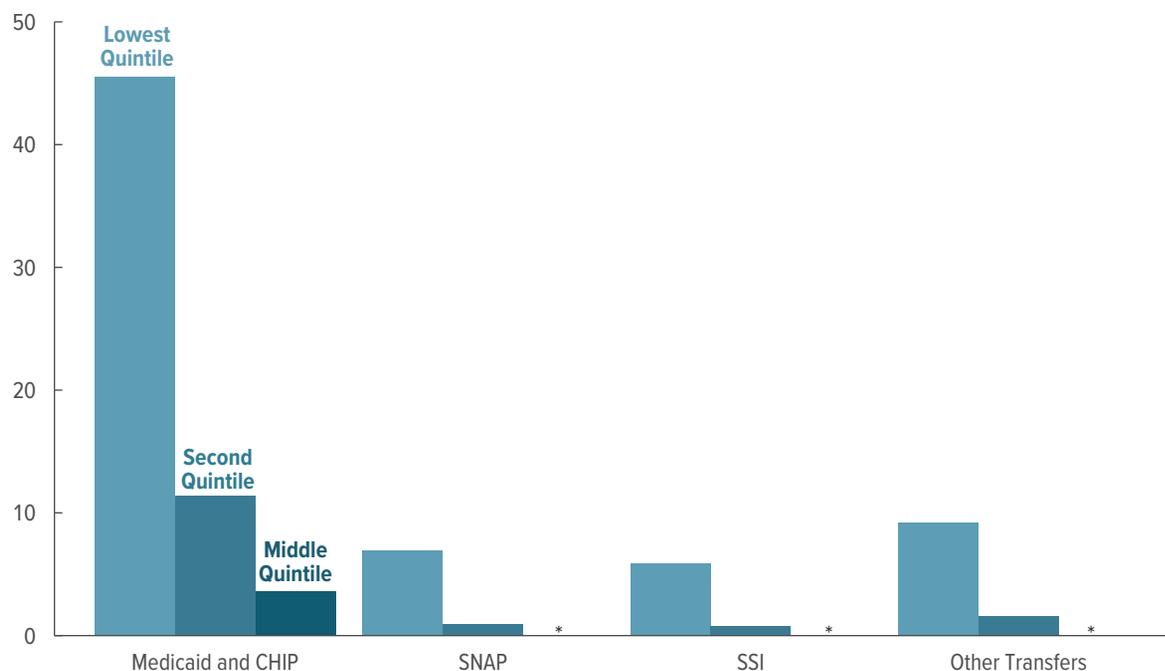
11. CBO’s estimates represent the number of recipients who were ever enrolled in Medicaid or CHIP in a given calendar year. Furthermore, the estimates apply to the noninstitutionalized population; they do not include recipients living in nursing homes and other long-term care facilities. The CHIP program began in 1998.

12. The value of Medicaid and CHIP benefits allocated to households is based on the average cost to the government of providing those benefits. CBO did not attempt to estimate the value that households place on those benefits. Although sick people enrolled in federal health programs that provide assistance to low-income families may value those benefits more than the average cost to the government of providing them, some empirical evidence suggests that, on average, Medicaid recipients value the benefits at less than the average cost to the government of providing those benefits. See Amy Finkelstein, Nathaniel Hendren, and Erzo F. P. Luttmer, “The Value of Medicaid: Interpreting Results From the Oregon Health Insurance Experiment,” *Journal of Political Economy*, vol. 127, no. 6 (December 2019), pp. 2836–2874, <https://tinyurl.com/3ks7wzdt>.

Exhibit 7.

Average Means-Tested Transfer Rates Among Selected Income Groups, by Type of Transfer, 2018

Percent



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Average means-tested transfer rates for both the fourth quintile and the highest quintile are less than 0.5 percent for all sources and transfer programs, except the average transfer rate for Medicaid in the fourth quintile, which is 1.2 percent.

Other transfers consist of housing assistance programs; low-income subsidies for Part D of Medicare (which covers prescription drugs); Temporary Assistance for Needy Families; child nutrition programs; cost-sharing reductions under the Affordable Care Act; the Low Income Home Energy Assistance Program; and state and local government general assistance programs.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

CHIP = Children's Health Insurance Program; SNAP = Supplemental Nutrition Assistance Program; SSI = Supplemental Security Income;

* = between zero and 0.5 percent.

In 2018, average means-tested transfer rates were highest among households in the lowest quintile, at 67 percent—that is, in total, means-tested transfers received by households in that quintile equaled 67 percent of all income before transfers and taxes in the quintile. For each of the four types of means-tested transfer programs, average transfer rates were highest in the lowest quintile and declined as income rose.

Medicaid and CHIP make up more than 70 percent of all means-tested transfers analyzed in this report (as measured by the average cost to the government of providing those benefits). Among households in the lowest quintile, average Medicaid and CHIP benefits were 46 percent of average income before transfers and taxes. Medicaid and CHIP transfer rates were 11 percent in the second quintile and 4 percent in the middle quintile.

SNAP constitutes about 8 percent of all means-tested transfers analyzed here. Average SNAP transfer rates in the lowest quintile were 7 percent. They were 1 percent in the second quintile and 0.2 percent in the middle quintile.

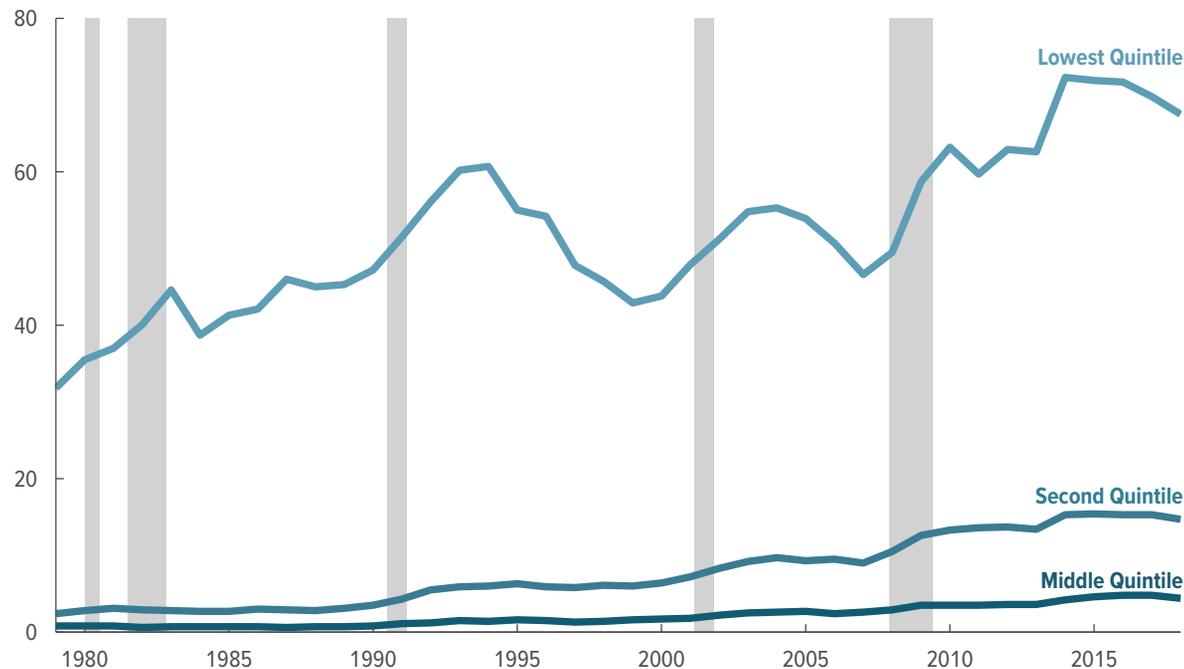
SSI accounts for about 8 percent of means-tested transfers. Among households in the lowest quintile, average SSI transfer rates were 6 percent, compared with less than 1 percent in the second and middle quintiles.

Together, programs categorized as Other Transfers make up about 12 percent of means-tested transfers. Among households in the lowest quintile, those other transfer rates were 9 percent.

Exhibit 8.

Average Means-Tested Transfer Rates Among Selected Income Groups, 1979 to 2018

Percent



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

Average means-tested transfer rates for the highest two quintiles have been less than 2 percent since 1979.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

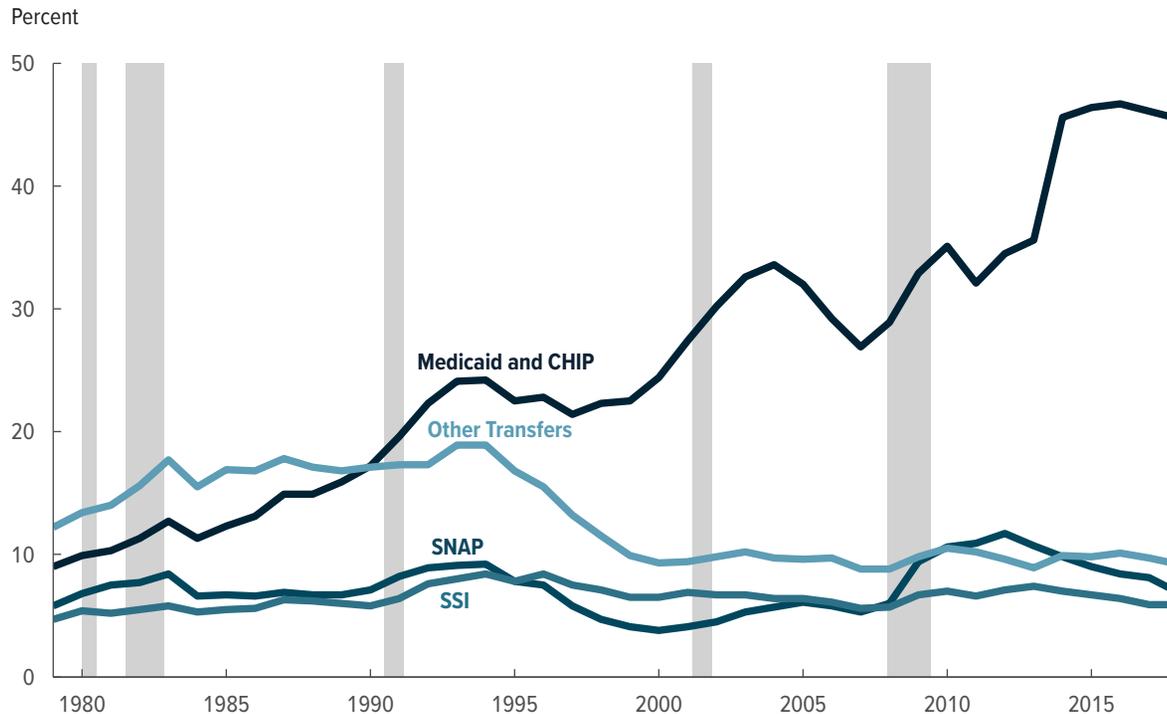
Beginning in the early 1980s, means-tested transfers as a share of total income increased among households in the bottom three quintiles. Average means-tested transfer rates more than doubled among households in the lowest income quintile, rising from 32 percent in 1979 to 67 percent in 2018. They also increased among households in the second quintile over that period, from 2 percent to 15 percent, and among households in the middle quintile, from 1 percent to 4 percent.

Expansions in eligibility and increased transfer spending contributed to rising means-tested transfer rates over the 40-year period. Increases in Medicaid enrollment and costs accounted for more than 80 percent of the growth in means-tested transfer rates in every quintile between 1979 and 2018. Within the lowest quintile, means-tested transfer rates peaked at 72 percent in 2014 after many states expanded Medicaid eligibility under the Affordable Care Act.

Over the 40-year period, means-tested transfer rates generally rose during recessions, particularly among households in the lowest quintile, as income decreased and more households became eligible for transfers. That growth typically continued for several years after each recession before declining during periods of economic expansion. As a consequence of the 2007–2009 recession, average means-tested transfer rates among households in the lowest quintile rose from 47 percent in 2007 to 63 percent in 2010. Since the Medicaid expansion in 2014, means-tested transfer rates fell each year among households in the lowest quintile, largely because income grew faster than transfers, on average.

Exhibit 9.

Average Means-Tested Transfer Rates Among Households in the Lowest Quintile, by Type of Transfer, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

Other transfers consist of housing assistance programs; low-income subsidies for Part D of Medicare (which covers prescription drugs); Temporary Assistance for Needy Families; child nutrition programs; cost-sharing reductions as part of the Affordable Care Act; the Low Income Home Energy Assistance Program; and state and local government general assistance programs.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

CHIP = Children's Health Insurance Program; SNAP = Supplemental Nutrition Assistance Program; SSI = Supplemental Security Income.

The growth between 1979 and 2018 of means-tested transfers as a percentage of income for low-income households varied by program. Medicaid (along with CHIP) was the fastest-growing means-tested transfer program over the period. Among households in the lowest quintile, average rates of Medicaid and CHIP transfers increased from 9 percent in 1979 to 46 percent in 2018. That growth is attributable to increases in the number of households receiving benefits and in the average cost of those benefits per recipient. Transfer rates rose after legislative expansions—after CHIP was introduced in 1998, for example, and after major provisions of the Affordable Care Act were implemented in 2014.

Transfer rates for SNAP, SSI, and other benefit programs changed less than those for Medicaid and CHIP over the same period. Among households in the lowest quintile, SNAP rates increased from 6 percent in 1979 to 7 percent in 2018. SSI transfer rates increased from 5 percent to 6 percent, and rates for other transfers fell from 12 percent to 9 percent.

Transfer rates for each program grew during economic recessions, but the extent of the growth varied. During the 2007–2009 recession, Medicaid, CHIP, and SNAP rates increased for the lowest quintile, in part because more people became eligible for those programs. Rates for SSI and other transfers also increased for that quintile, but by less.

Federal Taxes

In this analysis, federal taxes consist of individual income taxes, payroll taxes, corporate income taxes, and excise taxes. The taxes allocated to households in the analysis account for approximately 93 percent of all federal revenues collected in 2018.¹³ Individual income taxes and payroll taxes are the largest tax sources, followed by

corporate taxes and excise taxes.¹⁴ CBO's examination of household income focuses on the average federal tax rate, which is calculated by dividing total federal taxes in an income group by total income before transfers and taxes in that group.

Average federal tax rates generally rise with income. Households in the highest income quintile, which received about 55 percent of all income in 2018, paid more than two-thirds of federal taxes that year. In contrast, households in the lowest quintile, which received about 4 percent of all income, paid about 0.01 percent of federal taxes, on net, that year. Among households in the lowest two quintiles, individual income taxes are negative, on average, because they include refundable tax credits, which can result in net payments from the government.¹⁵

Year-to-year fluctuations in average federal tax rates are caused both by underlying changes in the income distribution and by legislative changes to federal tax rules. (For information about how changes to tax rules affected the distribution of federal tax rates in 2018, see "The Distributional Effects of the 2017 Tax Act in 2018" in this report.) For most income groups, the average federal tax rate fell over the 40-year period analyzed here; the lowest income quintile experienced the sharpest decrease. The average federal tax rate among households in the middle of the income distribution also decreased but not as much as it did among households in the lowest quintile. In contrast, the average federal tax rate for households in the 81st to 99th percentiles of the income distribution was relatively stable over the 1979–2018 period. The average rate for the top 1 percent of the distribution was significantly more volatile than that for other income groups.

13. The remaining federal revenue sources not allocated to U.S. households include states' deposits for unemployment insurance, estate and gift taxes, net income earned by the Federal Reserve, customs duties, and miscellaneous fees and fines. Because of the complexity of estimating state and local taxes for individual households, this report considers federal taxes only. Researchers differ about whether state and local taxes are, on net, regressive, proportional, or slightly progressive, but most agree that state and local taxes are less progressive than federal taxes. For estimates of the distribution of state and local taxes, see Meg Wiehe and others, *Who Pays? A Distributional Analysis of the Tax Systems in All 50 States*, 6th ed. (Institute on Taxation and Economic Policy, October 2018), <https://itep.org/whopays/>; and Gerald Prante and Scott Hodge, *The Distribution of Tax and Spending Policies in the United States*, Special Report No. 211 (Tax Foundation, November 2013), <https://tinyurl.com/roj9t2g> (PDF, 5.1 MB).

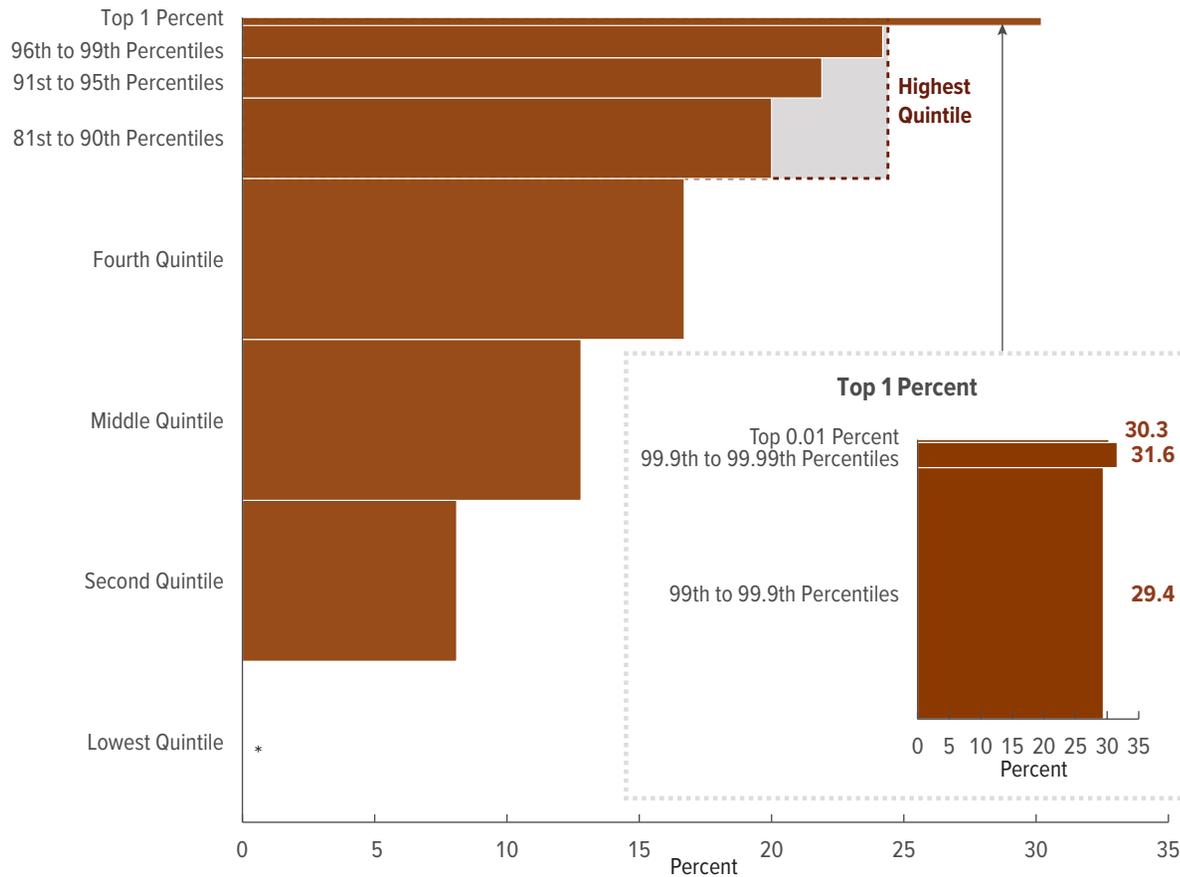
14. Federal taxes allocated to households in this analysis are based on tax liabilities incurred in calendar year 2018.

15. In the federal budget, the portion of refundable credits that reduces the amount of taxes owed is counted as a reduction in revenues, and the portion that exceeds a filer's tax liability is treated as an outlay. In the analysis presented here, CBO treated the refundable

and nonrefundable portions of the credit jointly. For more details about the history and economic effects of refundable tax credits, see Congressional Budget Office, *Refundable Tax Credits* (January 2013), www.cbo.gov/publication/43767.

Exhibit 10.

Average Federal Tax Rates, by Income Group, 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Income groups are created by ranking households by income before transfers and taxes, adjusted for household size. Each quintile (fifth) contains approximately the same number of people. The lowest quintile does not include households with negative income.

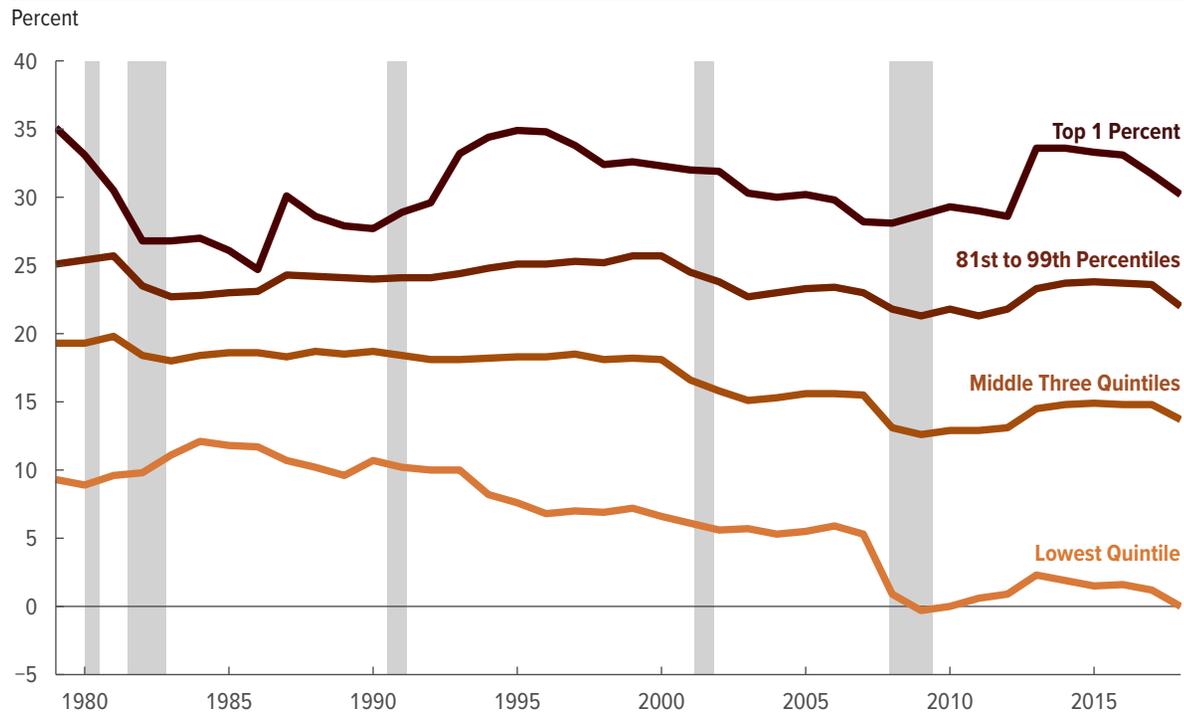
For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

* = between zero and 0.1 percent.

Average federal tax rates generally rise with income. In 2018, average federal tax rates were higher among higher-income groups than among lower-income groups. The highest quintile’s average federal tax rate was 24 percent, compared with 13 percent for the middle quintile. The lowest quintile’s average federal tax rate was less than 0.1 percent, on net, as refundable credits offset the taxes paid by that group (see Exhibit 13). Within the highest quintile, average tax rates were higher at the top of the distribution, averaging 30 percent among households in the top 1 percent.

Within that top 1 percent, average tax rates were relatively flat. Households in the highest income group receive a larger share of their income as capital income, which is generally taxed at a lower rate than other forms of individual income. (For example, in 2018, the top long-term capital gains tax rate was 20 percent, whereas the top marginal individual income tax rate was 37 percent.) As a result, households in the top 0.01 percent paid a lower average individual income tax rate than the next highest group (the 99.9th to 99.99th percentiles) in 2018. Although that lower individual income tax rate was partially offset by a higher average corporate tax rate, those households, in total, paid a lower average federal tax rate than the 99.9th to 99.99th percentiles in 2018. (CBO allocates 75 percent of the burden of corporate income taxes to owners of capital in proportion to their capital income and 25 percent of the corporate income tax to workers in proportion to their labor income.)

Exhibit 11.

Average Federal Tax Rates, by Income Group, 1979 to 2018

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

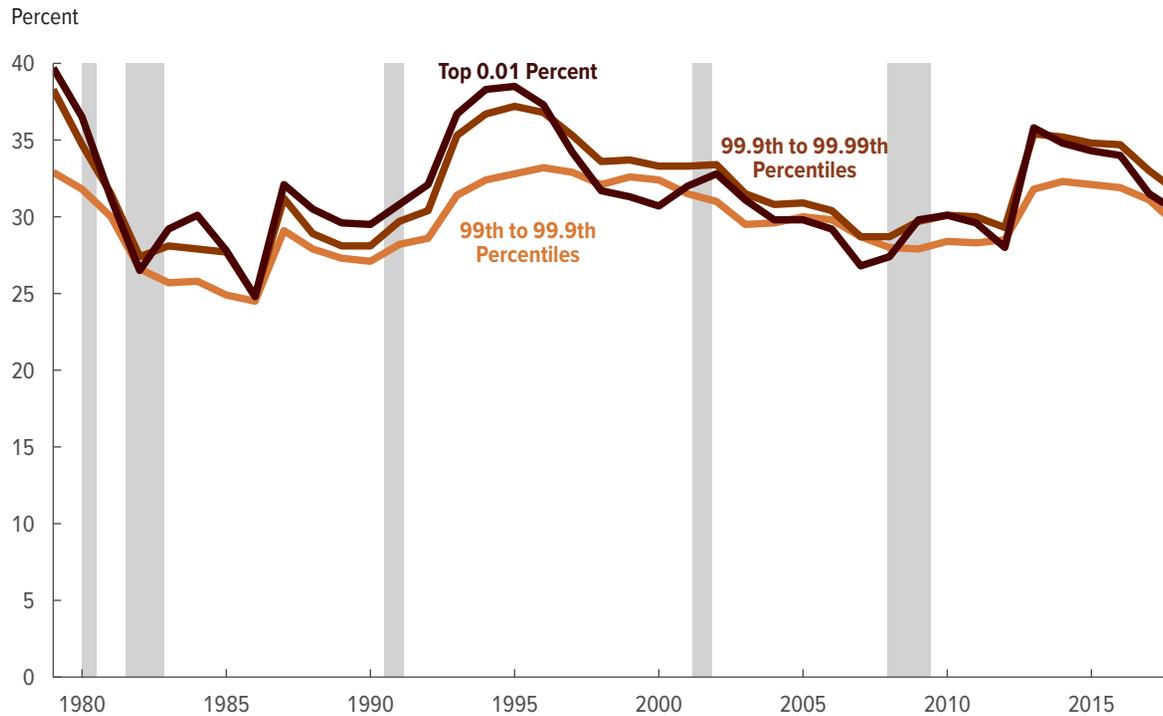
Between 1979 and 2018, changes in tax laws and in income caused the average federal tax rate to decline for the lowest quintile and fluctuate for the top 1 percent of the distribution. In 2018, the average federal tax rate for each income group fell, following the enactment of the 2017 tax act (see the next section of this report for CBO's estimates of the effects of the 2017 tax act on average federal tax rates across the distribution).

Over the 40-year period, the average federal tax rate declined most sharply among households in the lowest quintile, falling from a peak of 12.1 percent in 1984 to less than 0.1 percent, on net, in 2018. The introduction and expansion of refundable tax credits lowered the average individual tax rate among low-income taxpayers, particularly between 2007 and 2009, and in 2018 (see Exhibit 15). Average federal tax rates also declined among the middle three quintiles (from 19.3 percent in 1979 to 13.7 percent in 2018) and among the 81st to 99th percentiles (from 25.1 percent in 1979 to 22.0 percent in 2018).

Among households in the top 1 percent of the distribution, the average federal tax rate began to fall in the late 1990s and then rose in 2013. That dip coincided with reductions in the top statutory marginal individual income tax rate and the tax rate on dividends and capital gains in the late 1990s and early 2000s. In 2013, the top marginal tax rate returned to 39.6 percent, just as higher tax rates on capital gains and new taxes enacted as part of the Affordable Care Act went into effect.

Exhibit 12.

Average Federal Tax Rates Among Households in the Top 1 Percent, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

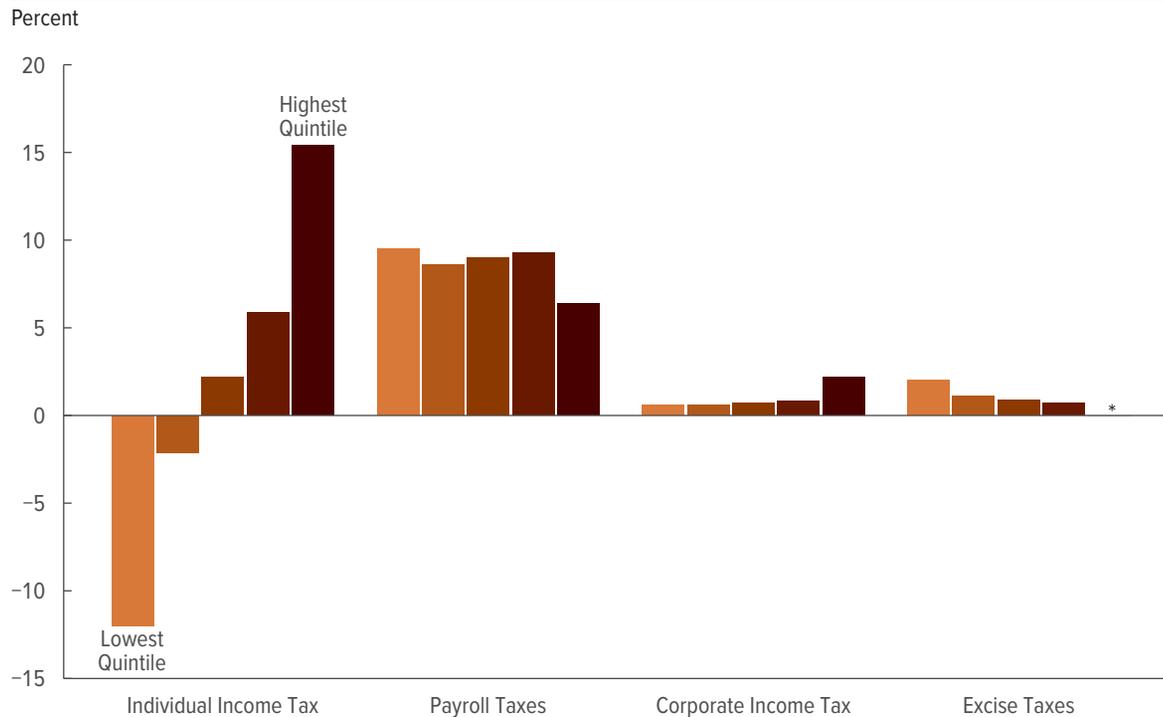
The average federal tax rate among households in the top 1 percent of the income distribution has varied over time, ranging from a low of 25 percent in 1986 to a high of 35 percent in 1979. Average federal tax rates generally moved in tandem across the three subgroups of the top 1 percent; however, the rates diverged in the mid-2010s, mid-1990s, and early 1980s.

During the mid-2010s and mid-1990s, the average federal tax rate among households in the top one-tenth of one percent of the distribution (that is, the top 0.01 percent and the 99.9th to 99.99th percentiles combined) increased more than that of the 99th to 99.9th percentiles in response to changes in tax laws. In 1993 and 2013, the top marginal individual income tax rate increased to 39.6 percent. Because higher-income households had more income subject to the top rate, the top 0.1 percent's average federal tax rate increased more than that of the 99th to 99.9th percentiles.

In general, households in higher income groups tended to pay higher average federal tax rates than households in lower income groups. However, in most years since the mid-1990s, households in the top 0.01 percent paid a lower average federal tax rate than did households in the 99.9th to 99.99th percentiles because a larger portion of the former group's income consisted of capital income, which is generally taxed at lower rates under the individual income tax. That group's average federal tax rate tended to fall in periods with large capital gains, such as the late 1990s, mid-2000s, and 2017.

Exhibit 13.

Average Federal Tax Rates, by Tax Source, 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

* = between zero and 0.5 percent.

Of the four types of federal taxes included in this analysis, the individual income tax is the most progressive. Average individual income tax rates ranged from -12 percent in the lowest quintile to 15 percent in the highest quintile. For the two lowest quintiles, average individual income tax rates were negative in 2018 because of refundable tax credits (see Exhibit 15).

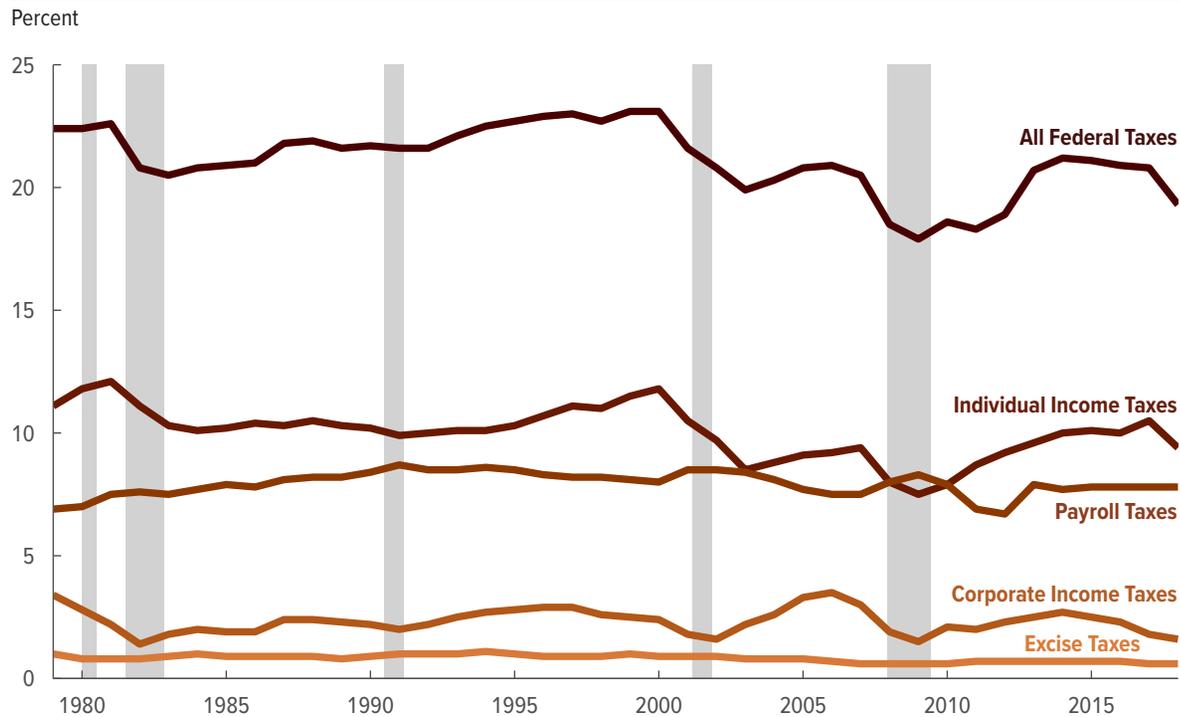
Average payroll tax rates were lower at the top of the distribution because a greater share of those households' earnings was above the maximum amount subject to Social Security payroll taxes (\$128,400 in 2018), which is also the maximum amount included in the computation of benefits. Average payroll tax rates for the lower four quintiles were about 9 percent, but the average was 6.4 percent among households in the highest quintile.

The average corporate income tax borne by households increases with income. In 2018, the average corporate tax rate was 2.2 percent among households in the highest quintile and 4.2 percent among households in the top 1 percent of the distribution.

Excise taxes are regressive: The amount of excise taxes paid relative to income is greatest for lower-income households, which tend to spend a larger share of their income on taxed goods and services. In 2018, the average excise tax rate was 2.0 percent for the lowest quintile, compared with 0.9 percent for the middle quintile and 0.4 percent for the highest quintile.

Exhibit 14.

Average Federal Tax Rates, by Tax Source, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

In 2018, the average federal tax rate among all households in the United States was 19 percent, which was less than the average rate for the entire 1979–2018 period (21 percent). Each of the four federal taxes that combine to make up that average—individual income taxes, payroll taxes, corporate income taxes, and excise taxes—had a distinct pattern over the 40-year period.

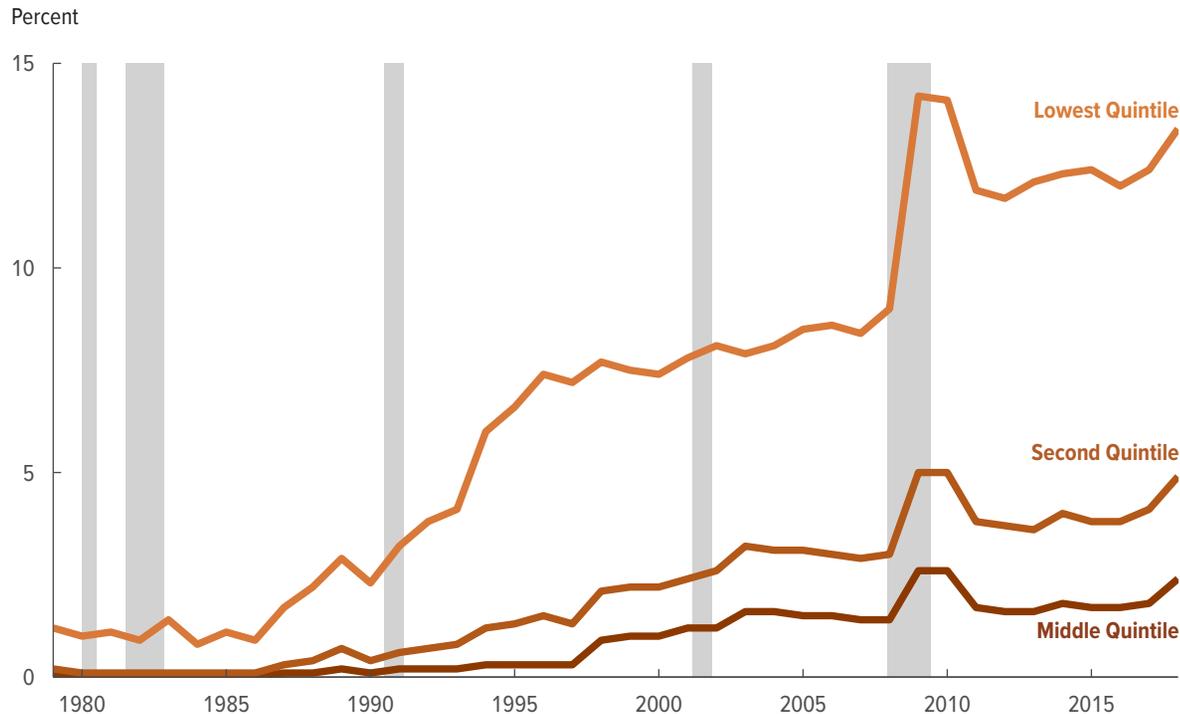
Over the period, the average individual income tax rate ranged from a high of 12.1 percent in 1981 to a low of 7.5 percent in 2009. In 2018, the average individual income tax rate was 9.4 percent, a decline of 1.1 percentage points from the previous year. Provisions included in the 2017 tax act contributed to that decrease (see the section titled “The Distributional Effects of the 2017 Tax Act in 2018” in this report).

In 2018, the average payroll tax rate was 7.8 percent, having held roughly constant since 2015. That rate was just below the 40-year average payroll tax rate of 7.9 percent. Payroll taxes fell in 2011 and 2012 because of a reduction in the Social Security payroll tax rate but rose again in 2013, when the Medicare payroll tax rate was increased for high-income taxpayers.

The average corporate tax rate fell from 3.4 percent in 1979 to 1.6 percent in 2018. It declined each year since 2014. The average excise tax rate, the smallest component of the overall federal tax rate, was relatively stable over the entire 1979–2018 period, amounting to 1.0 percent in 1979 and 0.6 percent in 2018.

Exhibit 15.

Average Refundable Tax Credit Rates Among Selected Income Groups, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

Major individual income tax credits consist of the earned income tax credit; the child tax credit; postsecondary education tax credits (the American Opportunity Tax Credit—formerly the Hope credit—and the Lifetime Learning credit); the premium tax credit; the 2008 economic stimulus payments; and the Making Work Pay tax credit. Major individual income tax credits include both the refundable and nonrefundable portions of the credit, when applicable.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

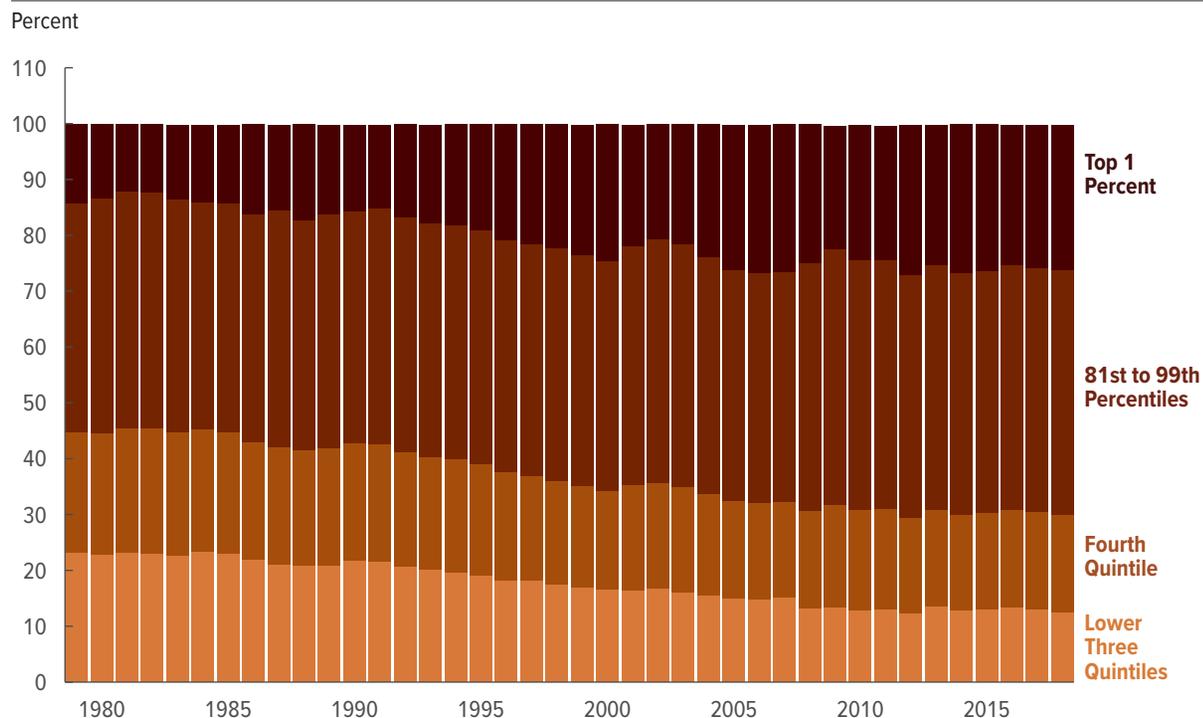
In 1979, the earned income tax credit (EITC) was the only refundable tax credit in effect. Since then, several additional refundable tax credits have been enacted, including the child tax credit in 1998 and the premium tax credit for health insurance coverage established by the Affordable Care Act in 2014. Additionally, the Congress increased the credit amount and income parameters of the EITC and the child tax credit several times over the years, including an expansion of the child tax credit in the 2017 tax act that took effect in 2018. As a result, the refundable tax credit rate—that is, total refundable tax credits divided by total income before transfers and taxes—among households in the lowest income quintile increased from approximately 1 percent in 1979 to 13.4 percent in 2018.

Because of refundable tax credits, the average individual income tax rates among households in the lowest and second quintiles were negative in 2018: –12 percent and –2 percent, respectively (see Exhibit 13). Without those tax credits, the average individual income tax rate for those two quintiles would have been positive: about 1 percent and 3 percent, respectively.

Each refundable credit has its own eligibility criteria and therefore varies in its response to economic changes. The two largest credits, the EITC and the child tax credit, tend to increase during economic recessions. Also, two temporary refundable credits were enacted during the 2007–2009 recession. Overall, the average refundable tax credit rate for the lowest quintile rose by 6 percentage points between 2007 and 2009, reaching 14.2 percent, its highest level over the 40-year period.

Exhibit 16.

Shares of Federal Taxes, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shares do not add up to 100, because households with negative income are not shown.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

The share of federal taxes paid by households in the highest quintile increased from 55 percent in 1979 to 70 percent in 2018. That group’s share of income before transfers and taxes also increased over the period but less than its share of federal taxes. Most of that 15 percentage-point increase in the federal tax share occurred in the top 1 percent of the distribution, whose share of all federal taxes rose by 12 percentage points, from 14 percent in 1979 to 26 percent in 2018. Those households’ share of income before transfers and taxes also rose, although to a lesser extent, from 9 percent in 1979 to 17 percent in 2018.

Between 1979 and 2018, the shares of individual income taxes, payroll taxes, and corporate taxes became increasingly concentrated in the highest quintile, whereas the distribution of shares of excise taxes remained relatively constant. The highest quintile’s share of individual income taxes rose from 65 percent in 1979 to 91 percent in 2018, and its share of payroll and corporate taxes each rose by 10 percentage points.

The share of taxes paid by higher-income households exceeded their share of income; the opposite is true for lower-income households. In 2018, households in the highest quintile received 55 percent of income before transfers and taxes and paid 70 percent of federal taxes. Households in the lowest quintile received 3.8 percent of income before transfers and taxes and paid about 0.01 percent of federal taxes, on net.

The Distributional Effects of the 2017 Tax Act in 2018

Public Law 115-97 (referred to here as the 2017 tax act) made important changes to the tax system that applied to both businesses and individuals beginning in 2018. The law's provisions interact in complex ways that vary according to each household's specific characteristics; but, on net, the 2017 tax act reduced federal taxes for most households, CBO estimates.¹⁶ The distributional effects of five broad sets of the law's provisions in 2018 are examined here.¹⁷

Reduction in Individual Income Tax Rates and in the Amount of Income Subject to the Alternative Minimum Tax

Under prior law, most people's taxable ordinary income was subject to seven statutory rates, each applying to a different income bracket. The 2017 tax act retained the seven-rate structure but reduced most of the rates. The act also changed the range of income within each bracket, which ultimately increased the total amount of income subject to lower rates.

16. CBO also estimates that the law boosted economic output and increased budget deficits. See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

17. For information about the methods underlying this analysis, see "Appendix B: How CBO Estimated the Distributional Effects of the 2017 Tax Act in 2018."

The alternative minimum tax (AMT) allows fewer exemptions, deductions, and tax credits than the regular income tax does. Some higher-income taxpayers who use tax preferences to reduce their liability under the regular income tax are required to pay the AMT if it is higher than their regular tax liability. Because the 2017 tax act increased the income levels at which the AMT takes effect, less income was subject to the AMT.

Repeal of Dependent Exemptions and Expansion of the Child Tax Credit

Under prior law, taxpayers could generally claim a personal exemption for each dependent, which reduced their taxable income. In addition, taxpayers with income below specified thresholds were eligible for a partially refundable tax credit of up to \$1,000 for each qualifying child under the age of 17.

The 2017 tax act repealed the personal exemption for dependents but doubled the size of the maximum child tax credit for most eligible taxpayers; it also extended eligibility for the credit to higher-income taxpayers and increased the maximum refundable portion to \$1,400 for each qualifying child. Taxpayers could also claim a new \$500 nonrefundable tax credit for each dependent who was not a qualifying child. On net, the

decrease in taxes attributable to the expanded child tax credit exceeded the increase in taxes attributable to repealing the dependent exemptions, which resulted in an average decrease in tax rates across the distribution.

Changes to the Standard Deduction, Itemized Deductions, and Taxpayer Exemptions

Taxpayers may either choose the standard deduction, which is a flat dollar amount, or itemize—that is, deduct certain expenses, such as state and local taxes. Taxpayers benefit from itemizing when the value of their deductions exceeds the standard deduction. Under prior law, however, the total amount of most itemized deductions was subject to a limit that affected some higher-income taxpayers. Taxpayers could also generally claim a personal exemption for themselves and their spouses, which reduced their taxable income.

The 2017 tax act repealed the taxpayer exemptions but nearly doubled the amount of the standard deduction. The act also changed the rules for itemized deductions. Most importantly, it limited the amount that can be claimed for the state and local tax deduction (commonly referred to as the SALT deduction) to \$10,000. That limit primarily affected higher-income households and disallowed

more than half of the state and local taxes reported in 2018 from being deducted. The 2017 tax act also repealed the overall limit on itemized deductions and reduced the amount that can be claimed for mortgage interest. On net, the increase in taxes attributable to the restrictions on itemized deductions and the repeal of taxpayer exemptions exceeded the decrease in taxes attributable to the expansion of the standard deduction, which resulted in an increase in average tax rates across the income distribution.

Changes to Tax Rules for Certain Owners of Pass-Through Businesses

The profits of pass-through businesses are allocated to their owners, added to their income, and taxed through the individual income tax. The 2017 tax act provided to many owners of pass-through businesses a new deduction equal to 20 percent of qualified business income. The deduction phased out as income increased for owners of personal-service businesses (such as law firms and medical practices). For other owners, the deduction was limited by the wages that the business paid or the property that it owned.

Changes to the Corporate Income Tax

The 2017 tax act made several partially offsetting changes to the corporate income tax system that reduced corporate taxes overall. Most importantly, the act replaced a graduated rate structure and a top rate of 35 percent with a single rate of 21 percent. The act also limited or eliminated some tax preferences, thus increasing the total amount of income subject to tax; allowed businesses to deduct the costs of certain types of investments more rapidly; changed how the United States taxes the foreign income of U.S. corporations; imposed a onetime tax on previously untaxed foreign profits; and added measures to discourage shifting profits out of the United States.

Exhibit 17.

Effects of Individual Income Tax Provisions of the 2017 Tax Act on Average Federal Tax Rates, 2018

Percentage Points



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

The analysis in this figure does not include the effects of the deduction on pass-through business income that was introduced in the 2017 tax act. For information about the methods underlying this analysis, see Appendix B.

* = between -0.05 and 0.05 percentage points

The individual income tax provisions of the 2017 tax act reduced average tax rates for all quintiles by about the same amount, although different sets of provisions produced that result in each income group.

The provisions that lowered statutory rates and amended the AMT decreased average federal tax rates for all income groups. The largest reductions were among households in the highest quintile, in part because taxpayers in those households were more likely to have been subject to the AMT under prior law.

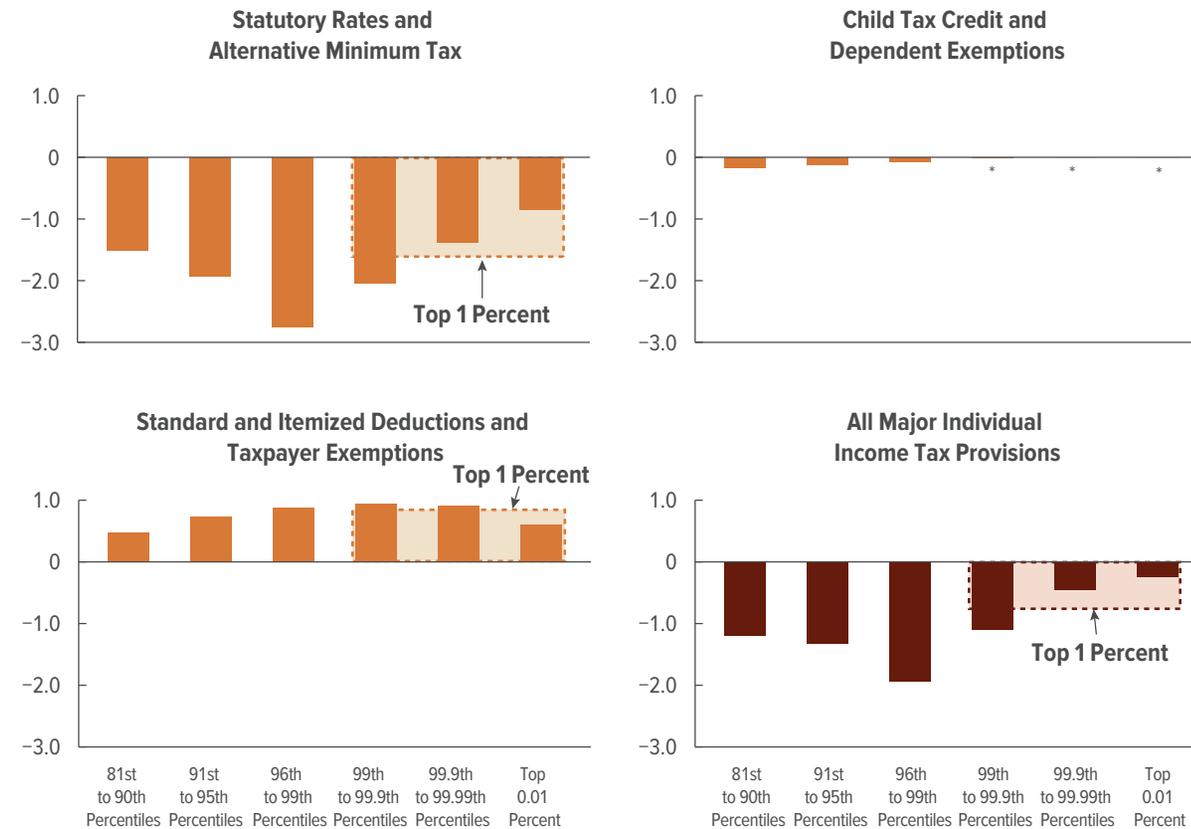
Taken together, the child tax credit and dependent exemption provisions decreased average tax rates most among households in the lowest quintile. Some lower-income households do not pay income taxes and were not affected by the elimination of the dependent exemption. Additionally, lower-income households with children benefited from the expanded refundable child tax credit, resulting in a decrease in their tax liability.

Provisions related to deductions and taxpayer exemptions had offsetting effects that varied across the income distribution. For households in the lowest three quintiles, many of which did not previously itemize deductions, the increase in the standard deduction was generally larger than the effect of removing the taxpayer exemptions. As a result, the amount of income subject to taxation was reduced for households in those quintiles, and average tax rates fell. For higher-income households, which are more likely to itemize their deductions, the limits on itemized deductions caused their average tax rates to increase, on net.

Exhibit 18.

Effects of Individual Income Tax Provisions of the 2017 Tax Act on Average Federal Tax Rates Among Households in the Highest Quintile, 2018

Percentage Points



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

The analysis in this figure does not include the effects of the deduction on pass-through business income that was introduced in the 2017 tax act. For information about the methods underlying this analysis, see Appendix B.

* = between -0.05 and 0.05 percentage points.

The individual income tax provisions of the 2017 tax act reduced average tax rates for all income groups within the highest quintile, with the largest reductions among households in the 96th to 99th percentiles.

The provisions that lowered the statutory rates and amended the AMT reduced taxes for all income groups within the highest quintile. Households in the 96th to 99th percentiles saw the largest reductions because many of them were subject to the AMT under prior law but not under the 2017 tax act. Within the top 1 percent of households, the smallest reductions were among the top 0.01 percent because those households receive a higher proportion of their income in capital gains than other households, and the tax rate on capital gains remained unchanged.

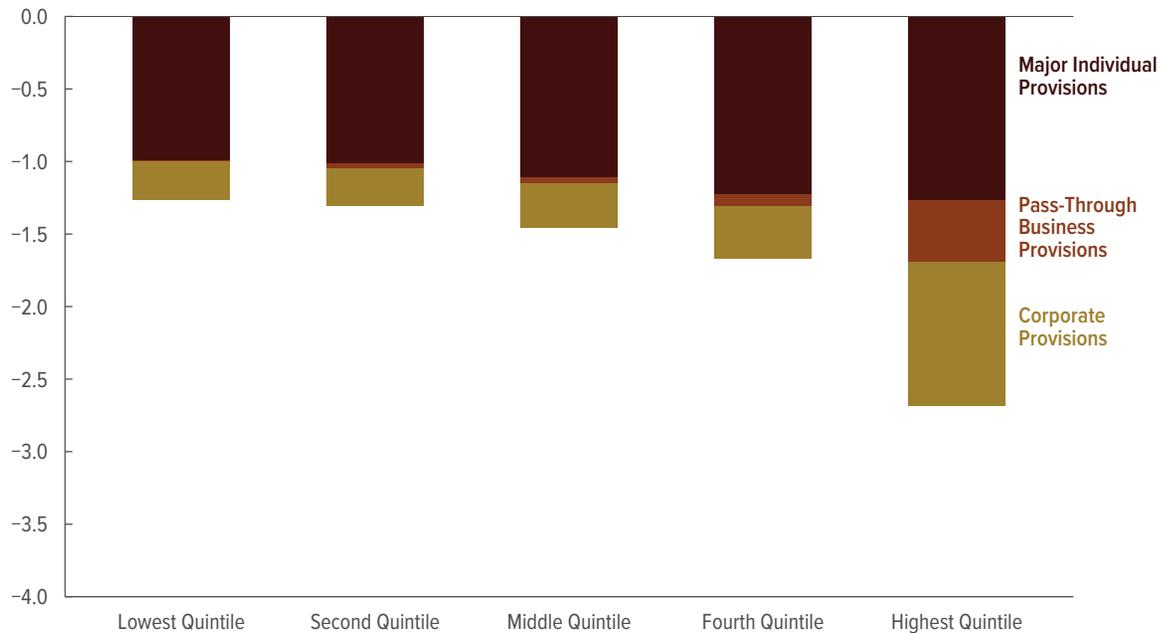
Taken together, the child tax credit and dependent exemption provisions decreased tax rates across all income groups within the highest quintile. However, those decreases were smaller than those in other quintiles because many higher-income households—particularly those in the top 1 percent of the distribution—were ineligible for the child tax credit or dependent exemptions.

Provisions related to deductions and taxpayer exemptions, including the new limit on deductions for state and local taxes, increased average tax rates for all income groups within the highest quintile. Those increases were more evenly distributed across the income groups than were the effects of the provisions related to statutory rates and the AMT.

Exhibit 19.

Effects of Individual, Pass-Through Business, and Corporate Provisions of the 2017 Tax Act on Average Federal Tax Rates, 2018

Percentage Points



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

For information about the methods underlying this analysis, see Appendix B.

In addition to affecting individual income taxes, the 2017 tax act affected the taxation of corporate and pass-through business income in 2018. Although the ultimate effects of the changes are highly uncertain, CBO allocated those taxes to households to provide a more complete view of the act's distributional effects.

In general, the 2017 tax act decreased tax rates most among households in the highest quintile. The overall reductions in tax rates attributable to the individual income tax provisions were relatively evenly distributed across all households, but households in the highest quintile benefited most from the reductions in taxes attributable to the corporate and pass-through business provisions.

CBO estimated the decrease in the corporate tax liabilities attributable to the tax act and allocated that amount mostly to owners of capital (see Appendix B for details). Because households in the highest quintile receive the largest share of capital income, most of the corporate tax was allocated to those households, which, in turn experienced the largest reductions in tax rates from the decrease in the corporate tax.

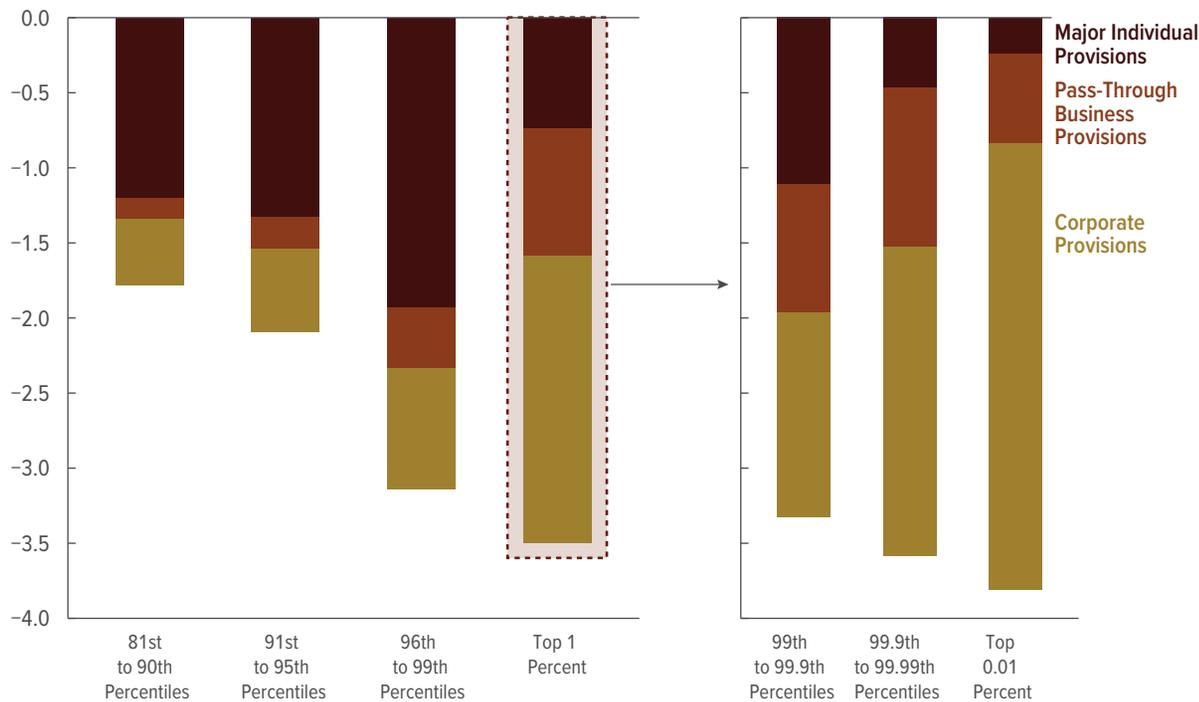
Pass-through businesses are also more likely to be owned by taxpayers in high-income households. As a result, most of the reductions in tax rates attributable to the business provisions accrue to households in the highest quintile.

In total, the 2017 tax act is estimated to have reduced average tax rates among the lowest two quintiles by about 1.3 percentage points in 2018. Among households in the highest quintile, the reduction was more than twice as large, or 2.7 percentage points.

Exhibit 20.

Effects of Individual, Pass-Through Business, and Corporate Provisions of the 2017 Tax Act on Average Federal Tax Rates Among Households in the Highest Quintile, 2018

Percentage Points



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

For information about the methods underlying this analysis, see Appendix B.

The 2017 tax act decreased taxes for all income groups within the highest quintile, but the decreases were largest among households in the top 1 percent of the distribution. That effect was driven largely by the reductions in corporate taxes.

The decrease in average tax rates among households in the 81st to 99th percentile was mostly attributable to the individual income tax provisions because those households receive a larger share of their total household income in the form of labor income than do households in the top 1 percent. Households in the 96th to 99th percentiles saw the largest decreases attributable to the individual income tax provisions, partly resulting from the changes to the AMT (see Exhibit 18).

The total decreases in the average federal tax rate were similar among each of the three income groups in the top 1 percent of the distribution, but the composition of those decreases differed according to the composition of each group's income. In general, capital income makes up a larger share of total household income for higher-income households (see Exhibit 5). Because CBO allocates corporate taxes mostly to owners of capital, higher-income households are affected most by decreasing such taxes; they are affected least by decreasing ordinary individual income taxes. As a result, for households in the top 0.01 percent of the distribution, the decrease stemmed mainly from the corporate tax provisions of the tax act, whereas for households in the 99th to 99.9th percentiles, the decrease was more evenly split among the three types of provisions.

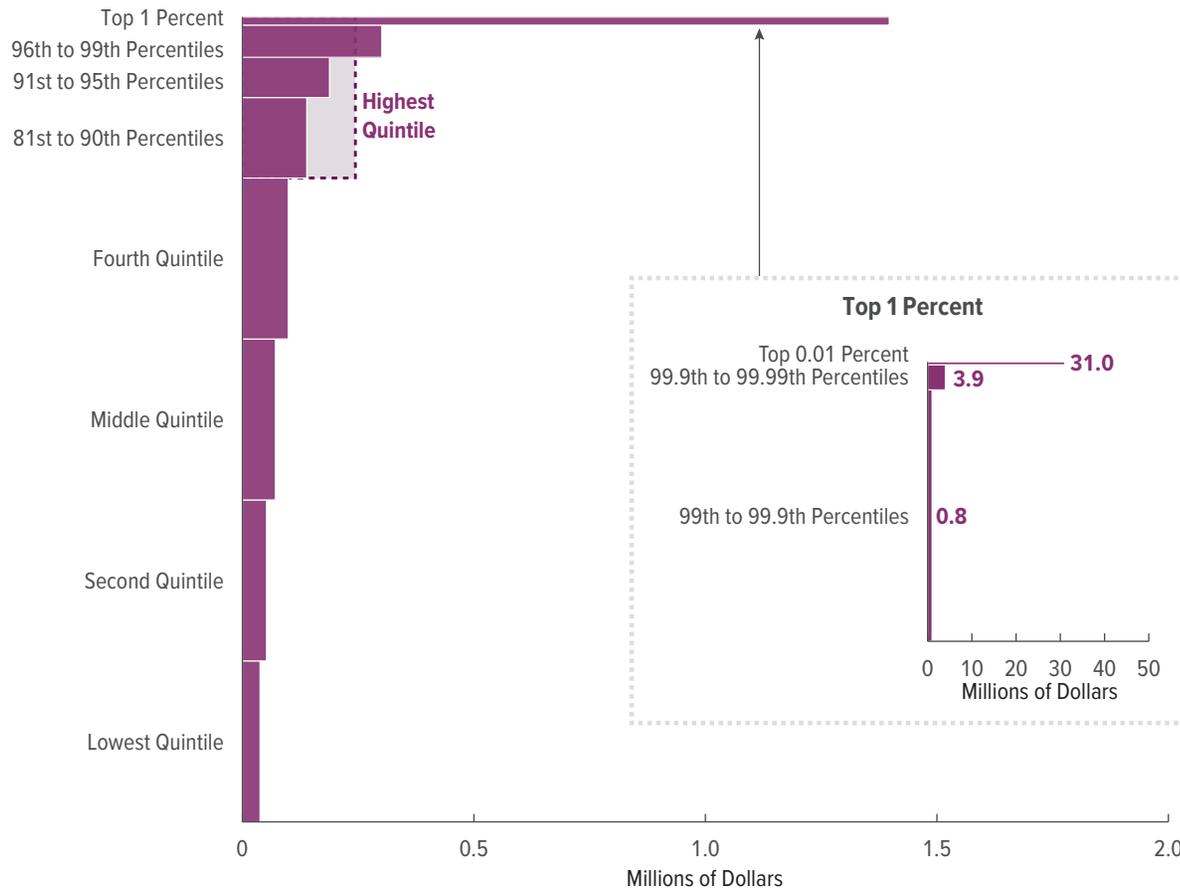
Income After Transfers and Taxes

Income after transfers and taxes is income before transfers and taxes plus means-tested transfers minus federal taxes. Because of the progressivity of means-tested transfers and federal taxes (driven primarily by the size and structure of the individual income tax), income *after* transfers and taxes is less skewed toward households at the top of the distribution than income *before* transfers and taxes. From 1979 to 2018, income after transfers and taxes grew more evenly across the income distribution than income before transfers and taxes.

The average income after transfers and taxes of households in different income groups grew at different rates because of changes in means-tested transfer programs, federal tax laws, and economic conditions. Income grew significantly faster among households in the highest quintile than for all other income groups, mainly because of changes in income before transfers and taxes.

Exhibit 21.

Average Household Income After Transfers and Taxes, 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

All dollar amounts are in 2018 dollars.

Income groups are created by ranking households by income before transfers and taxes, adjusted for household size. Each quintile (fifth) contains approximately the same number of people. The lowest quintile does not include households with negative income.

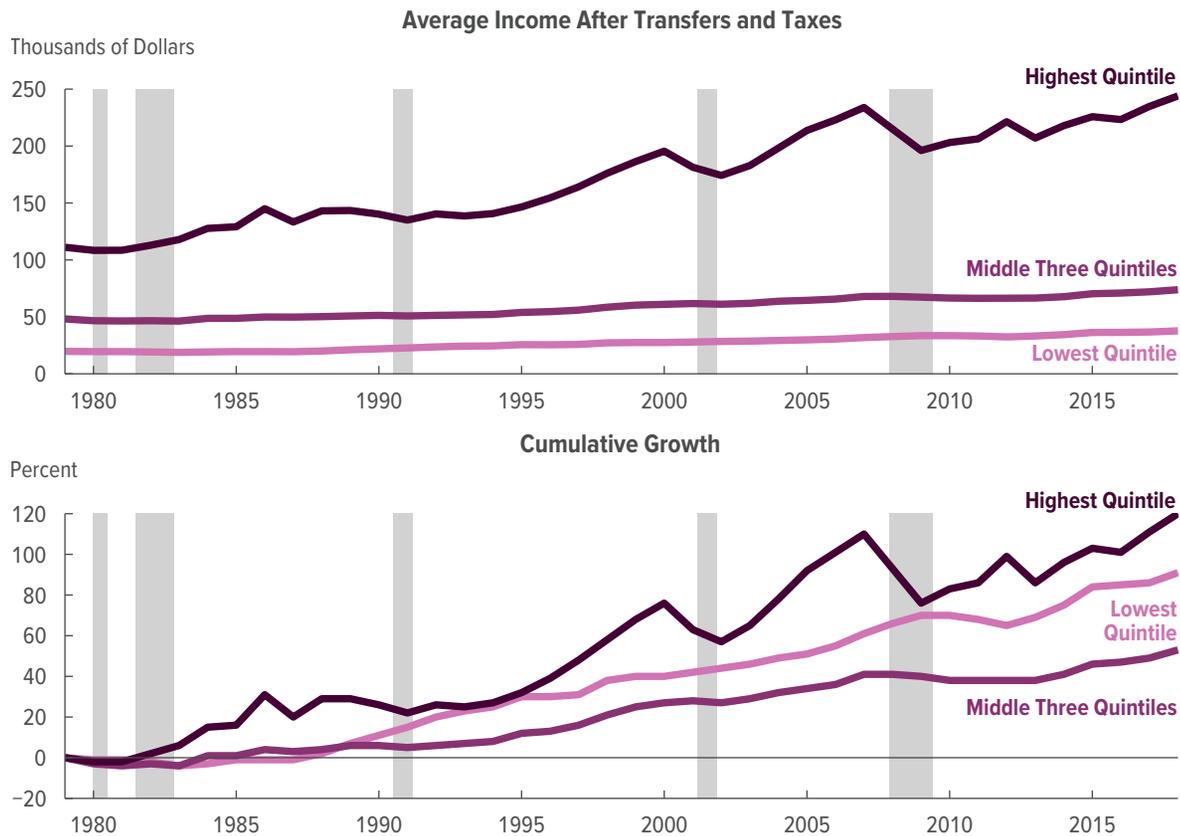
For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Because means-tested transfers and the federal tax system are progressive, income *after* transfers and taxes was less skewed than income *before* transfers and taxes. Among households in the lowest quintile, average income after transfers and taxes was about 68 percent higher than income before transfers and taxes in 2018—\$37,700 versus \$22,500 (see Exhibit 1). Average income after transfers and taxes in the middle quintile was \$71,100. Because, overall, households in the middle quintile paid more in federal taxes than they received in means-tested transfers, average income after transfers and taxes for that quintile was about \$6,400 less than the average income before transfers and taxes for the group.

Among households in the highest quintile, average income after transfers and taxes was about \$243,900 in 2018. Because households at the top of the income distribution paid significantly more in federal taxes than they received in means-tested transfers, income after transfers and taxes for that quintile was about \$77,700 less than the group’s income before transfers and taxes, on average. Among households in the top 1 percent of the income distribution, income after transfers and taxes was \$1.4 million, on average—about \$600,000 less than that group’s income before transfers and taxes. The average income after transfers and taxes for the top 0.01 percent was \$31.0 million in 2018, or \$13.5 million less than that group’s average income before transfers and taxes.

Exhibit 22.

Trends in the Distribution of Income After Transfers and Taxes, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

All dollar amounts are in 2018 dollars.

To calculate growth rates, CBO first converted all dollar amounts to 2018 dollars using the Bureau of Economic Analysis's price index for personal consumption expenditures.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

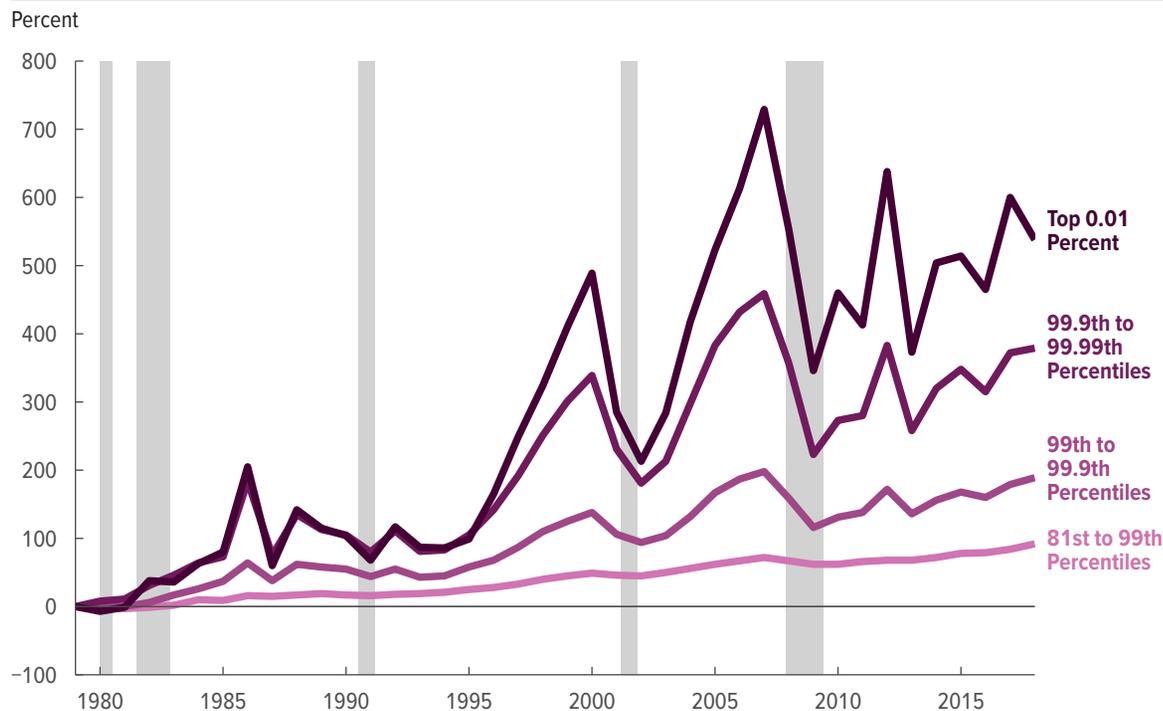
All five quintiles reached their highest average income after transfers and taxes for the 40-year period in 2018. Income after transfers and taxes grew fastest among households at the top of the income distribution. However, it grew more evenly across the distribution than income before transfers and taxes because of the progressivity of the transfer and tax systems.

Within the lower four quintiles, average federal tax rates fell over time, and average means-tested transfer rates increased. As a result, the average income after transfers and taxes grew more quickly than the average income before transfers and taxes for those income groups. The lowest quintile's average income after transfers and taxes grew by a cumulative 91 percent (or at an average annual rate of 1.7 percent) between 1979 and 2018, and its average income before transfers and taxes grew by 40 percent. Similarly, the middle three quintiles' average income after transfers and taxes grew by a cumulative 53 percent (or at an average annual rate of 1.1 percent) over that period, and their income before transfers and taxes grew by 37 percent.

The average federal tax rate for the highest quintile declined over time, so income after transfers and taxes grew slightly more quickly than income before transfers and taxes. That group's income after transfers and taxes grew by a cumulative 120 percent (or at an average annual rate of 2.0 percent), rising from an average of \$111,100 in 1979 to \$243,900 in 2018. In comparison, the highest quintile's income before transfers and taxes grew by 111 percent.

Exhibit 23.

Cumulative Growth in Income After Transfers and Taxes Among Households in the Highest Quintile, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

To calculate growth rates, CBO first converted all dollar amounts to 2018 dollars using the Bureau of Economic Analysis's price index for personal consumption expenditures.

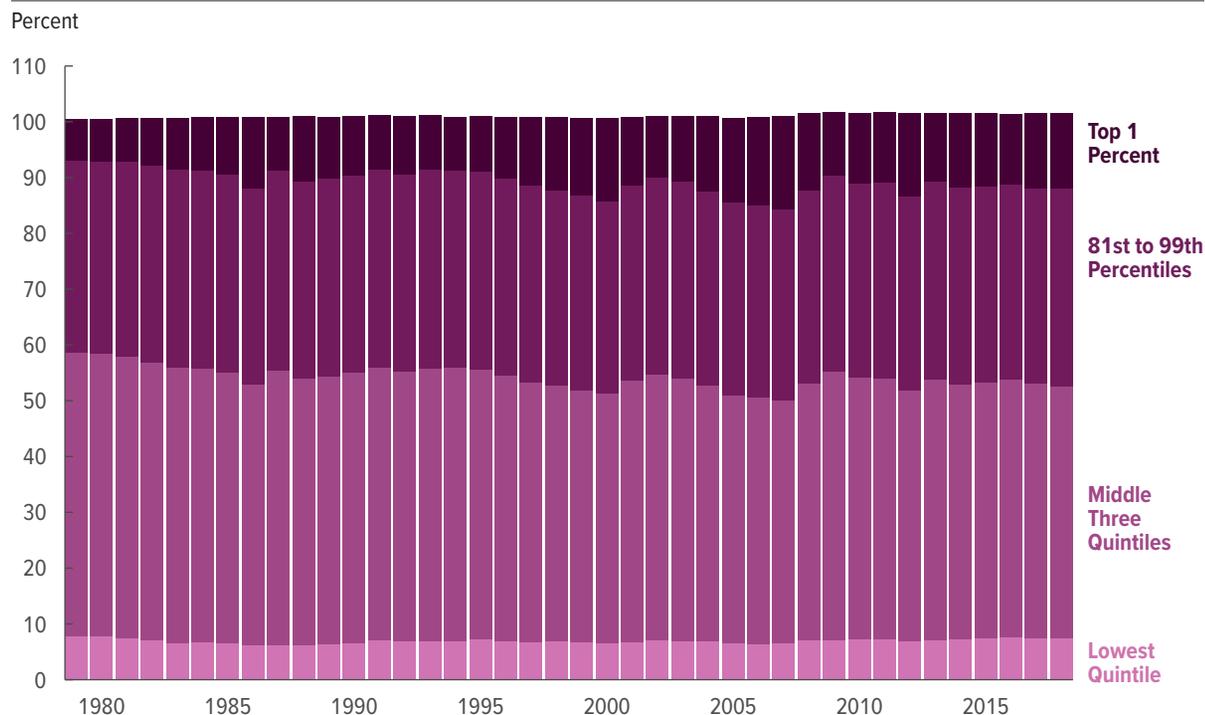
For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Between 1979 and 2018, income after transfers and taxes grew most quickly among households in the top 0.01 percent of the distribution, spurred by strong growth in income before transfers and taxes and a reduction in average tax rates. From 1979 to 2018, average income after transfers and taxes grew by the following amounts:

- 92 percent among households in the 81st to 99th percentiles, or at an average annual rate of 1.7 percent per year, from \$96,500 to \$185,400;
- 189 percent among households in the 99th to 99.9th percentiles, or at an average annual rate of 2.8 percent per year, from \$279,400 to \$808,400;
- 379 percent among households in the 99.9th to 99.99th percentiles, or at an average annual rate of 4.1 percent, from \$823,900 to \$3.9 million; and
- 538 percent among households in the top 0.01 percent of the distribution, or at an average annual rate of 4.9 percent, from \$4.9 million to \$31.0 million.

Among households in the top 0.01 percent of the distribution, reductions in the average federal tax rate over the period caused income after transfers and taxes to grow by a cumulative 86 percentage points more than income before transfers and taxes; for the 99.9th to 99.99th percentiles, it grew by 47 percentage points more. In contrast, among the 81st to 99th percentiles and the 99th to 99.9th percentiles, growth rates in income after transfers and taxes were similar to the growth in income before transfers and taxes.

Exhibit 24.

Shares of Income After Transfers and Taxes, 1979 to 2018

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shares do not add up to 100, because households with negative income are not shown.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Between 1979 and 2018, households in the top 1 percent of the distribution received an increasing share of income after transfers and taxes, amounting to a gain of 6 percentage points. The middle three quintiles' shares of income after transfers and taxes, in contrast, decreased by 6 percentage points over the period.

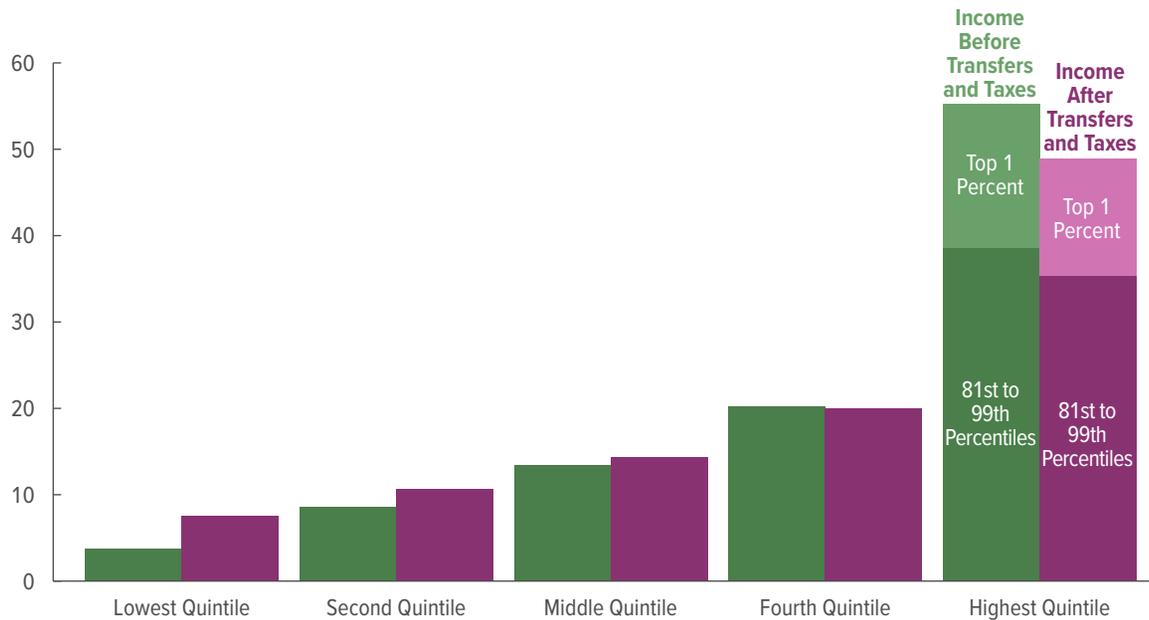
In 1979, the middle three quintiles received more than half of all income after transfers and taxes: 51 percent. By 2018, that share had declined to 45 percent. Meanwhile, the top 1 percent's share of income after transfers and taxes rose from 7 percent in 1979 to 14 percent in 2018. Shares of income for the lowest quintile and the remainder of the highest quintile were comparatively constant over the period: The lowest quintile's share fell by 0.3 percentage points, and the 81st to 99th percentiles' share grew by 1 percentage point.

Because the share of federal taxes increased between 1979 and 2018 for households in the top 1 percent (see Exhibit 16), that group's share of income *after* transfers and taxes grew more slowly than its share of income *before* transfers and taxes: The latter increased by 8 percentage points over the period, 2 percentage points more than the share of income after transfers and taxes. The group's share of income after transfers and taxes fluctuated over the 40-year period in response to economic conditions and shifts in tax and transfer policies, peaking in 2007 at 17 percent.

Exhibit 25.

Shares of Income Before and After Transfers and Taxes, 2018

Percent



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shares do not add up to 100, because households with negative income are not shown.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

In 2018, income both *before* and *after* transfers and taxes was skewed toward the top of the distribution. However, income after transfers and taxes was more evenly distributed than income before transfers and taxes.

Households in the lower three quintiles received a larger share of income after transfers and taxes than of income before transfers and taxes in 2018. The lowest quintile received 7 percent of income after transfers and taxes, compared with 4 percent of income before transfers and taxes. The middle quintile's share of income after transfers and taxes was 14 percent, and its share of income before transfers and taxes was 13 percent. Because households in the lower quintiles received more in means-tested transfers than they paid in taxes, the transfer and tax systems combined to increase their shares of income.

In contrast, the share of income after transfers and taxes for the highest quintile was about 6 percentage points *less* than the share of income before transfers and taxes. Because those households paid more in taxes than they received in transfers, the transfer and tax systems combined to reduce their share of income from 55 percent to 49 percent. Much of that decline was experienced by households in the top 1 percent of the distribution, whose share of income after transfers and taxes was 14 percent, 3 percentage points lower than their share of income before transfers and taxes.

Income Inequality

As the distribution of income shifted in the United States between 1979 and 2018, so did the degree of income inequality.¹⁸ A standard measure of income inequality is the Gini coefficient, which summarizes an entire distribution in a single number that ranges from zero to one. At the theoretical extremes, a value of zero means that income is distributed equally among all income groups, whereas a value of one indicates that all income is received by the highest-income group, and none is received by any of the lower-income groups.

The Gini coefficient can also be interpreted as a measure of one-half of the average difference in income between every pair of households in the population, divided by the average income of the total population. For example, the Gini coefficient based on income before transfers and taxes of 0.521 for 2018 indicates that the average difference in income before transfers and taxes between pairs of households in that year was equal to 104.2 percent (twice 0.521) of average household income, or about \$78,900 (adjusted to account for differences in household size).

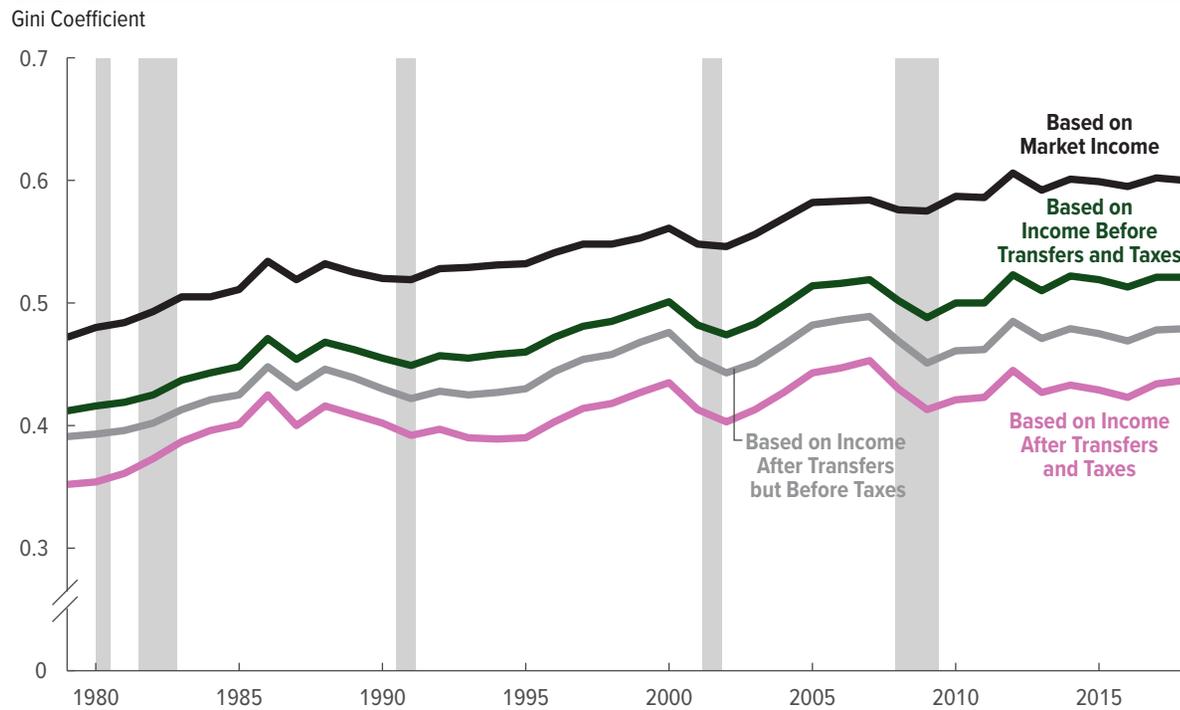
CBO's analysis compares Gini coefficients based on four different income measures: market income, income before transfers and taxes, income after transfers but before taxes, and income after transfers and taxes. Social insurance benefits, transfers, and taxes tend to reduce income inequality as measured by the Gini coefficient. Still, the Gini coefficients based on each of the four income measures indicate a rise in income inequality between 1979 and 2018; changes in the distribution of market income caused much of that increase.

The degree to which federal taxes and means-tested transfers reduce income inequality can be measured by the difference between the Gini coefficient for income *before* transfers and taxes and the Gini coefficient for income *after* transfers and taxes. That difference has fluctuated over time, as average federal tax rates and means-tested transfer rates have changed. But overall, the degree to which income inequality was reduced by transfers and taxes increased between 1979 and 2018.

18. A significant body of research has examined changes in U.S. income inequality over time using various data sources and measures of income. For recent examples, see Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, "Distributional National Accounts: Methods and Estimates for the United States," *The Quarterly Journal of Economics*, vol. 133, no. 2 (May 2018), pp. 553–609, <https://tinyurl.com/7pvnjysd>; and Gerald Auten and David Splinter, "Income Inequality in the United States: Using Tax Data to Measure Long-term Trends" (draft, December 2019), <https://tinyurl.com/y53tqqfx> (PDF, 485 KB).

Exhibit 26.

Income Inequality As Measured by the Gini Coefficient, 1979 to 2018



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

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

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

Between 1979 and 2018, income inequality as measured by the Gini coefficient for all four income measures increased. Increases in market income at the top of the distribution drove much of the rising income inequality over that time. Of the four measures of income presented here, income inequality as measured by market income is the highest. Social insurance benefits, particularly Social Security and Medicare benefits, reduced income inequality relative to market income inequality. (Those benefits are included in income before transfers and taxes.) The progressive structures of means-tested transfers and federal taxes also reduced income inequality, but by smaller amounts than social insurance benefits did.

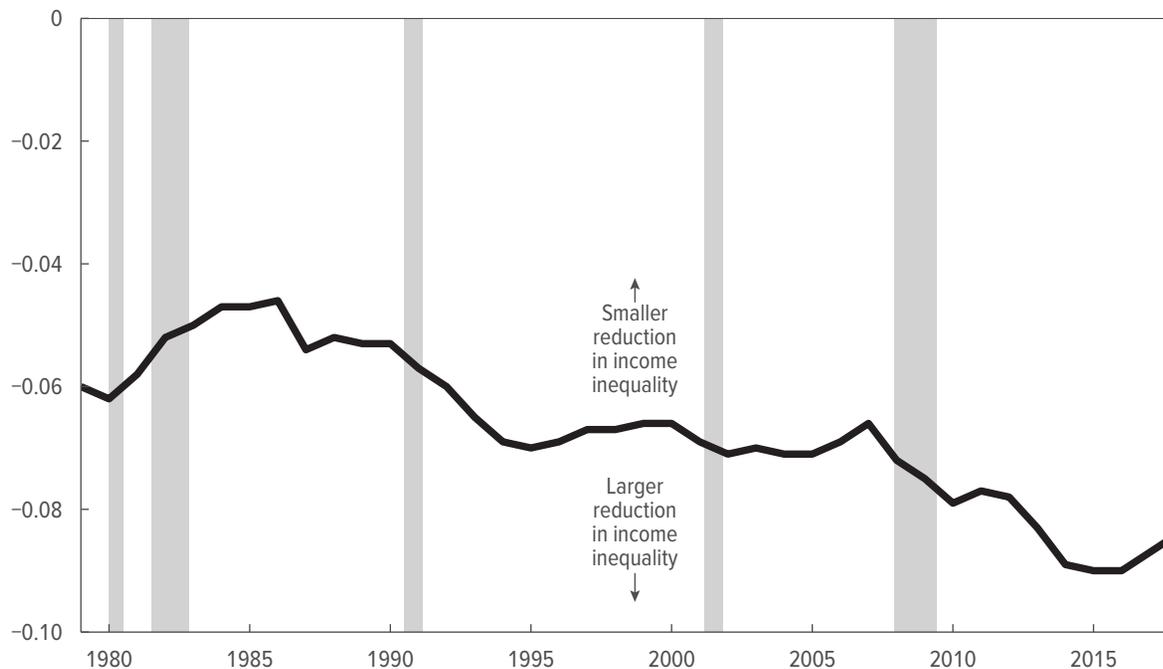
During periods of economic expansion, such as the mid-1990s and mid-2000s, income inequality tended to increase. Whereas income grew for all groups, including those at the bottom of the distribution, inequality increased because income at the top grew more.

There were also several temporary drops in income inequality over the years. Some drops, such as that in 2008, were largely attributable to economic recessions that brought about significant capital income losses—and, to a lesser extent, labor income losses—at the top of the income distribution. Other drops, including the decline in 2013, followed changes in tax laws that probably caused some high-income households to shift the realization of capital gains into the prior year.

Exhibit 27.

Reduction in Income Inequality Stemming From Means-Tested Transfers and Federal Taxes, 1979 to 2018

Change in Gini Coefficient



Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

Shaded vertical bars indicate the duration of recessions. (A recession extends from the peak of a business cycle to its trough.)

To measure the effect of means-tested transfers and federal taxes on inequality in each year, CBO subtracted the Gini coefficient for income before transfers and taxes from the Gini coefficient for income after transfers and taxes. A Gini coefficient value of zero indicates complete equality, and a value of one indicates complete inequality; thus, a negative change in the Gini coefficient indicates that inequality was reduced. The more negative the change, the greater the reduction in inequality.

For information about the methods underlying this analysis, see Appendix A. For detailed definitions of income measures, see Appendix C.

The Gini coefficient for income *after* transfers and taxes is lower than the coefficient for income *before* transfers and taxes because means-tested transfers and federal taxes in the United States are progressive. Although the degree to which transfers and federal taxes reduce income inequality varies from year to year, the extent to which they have done so has increased since 1979.

In 2018, the Gini coefficient for income after transfers and taxes was 0.437—that is, 0.084 less than the Gini coefficient was for income before transfers and taxes (see Exhibit 26). That reduction in inequality was larger than in 1979, when transfers and federal taxes reduced the Gini coefficient by 0.060, from 0.412 to 0.352.

The reduction in inequality as a result of taxes increased in the early 1990s, after lawmakers expanded the earned income tax credit and raised top individual marginal tax rates. It increased again after higher individual income tax rates went into effect in 2013, particularly for households at the top of the income distribution.

Similarly, means-tested transfers increasingly lessened income inequality when transfer rates grew among households in the lowest quintile. Major expansions in transfer rates occurred in the early 1990s, during the 2007–2009 recession, and in 2014 after Medicaid expanded under the Affordable Care Act.

Appendix A: Data and Methods

The Congressional Budget Office has released its analyses of the distribution of household income and federal taxes on a regular basis for more than 30 years.¹ This appendix provides additional details about CBO’s methodology and the most important assumptions underlying its analyses. The estimates in this report were produced using the agency’s framework for analyzing the distributional effects of both means-tested transfers and federal taxes.² That framework uses income before transfers and taxes, which consists of market income plus social insurance benefits. The measure is used to rank households when creating income groups and serves as the denominator when calculating average means-tested transfer rates and average federal tax rates.³

1. For links to reports in this series going back to 2001, see Congressional Budget Office, “Major Recurring Reports,” <https://go.usa.gov/xF8ht>.
2. For more details about CBO’s current framework and how it differs from the agency’s previous approach to distributional analyses, see Kevin Perese, *CBO’s New Framework for Analyzing the Effects of Means-Tested Transfers and Federal Taxes on the Distribution of Household Income*, Working Paper 2017-09 (Congressional Budget Office, December 2017), www.cbo.gov/publication/53345.
3. Social insurance benefits consist of benefits provided through Social Security (Old Age, Survivors, and Disability Insurance); Medicare (measured as the average

Unit of Analysis

CBO uses households as the unit of analysis in its distributional reports. A household consists of the people who share a housing unit regardless of their relationship.⁴ The data used in CBO’s analyses come from two primary sources: One provides data on tax-filing units, and the other provides

cost to the government of providing those benefits, net of offsetting receipts); unemployment insurance; and workers’ compensation. Although those social insurance benefits are often considered forms of government transfers, they are included in the base measure of income CBO used to rank households; however, the distributional effects of those benefit programs are not directly examined in this report. Social Security and Medicare, in particular, provide substantial resources to retirees and significantly affect the distribution of household income. In CBO’s estimation, when analyzing the distributional effects of those programs, it is more appropriate to use lifetime measures of income earned, payroll taxes paid, and benefits received. The framework used for analyzing the distribution of household income in this report is based on annual income data and, therefore, is less suitable for analyzing the distributional effects of those retirement benefit programs.

4. The U.S. Treasury’s Office of Tax Analysis uses family units in its distributional analyses. Family units are similar to household units but exclude unrelated persons living together. The Internal Revenue Service, the Joint Committee on Taxation, and the Urban–Brookings Tax Policy Center all use tax-filing units as the unit of analysis in their distributional analyses.

household-level data. A household can consist of *more* than one tax-filing unit, such as a married couple and their adult child.

To incorporate data on tax-filing units into the analysis, the agency creates tax-filing units from the household-level data on the basis of the relationship and income information collected by household surveys. After both data sources are organized using the same unit of analysis (tax-filing units), they are statistically matched to create a database with information from both sources (see the next section in this appendix for details about the statistical matching methodology). For the final presentation of distributional results, data for those statistically matched tax-filing units are combined and represented at the household level.

Data

The core data used in CBO’s distributional analyses were obtained from the Statistics of Income (SOI), a nationally representative sample of individual income tax returns collected by the Internal Revenue Service. The number of returns sampled grew over the period studied—1979 to 2018—rising from roughly 90,000 in some of the early years to more than 350,000 in later years. This sample of tax returns becomes available to CBO approximately two years after the returns are filed.

Information from tax returns is supplemented with data from the Annual Social and Economic Supplement of the Census Bureau's Current Population Survey (CPS), which contains survey data on the demographic characteristics and income of a large sample of households.⁵ The two sources are combined by statistically matching each SOI record to a corresponding CPS record on the basis of demographic characteristics and income. Each pairing results in a new record that takes on some characteristics of the CPS record and some characteristics of the SOI record.⁶

5. The CPS sampling frame seeks to represent the civilian noninstitutionalized population of the United States. The scope of CBO's analysis is therefore limited to that target population. People living in correctional facilities, nursing homes, and on military bases are not included in this analysis. However, members of the Armed Forces living in civilian housing units on a military base or in a household not on a military base are included. In 2014, the Census Bureau split the CPS sample into two groups to test new income and health insurance questions on a smaller subsample. For this report, CBO used the data corresponding to survey questions that were consistent with those used in prior years.

6. For a general description and evaluation of statistical matching, see Marcello D'Orazio, Marco Di Zio, and Mauro Scanu, *Statistical Matching: Theory and Practice* (John Wiley & Sons, 2006), <http://dx.doi.org/10.1002/0470023554>; and Michael L. Cohen, "Statistical Matching and Microsimulation Models," in Constance F. Citro and Eric A. Hanushek, eds., *Improving Information for Social Policy Decisions: The Uses of Microsimulation Modeling—Volume II: Technical Papers* (The National Academies Press, 1991), pp. 62–86, <http://dx.doi.org/10.17226/1853>.

The first step in the statistical matching process is to align the unit of analysis by constructing tax-filing units from CPS households. A tax-filing unit is a single person or a married couple plus any dependents. In CBO's analysis, the heads of CPS households (and their spouses, if present) are designated as tax-filing units. Tax rules are used to determine whether other members of the household can be claimed as dependents on the basis of their age, relationship with the primary tax-filing unit, and income.⁷ People who meet those criteria are classified as dependents; those who do not are classified as separate tax-filing units within the household. When multiple people could claim one member of a household as a dependent, the agency assumes that the household chooses the arrangement that results in the most advantageous tax situation—for example, two unmarried, cohabitating partners with two children might each claim one child and file as a head of household if doing so lowers their combined taxes.

Next, the agency divides the tax-filing unit records in each file into 15 demographic groups on the basis of marital status (married or single); number of dependents (zero, one, or two or more); whether the tax-filing unit can be claimed as a dependent (yes or no); and whether the tax filer and his or her spouse (if applicable) are 65 or older (neither, one, or both). Records from the two files are matched within the same demographic groups,

7. A dependent may be considered a tax-filing unit if he or she received income above a certain threshold in a given tax year.

with certain exceptions. Because the CPS file contains fewer head-of-household tax-filing units (single parents with dependent children) than the SOI file does, some SOI head-of-household tax-filing units are matched with single tax-filing units without children and married tax-filing units from the CPS. The deficit in head-of-household filers in the CPS data probably reflects some combination of misreporting of filing status in the SOI and a failure of the algorithm that creates tax units for the CPS to account for complex living arrangements.

Within each demographic group, CBO estimates an ordinary least squares (OLS) regression model of total income as a function of all the income items that are common to both the SOI and the CPS—such as wages, interest, dividends, rental income, business income and losses, pension income, and unemployment insurance. The OLS models are estimated using the SOI data. CBO applies the coefficients estimated from the regression models to the records in both files to construct a predicted total income variable. Tax-unit records in both files (independently within each demographic cell) are then sorted in descending order by predicted total income.

The SOI data and the CPS data come from samples, and therefore each record from both files has a sample weight associated with it. The sum of all the sample weights in the SOI file represents the total number of tax units that filed taxes in a given year. The sum of all the weights in the CPS file represents all of the tax units in the United

States—both those that filed a tax return and those that did not. The SOI file contains many more records than the CPS file yet represents fewer total tax units. Therefore, the average sample weight in the SOI file is lower than the average sample weight in the CPS file.

Because of those differences in sample weights, SOI and CPS records are not matched on a one-to-one basis. Within each demographic group, matching begins with the record from each file that represents the highest predicted total income. Of the two records, the one with the lower sample weight is matched to only one corresponding record from the other file. The record with the higher weight is “split” and is available (with its weight reduced) to be matched to the next record in the other file. (In practice, the highest-income SOI records have very low sample weights, so the matching algorithm matches the top CPS record to many SOI records.)

That process is repeated until all the SOI records are exhausted. Each matched pairing results in a new record with the demographic characteristics of the CPS record and the income reported in the SOI. Some types of income, such as certain types of transfer payments and in-kind benefits, appear only in the CPS records; values for those items are drawn directly from that survey. Income values for CPS records that represent nonfiling tax units are taken directly from the CPS. Residual CPS records (those with the lowest predicted income) are assumed to represent tax-filing units that did not file a tax return.

Finally, households are reconstructed from tax-filing units on the basis of relationships reported in the CPS. In general, CPS tax-filing units will have been matched to multiple SOI tax-filing units. When CPS tax-filing units are combined at the household level, multiple replications of a given household are created to cover all possible combinations of the matched SOI–CPS tax units. Each household replication is appropriately weighted so that the sum of all the replications equals the original CPS household-level sample weight.⁸

Measures of Income, Federal Taxes, and Means-Tested Transfers

Most distributional analyses rely on a measure of annual income as the metric for ranking households. In CBO’s analyses, information on taxable income sources for tax-filing units that file individual income tax returns comes from the SOI, whereas information on nontaxable income sources and income for tax-filing units that do not file individual income tax returns comes from the CPS. Among households at the top of the distribution, the vast majority of income data are drawn from the SOI. In contrast, among households in the lower and middle quintiles, a larger

portion of income data is drawn from the CPS (see Table A-1).

Most measures of income are drawn from federal tax returns, and those income measures are not adjusted to match the Bureau of Economic Analysis’s (BEA’s) national income and product accounts. This analysis does not capture income that is underreported or misreported to the Internal Revenue Service as a result of tax noncompliance.⁹ Underreported income that is excluded from this analysis may affect the distribution of income.¹⁰

In this report, CBO’s measures of federal taxes are based on tax liabilities incurred in a calendar year, regardless of when those liabilities are paid; by contrast, federal receipts measure taxes paid to the government in that year, regardless of when those liabilities are incurred. The measures of individual

8. For a graphical presentation of the statistical matching algorithm, see Kevin Perese, “Statistically Matching Administrative Tax Data With Household Survey Data” (presentation at a Washington Center for Equitable Growth workshop on distributional national accounts, Washington, D.C., July 21, 2017), www.cbo.gov/publication/52914.

9. For a description of tax noncompliance, see Internal Revenue Service, *Federal Tax Compliance Research: Tax Gap Estimates for Tax Years 2011–2013*, Publication 1415 (September 2019), www.irs.gov/pub/irs-pdf/p1415.pdf (1.39 MB).

10. Other researchers have found that as a result of tax noncompliance, tax data may understate income. See Andrew Johns and Joel Slemrod, “The Distribution of Income Tax Noncompliance,” *National Tax Journal*, vol. 63, no. 3 (September 2010), pp. 397–418, <https://tinyurl.com/y4cqarg9> (PDF, 309 KB); and John Sabelhaus and Somin Park, “U.S. Income Inequality Is Worse and Rising Faster Than Policymakers Probably Realize” (Washington Center for Equitable Growth, May 2020), <https://tinyurl.com/ybquz5ac>.

Table A-1.

Weighted and Unweighted Sample Sizes, 2018

Income Group	Statistically Matched Data Set (Weighted)		CPS (Unweighted) Households	SOI (Unweighted) Tax Units
	Households	Individuals		
Negative Income	545,753	1,250,374	1,208	18,489
Lowest Quintile	25,100,076	61,963,607	13,669	22,688
Second Quintile	26,268,699	63,215,034	14,130	29,554
Middle Quintile	25,653,862	63,214,654	13,261	37,072
Fourth Quintile	25,637,203	63,214,018	12,945	42,349
Highest Quintile	25,468,894	63,216,884	13,131	209,615
81st to 90th Percentiles	12,821,483	31,609,384	6,184	28,665
91st to 95th Percentiles	6,388,593	15,803,383	3,064	24,207
96th to 99th Percentiles	5,029,095	12,643,349	2,431	40,608
Top 1 Percent	1,229,723	3,160,768	1,451	116,136
99th to 99.9th Percentiles	1,107,990	2,844,692	973	55,451
99.9 to 99.99th Percentiles	109,077	284,469	413	47,948
Top 0.01 Percent	12,655	31,607	66	12,737
All Quintiles	128,674,487	316,074,571	68,345	359,769

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

CPS = Current Population Survey; SOI = Statistics of Income (a nationally representative sample of individual income tax returns collected by the Internal Revenue Service).

income taxes (including taxes on pass-through business income) and payroll taxes are calculated on the basis of the income and characteristics of each tax-filing unit in the underlying data set. Those calculated values align closely with the reported values. The measure of excise taxes is drawn from data on tax liabilities and collections from the Internal Revenue Service. The measure

of corporate taxes comes from BEA's estimate of taxes on corporate income plus CBO's estimate of repatriation tax payments due.¹¹

11. CBO uses the Bureau of Economic Analysis series from the national income and product accounts, Table 3.2, Federal Government Current Receipts and Expenditures, line 8 (Taxes on Corporate Income). Repatriation tax payments reflect a provision of the 2017 tax act that

The measures of transfers used in this report are mostly drawn from the agencies that administer the relevant programs. For example, the measure of benefits from the Supplemental Nutrition Assistance Program (SNAP) comes from the Food and Nutrition Service in the Department of Agriculture. CBO makes some adjustments to those data to align them with the sampling frame and reporting period of the CPS.¹²

Incidence of Federal Taxes

CBO allocates the individual income taxes and the employee's share of payroll taxes to the households paying those taxes directly. CBO also allocates the employer's share of payroll taxes to employees because employers appear to pass on their share of payroll taxes to employees by paying lower wages than they otherwise would.¹³ However, the research literature suggests that many factors could

imposed a onetime tax on foreign profits that had not been previously taxed by the United States. Those payments can be made in installments over an eight-year period.

12. For more details about how CBO develops administrative totals for transfer programs, see Bilal Habib, *How CBO Adjusts for Survey Underreporting of Transfer Income in Its Distributional Analyses*, Working Paper 2018-07 (Congressional Budget Office, July 2018), www.cbo.gov/publication/54234.
13. In theory, if the payroll tax did not exist, an employee's salary and wages would be higher by approximately the amount of the employer's share of the payroll tax. Therefore, CBO adds the employer's share of payroll taxes to households' earnings when calculating income before transfers and taxes.

cause the incidence to differ from CBO's allocation, especially in the short term.¹⁴

CBO allocates excise taxes to households according to their consumption of taxed goods and services. Excise taxes on intermediate goods, which are paid by businesses, are allocated to households in proportion to their overall consumption. CBO assumes that household spending patterns among income and demographic groups in the CPS are similar to those observed in the Bureau of Labor Statistics' Consumer Expenditure Survey.

There is far less consensus among researchers about how to allocate corporate income taxes (and taxes on capital income generally). CBO allocates 75 percent of the burden of corporate income taxes to owners of capital in proportion to their income from interest, dividends, rents, and adjusted capital gains. That measure excludes some forms of capital income that are more difficult to measure, such as investment earnings in tax preferred retirement accounts and unrealized capital gains.¹⁵ The agency adjusts capital gains by scaling them to their long-term historical level given the size of the economy and the applicable tax rate; that method reduces the effects of large year-to-

14. See Dorian Carloni, *Revisiting the Extent to Which Payroll Taxes Are Passed Through to Employees*, Working Paper 2021-06 (Congressional Budget Office, June 2021), www.cbo.gov/publication/57089.

15. For a discussion of alternative methods for allocating corporate income to individuals, see the online appendix to Matthew Smith and others, "Capitalists in the Twenty-First Century," *The Quarterly Journal of Economics*, vol. 134, no. 4 (November 2019), pp. 1675–1745, <https://doi.org/10.1093/qje/qjz020>.

year variations in the total amount of gains realized. The remaining 25 percent of the corporate income tax is allocated to workers in proportion to their labor income.¹⁶

Adjusting Income to Account for Differences in Household Size

Households with identical income can differ in ways that affect their economic status. For example, a larger household generally needs more income to support a given standard of living than a smaller one does. However, economies of scale in some types of consumption—housing, in particular—can mean that two people generally do not need twice the income to live as well as one person who lives alone. Because of those known economies of scale, household income is an imperfect measure of economic status.

To better rank households by their relative economic status, CBO adjusts the income measure, dividing household income by an adjustment factor known as an equivalence scale. Various equivalence scales are in use today, and a significant, if somewhat dated (though still useful), body of literature explores why and how alternative equivalence scales should be calculated for the purpose of setting public policy parameters—specifically, those related to measuring poverty and means-tested programs.¹⁷

16. For a more detailed discussion about how CBO allocates corporate taxes, see Congressional Budget Office, *The Distribution of Household Income and Federal Taxes, 2008 and 2009* (July 2012), www.cbo.gov/publication/43373.

17. See, for example, OECD Project on Income Distribution and Poverty, "What Are Equivalence Scales?" (accessed April 27, 2021), <https://tinyurl.com/y62frer>

To account for household economies of scale, the equivalence scale should take a value between one and the number of people in the household. An equivalence scale equal to one would make no change to the income measure and would not account for the greater needs of larger households. At the other end of the spectrum, an equivalence scale equal to the number of people in the household would imply that each person requires the same resources, which would not capture the benefits of shared consumption—most significantly, housing expenses—within the household.

A generalized formula for calculating an equivalence scale can be expressed as follows:

$$ES = n^e,$$

where n is the number of people in the household and e is an elasticity parameter for household size that ranges from zero to one, with larger values implying smaller economies of scale.¹⁸ To adjust household income for differences in household size, CBO uses an equivalence scale known as the

(PDF, 388 KB); Constance F. Citro and Robert T. Michaels, eds., *Measuring Poverty: A New Approach* (The National Academies Press, 1995), <http://dx.doi.org/10.17226/4759>; and Patricia Ruggles, *Drawing the Line: Alternative Poverty Measures and Their Implications for Public Policy* (Urban Institute Press, 1990).

18. Some equivalence scales have additional parameters to differentiate between the needs of additional adults and additional children, in which case the formula would be $ES = 1 + (\alpha n_a + \gamma n_c)$ where α and γ are weights between zero and one applied to the additional number of adults and children (n_a and n_c) in the household, respectively.

square root scale.¹⁹ Under that method, adjusted household income is calculated as household income divided by the square root of the number of people in the household.

Calculating the equivalence scale as the square root of the number of people in the household is the same as setting the elasticity parameter for household size to 0.5 because $\sqrt{n} \equiv n^{0.5}$. Using 0.5 as the elasticity parameter for household size is convenient for several reasons:

- It is the midpoint in the range of possible values for the parameter ($n^0 < n^{0.5} < n^1$).
- It implies that each additional person increases the household's needs but at a decreasing rate.
- The resulting household-size adjustment is similar to the family-size adjustments the

Census Bureau uses in setting U.S. poverty thresholds.

- It is transparent and relatively easy to understand.

Applying the square root equivalence scale to adjust income for differences in household sizes means that some households with higher income (but more people living in them) may be considered equivalent in income to households with lower income (but fewer people living in them).

CBO adjusts income for household size using the square root equivalence scale only for the purpose of ranking households and assigning them to income groups. All other income measures presented in the agency's distributional analyses are unadjusted.

CBO presents households in adjusted household income quintiles and provides additional detail for smaller, percentile-based groupings of households within the highest income quintile (the 81st through 90th percentiles, the 91st through 95th percentiles, the 96th through 99th percentiles, the 99th to 99.9th percentiles, the 99.9th to 99.99th percentiles, and the top 0.01 percent). Each quintile contains approximately 20 percent of the civilian noninstitutionalized U.S. population, and each full percentile (that is, a percentile expressed as a whole number) contains approximately 1 percent of the population. However, because household sizes vary, the adjusted household income quintiles contain slightly different numbers of households (see Table A-1 on page 42).

19. The most recent distributional analyses by the Treasury and the Organisation for Economic Co-operation and Development (OECD) also adjust for household or family size using the square root equivalence scale. By contrast, recent studies by government agencies in the United Kingdom and Australia use a more complex adjustment called the modified OECD equivalence scale (although it is no longer used by the OECD), which gives a full weight to the first adult in a household, a half weight to the second adult, and a 0.3 weight to each child. The Urban–Brookings Tax Policy Center, the Internal Revenue Service, the Joint Committee on Taxation, and economists Thomas Piketty and Emmanuel Saez all use tax units as their units of analysis and do not make any adjustments for differences in tax-unit size.

Appendix B: How CBO Estimated the Distributional Effects of the 2017 Tax Act in 2018

Beginning in 2018, provisions of Public Law 115-97 (originally called the Tax Cuts and Jobs Act but referred to here as the 2017 tax act) reduced the tax liabilities of most households at all income levels. The 2017 tax act affected taxes for both corporations and individuals (including owners of pass-through businesses). In the Congressional Budget Office's analysis, changes to both types of taxes are modeled and allocated to households separately, as outlined in this appendix.

Scope of the Analysis

The analysis in this report examines the distributional effects of the 2017 tax act in 2018 (see Table B-1 for details about changes in federal taxes attributable to the 2017 tax act). Analyses of the distributional effects of the tax act in other years would show different results because some provisions of the act are set to expire in 2025, and the effects of certain other provisions vary over time. The estimates of the distributional effects of the 2017 tax act presented here are not intended to replace or update prior estimates of the budgetary or economic effects of the act produced by the

staff of the Joint Committee on Taxation (JCT) and CBO.¹

In this analysis, CBO's estimates are based on income and deductions reported in 2018 and do not separately account for the behavioral effects that may have resulted from implementing the 2017 tax act. For example, taxpayers might have contributed different amounts to charity under prior law, depending on whether they itemized their deductions and the applicable tax rate. There is also evidence that corporations may have shifted deductions into 2017 and income into 2018 in response to the new law.² Although those types of behavioral responses affected household income and tax liabilities in 2018, they are not attributed

to the 2017 tax act in this analysis, because CBO cannot identify them in the available data.

Similarly, changes in tax policy also affect the economy and hence the market income that households receive. In its prior analysis of the 2017 tax act, CBO estimated that total economic output and income were greater in 2018 than they would have been if the tax act had not been enacted.³ Although those changes are reflected in CBO's estimates of the distribution of income before transfers and taxes, the agency does not include them in its estimates of the changes in taxes attributable to the tax act. That is because the actual economic effects of the tax act are unobserved and uncertain, and because such changes associated with specific provisions cannot be disentangled from other factors in the data available to the agency. For example, the tax act altered depreciation deductions, which changes the income of owners of pass-through businesses. But in the data available to CBO, that type of change cannot be

1. For details about those estimates, see Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651; and Joint Committee on Taxation, *Estimated Budget Effects of the Conference Agreement for H.R. 1, The Tax Cuts and Jobs Act*, JCX-67-17 (December 18, 2017), www.jct.gov/publications/2017/jcx-67-17/.

2. See Tim Dowd, Christopher Giosa, and Thomas Willingham, "Corporate Behavioral Responses to the TCJA for Tax Years 2017–2018," *National Tax Journal*, vol. 73, no. 4 (December 2020), pp. 1109–1134, <http://dx.doi.org/10.17310/ntj.2020.4.09>.

3. See "Appendix B: The Effects of the 2017 Tax Act on CBO's Economic and Budget Projections" in Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

Table B-1.

Average Federal Taxes and Average Income After Transfers and Taxes in 2018, Under Current Law and Changes From Prior Law

Income Group	Average Federal Tax Rates		Average Federal Taxes (2018 dollars)			Average Income After Transfers and Taxes (2018 dollars)		
	Current Law (Percent)	Change From Prior Law (Percentage points)	Current Law	Change From Prior Law	Share of Total Change From Prior Law (Percent)	Current Law	Change From Prior Law	Change From Prior Law (Percent)
Lowest Quintile	0.0	-1.3	0	-300	2.2	37,700	300	0.8
Second Quintile	8.1	-1.3	4,000	-600	5.2	51,800	600	1.2
Middle Quintile	12.8	-1.5	9,900	-1,100	9.0	71,100	1,100	1.6
Fourth Quintile	16.7	-1.7	19,500	-2,000	15.5	99,200	2,000	2.0
Highest Quintile	24.4	-2.7	78,600	-8,600	68.2	243,900	8,600	3.5
Percentiles								
81st to 90th	20.0	-1.8	34,400	-3,100	12.2	138,800	3,100	2.2
91st to 95th	21.9	-2.1	52,500	-5,000	9.9	187,900	5,000	2.7
96th to 99th	24.2	-3.2	96,000	-12,500	19.5	301,100	12,500	4.2
Top 1 Percent	30.2	-3.5	602,900	-69,800	26.6	1,397,400	69,800	5.0
99th to 99.9th	29.4	-3.3	335,600	-38,000	13.0	808,400	38,000	4.7
99.9th to 99.99th	31.6	-3.6	1,821,200	-205,900	7.0	3,945,700	205,900	5.2
Top 0.01 Percent	30.3	-3.8	13,506,600	-1,687,500	6.6	31,008,900	1,687,500	5.4

Data source: Congressional Budget Office. See www.cbo.gov/publication/57061#data.

distinguished from other changes in business activity unrelated to the 2017 tax act.

CBO's estimates of the effects of the 2017 tax act include the provisions with the largest budgetary effects in 2018. However, the agency did not have

the data to reliably estimate the effects of some provisions with smaller budgetary consequences, including those that made tax deductions available to taxpayers in federally declared disaster areas; required children to have a valid Social Security Number to qualify for the child tax credit; and

created opportunity zones for investment in certain areas.⁴ The effect of the 2017 tax act on estate and gift taxes is also not estimated, because CBO does not allocate those taxes to U.S. households in its analyses of the distribution of household income.

Incidence of Tax Changes

The statutory incidence of a tax reflects the person or entity that remits the tax payment, whereas the economic incidence reflects who actually bears the economic burdens of the tax, after accounting for changes in behavior and prices. In its analyses of the distribution of household income, CBO generally allocates each tax to households in a way that reflects the tax's economic incidence (see Appendix A for details). For individual taxes, the agency allocates the changes in tax liability to the households paying those taxes directly. Taxes paid by businesses are allocated to households according to rules that vary by the nature of the tax.

When considering the effects of a change in tax law, the initial effects may differ from the economic incidence if market prices are slow to adjust. In that case, the initial incidence of a tax change may follow the statutory incidence and evolve over time to reflect the economic incidence as market prices adjust. Because the 2017 tax act was enacted in late December 2017, the incidence of the resulting changes in 2018 was

4. The 2017 tax act also set to zero the penalty for not having health insurance that meets specific standards, which changed tax liabilities for some households. However, that provision did not take effect until 2019 and is not included in this analysis.

probably closer to the statutory incidence than to the longer-run allocations that CBO uses in this analysis.

Modeling the Effects of the Individual Income Tax Provisions

CBO calculates the individual income tax liabilities and pass-through business tax liabilities of U.S. households on the basis of current tax rules and using the same data from tax returns that the agency uses for its distributional analyses.⁵ In 2018, those liabilities were determined for each household under the rules of the 2017 tax act. In this analysis, CBO estimated the changes in those tax liabilities that were attributable to the 2017 tax act by first estimating what the liabilities would have been under prior law.

To calculate those estimates, CBO used its microsimulation tax model, which evaluates tax liabilities for an independent, representative sample of tax returns in each year.⁶ The agency used the model to apply the tax rules from prior law to each tax-filing unit in a representative sample of

tax filers in 2018.⁷ The agency then calculated the difference between the underlying distribution of those simulated average federal tax rates and that of the observed tax rates in the data from 2018 tax returns.

Calculating the effects of the 2017 tax act using 2018 data has advantages and disadvantages. For some of the act's provisions, estimates based on 2018 data would be more accurate than those based on previous years. For example, for the pass-through business income deduction, the information necessary to determine which businesses are eligible for the deduction was not collected prior to 2018.

For other provisions, however, the 2018 data could less accurately reflect the effects of the tax act because taxpayers may have changed how they reported their income and deductions in response to the act. For example, many taxpayers who would have itemized their deductions under prior law claimed the standard deduction in 2018 and therefore did not report their itemized deductions that year.⁸ To account for that underreporting and

to estimate what the itemized deductions of those taxpayers would have been under prior law, CBO imputed them based on the reported itemized deductions of taxpayers in 2017.⁹

To analyze the effects of changes in the individual income tax stemming from the 2017 tax act, CBO separately examined the effects of four broad sets of the act's provisions. Each set included provisions that were conceptually similar or that offset each other in clearly identifiable ways:

- **Statutory Rates and the Alternative Minimum Tax:** Individual income tax rates were reduced for nearly all tax brackets, and the threshold at which taxpayers become subject to the alternative minimum tax was increased.
- **Child Tax Credit and Dependent Exemptions:** Personal exemptions for dependents were eliminated; the child tax credit amount was

deductions in 2017 or who were new to the sample in 2018, CBO imputed their potential itemized deductions on the basis of spending patterns of people with similar income and demographic characteristics.

9. To test the sensitivity of its analysis to the data year, CBO also estimated the effects of the individual income tax provisions of the 2017 tax act (excluding the pass-through business provisions) on the basis of 2017 data using a method similar to the one used for 2018 data. CBO found the differences to be small. For the bottom four quintiles, the change in the average tax rate was within 0.1 percentage point of the change estimated on the basis of 2018 income. For households in the highest quintile, the difference was 0.3 percentage points, largely because taxpayers in that quintile reported more itemized deductions in 2017 than did taxpayers in that quintile in 2018.

5. See Appendix A for more details about the data sources underlying CBO's distributional analyses.

6. The households in any particular segment of the income distribution in a given year do not necessarily represent the same households in that segment in other years, for two main reasons. First, the samples of tax returns that CBO uses are drawn independently each year and do not necessarily contain information on the same households. Second, many households experience changes in their income, transfers, taxes, or household composition from year to year, which can cause them to move from one segment of the income distribution to another over time.

7. For more details on CBO's microsimulation tax model, see Congressional Budget Office, "An Overview of CBO's Microsimulation Tax Model" (presentation, June 2018), www.cbo.gov/publication/54096.

8. CBO's estimates of the effects of the 2017 tax act include so-called "tax form" behavior and reflect the fact that some taxpayers would have elected to itemize their deductions without the larger standard deduction. For taxpayers who itemized their deductions in 2017 but not in 2018, CBO imputed the potential amount of each itemized deduction on the basis of what those taxpayers reported in 2017. For taxpayers who did not itemize

doubled; and the phaseout threshold of the child tax credit was expanded.

- **Standard and Itemized Deductions and Taxpayer Exemptions:** The standard deduction was increased; personal exemptions for taxpayers were eliminated; and new rules were put in place for itemized deductions, including the \$10,000 limit on state and local tax deductions.
- **Pass-Through Business Provisions:** A deduction of the income of pass-through businesses was introduced, and a limit was set on the amount of active pass-through business losses that are deductible from an owner's taxable income.¹⁰

Multiple provisions in the 2017 tax act interacted with and offset each other, depending on the income composition and demographic characteristics of given households. CBO incorporated those interactions into its estimates using its microsimulation tax model. The effects of the act were estimated by applying 2017 tax rules to the 2018 data and then applying the rules of each set of provisions sequentially, in the order listed above. As a result, the effects of the act shown for each set of provisions as presented in this report (in exhibits 17 through 20 in the section titled “The Distributional Effects of the 2017 Tax Act in

10. The limit on the amount of active pass-through business losses that are deductible from an owner's taxable income was repealed retroactively in 2020, but the effects in 2018 are included here because the rules were implemented in that year.

2018”) include the interactions between the provisions in that set and those in preceding sets.

Modeling the Effects of the Corporate Tax Provisions

To analyze the distribution of household income, CBO must allocate certain taxes that are not directly paid by households. Corporations are legally obligated to pay the corporate income tax, but households ultimately bear the burden of that tax. Economists estimate that the burden of the corporate tax is shared between suppliers of capital (that is, corporations' shareholders and recipients of other forms of capital income, including interest, rents, dividends, and capital gains) and suppliers of labor (that is, workers). To determine the effects of corporate taxes on the distribution of household income, CBO must determine an appropriate measure of corporate taxes and then allocate those taxes to households on the basis of each household's share of income from capital and labor.

Measure of Corporate Taxes

In this report, the measure of corporate taxes allocated to households is equal to the measure of current federal receipts of taxes on corporate income published by the Department of Commerce's Bureau of Economic Analysis (BEA) plus CBO's estimate of repatriation tax payments for the relevant tax year.¹¹ For 2018, the current

11. Current federal receipts of taxes on corporate income are reported in row 8 of Table 3.2 of BEA's national income and product accounts (NIPAs). Repatriation tax payments reflect a provision of the 2017 tax act that imposed a onetime tax on foreign profits that had not been previously taxed by the United States. Those

federal receipts of taxes on corporate income totaled \$210.6 billion, according to BEA, and CBO estimates that repatriation tax payments for 2018 were \$19.8 billion, resulting in total corporate taxes of \$230.4 billion.¹²

CBO used historical data from BEA to approximate what current federal receipts of taxes on corporate income would have been for 2018 without the changes introduced by the 2017 tax act. CBO first calculated the average tax rate on BEA's measure of profits from current production for the period between 2007 and 2016 and then applied that average tax rate to BEA's measure of profits from current production in 2018.¹³ Calculating corporate taxes in that way results in a value of \$334.7 billion.

payments can be made in installments over an eight-year period. In the BEA accounts, repatriation tax payments are not included as receipts and are instead treated as a capital transfer from businesses to the federal government. See Congressional Budget Office, *CBO's Projections of Federal Receipts and Expenditures in the National Income and Product Accounts* (July 2018), www.cbo.gov/publication/54194.

12. For 2017, repatriation tax payments totaled approximately \$15 billion.
13. That average tax rate for each year is calculated as current federal receipts of taxes on corporate income (row 8 of NIPA Table 3.2) divided by profits from current production (Corporate Profits with IVA and CCAAdj, row 13 of NIPA Table 1.12). It is possible that profits from current production in 2018 were elevated because corporations shifted deductions into 2017 and shifted income into 2018 for tax purposes. However, such shifting for tax purposes would not necessarily affect the timing of profits in the BEA data.

Therefore, the change in corporate taxes used for the distributional analysis of the 2017 tax act is the difference between the estimate of \$334.7 billion and the 2018 measure of corporate taxes of \$230.4 billion, or \$104.3 billion. That change reflects the offsetting effects of some provisions that reduced corporate taxes, such as the lowered statutory rate, and some provisions that increased taxes, such as the repatriation tax payments and the limit on the deduction of net interest. When the tax act was passed in 2017, CBO estimated that its effects on corporate receipts in each of fiscal years 2018 and 2019 would be roughly \$90 billion. Although the estimate of \$104.3 billion (used in this report) is derived using a different method than the one CBO used to estimate the effects of the 2017 tax act at the time of its passage, it is similar in magnitude.¹⁴

CBO's Allocation of Corporate Taxes

Since 2012, CBO has allocated 75 percent of the corporate tax to owners of capital and 25 percent to workers.¹⁵ That allocation is intended to reflect

the long-run incidence—or the distribution of the burden of taxation—of the corporate tax system as a whole. The incidence of a specific provision of the corporate tax system can differ from the incidence of the corporate tax system as a whole. The 2017 tax act included a variety of provisions that, on net, are estimated to have reduced corporate tax revenues. That net reduction reflects the offsetting effects of some provisions that reduce corporate tax revenues and others that increase them. The composition of that net reduction changes over time. For example, the repatriation tax, which can be paid in installments, only affects corporate revenues through 2026.

According to estimates produced by JCT when the legislation was enacted, the provision with the largest effect on corporate tax revenues is the reduction in the corporate income tax rate; in CBO's assessment, the incidence of that change is likely to be similar to the overall incidence of the corporate tax.¹⁶ However, the incidence of other provisions may differ from that standard allocation, meaning that capital owners' share of the burden or benefit of the change may be larger or smaller than projected. For example, a corpo-

difficult to measure, such as investment earnings inside of tax preferred retirement accounts and unrealized capital gains. CBO's measure of income before taxes and transfers does include most of that capital income, but not as it accrues. Capital gains are included when realized, and taxable distributions from retirement accounts are included when withdrawn.

ration's repatriation tax liability is determined by past business decisions, so that tax should have little effect on corporations' future investment decisions. Typically, corporate taxes affect wages to the extent that they affect investment (and thereby labor productivity). Because the repatriation tax does not affect future investment decisions and thus does not affect wages, the corporate tax payments associated with that provision would fall more heavily on corporate shareholders and other owners of capital, in CBO's judgment.

It takes time for the economy to reach a new general equilibrium after a change is made to the corporate tax system, so the short-run incidence of such a change can differ from the eventual long-run incidence. In the very short run, corporate shareholders probably experience most of the benefit of a reduction in the corporate income tax. In the medium run, such a change affects a broader set of recipients of capital income as the reduction affects the return on all forms of capital. Finally, as shifts in investment affect the size of the capital stock, some of the benefit of the reduction will shift to a wider set of households as the change in the capital stock affects workers' productivity, and changes in labor productivity translate to changes in workers' wages.

It is uncertain how long it will take the economy to adjust to the new general equilibrium. To the extent the economy has not reached that equilibrium, the use of CBO's standard long-run allocation may not distribute enough of the benefit of the net reduction in corporate taxes to capital income and thus may allocate too much of the corporate income tax reduction to labor income.

14. See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), Appendix A, www.cbo.gov/publication/53651. The tax liability associated with profits earned in 2018, which is the measure of corporate taxes allocated in this report, is different from the concept of fiscal year corporate receipts used in the government's budget. Taxes on corporate profits earned in 2018 would have been partly paid in fiscal year 2018, typically with the remainder paid in fiscal year 2019.

15. CBO allocates corporate income taxes to owners of capital in proportion to their income from interest, dividends, rents, and adjusted capital gains. That measure excludes some forms of capital income that are more

16. See Joint Committee on Taxation, "Estimated Budget Effects of the Conference Agreement for H.R. 1, The Tax Cuts and Jobs Act" (December 2017), www.jct.gov/publications/2017/jcx-67-17/.

In this analysis, CBO used its standard allocation rule for the corporate tax and allocated 75 percent of the corporate tax in 2018 to owners of capital and 25 percent to workers.¹⁷ To test the effect of changing the allocation rule, CBO estimated

how average tax rates would change if the entire effect of the 2017 tax act on corporate taxes was allocated to owners of capital, which is similar to the statutory incidence of those provisions. In that scenario, the first through fourth quintiles

experienced a smaller reduction in average tax rates, whereas the highest quintile experienced a larger reduction; but the difference in the average tax rate for each quintile was less than 0.2 percentage points.

17. For a discussion of CBO's allocation of corporate taxes, see Congressional Budget Office, *Projected Changes in the Distribution of Household Income, 2016 to 2021* (December 2019), pp. 18–19, www.cbo.gov/publication/55941, and *The Distribution of Household Income and Federal Taxes, 2008 and 2009* (July 2012), pp. 13–16, www.cbo.gov/publication/43373. For a discussion of the agency's views on the differences between long- and short-term incidence, see Congressional Budget Office, *The Incidence of the Corporate Income Tax* (March 1996), pp. 4–6, <https://go.usa.gov/xFK2T> (PDF, 133 KB).

Appendix C: Definitions

Household income, unless otherwise indicated, refers to income before accounting for the effects of means-tested transfers and federal taxes. Throughout this report, that income concept is called **income before transfers and taxes**. It consists of market income plus social insurance benefits.

Market income consists of the following:

- **Labor income.** Wages and salaries, including those allocated by employees to 401(k) and other employment-based retirement plans; employer-paid health insurance premiums (as measured by the Census Bureau's Current Population Survey); the employer's share of Social Security, Medicare, and federal unemployment insurance payroll taxes; and the share of corporate income taxes borne by workers.
- **Business income.** Net income from businesses and farms operated solely by their owners, partnership income, and income from S corporations.
- **Capital income (including capital gains).** Net profits realized from the sale of assets (but not increases in the value of assets that have not been realized through sales); taxable and tax-exempt interest; dividends paid

by corporations (but not dividends from S corporations, which are considered part of business income); positive rental income; and the share of corporate income taxes borne by capital owners.

- **Other income sources.** Income received in retirement for past services and other nongovernmental sources of income.

Social insurance benefits consist of benefits from Social Security (Old Age, Survivors, and Disability Insurance), Medicare (measured by the average cost to the government of providing those benefits), unemployment insurance, and workers' compensation.

Means-tested transfers are cash payments and in-kind services provided through federal, state, and local government assistance programs. Eligibility to receive such transfers is determined primarily on the basis of income, which must be below certain thresholds. Means-tested transfers are provided through the following programs: Medicaid and the Children's Health Insurance Program (measured by the average cost to the government of providing those benefits); the Supplemental Nutrition Assistance Program (formerly known as the Food Stamp program); housing assistance programs; Supplemental

Security Income; Temporary Assistance for Needy Families and its predecessor, Aid to Families With Dependent Children; child nutrition programs; the Low Income Home Energy Assistance Program; and state and local government general assistance programs.

Average means-tested transfer rates are calculated as means-tested transfers divided by income before transfers and taxes.

Federal taxes consist of individual income taxes, payroll (or social insurance) taxes, corporate income taxes, and excise taxes. In this analysis, taxes for a given year are the amount a household owes on the basis of income received that year, regardless of when the taxes are paid. Taxes from those four sources accounted for 93 percent of federal revenues in fiscal year 2018. Revenue sources not examined in this report include states' deposits for unemployment insurance, estate and gift taxes, net income of the Federal Reserve remitted to the Treasury, customs duties, and miscellaneous fees and fines. Federal taxes comprise the following:

- **Individual income taxes.** Individual income taxes are paid by U.S. citizens and residents on their income from all sources, except those sources exempted under the law. Individual income taxes can be negative because they

include the effects of refundable tax credits, which can result in net payments from the government. Specifically, if the amount of the refundable tax credit exceeds a filer's tax liability before that credit is applied, the government pays that excess to the filer.

- **Payroll taxes.** Payroll taxes are levied primarily on wages and salaries and generally have a single rate and few exclusions, deductions, or credits. Payroll taxes include those that fund the Social Security trust funds, the Medicare trust fund, and unemployment insurance trust funds. The federal portion of the unemployment insurance payroll tax covers only administrative costs for the program; state-collected unemployment insurance payroll taxes are not included in CBO's measure of federal taxes (even though they are recorded as revenues in the federal budget). Households can be entitled to future social insurance benefits, including Social Security,

Medicare, and unemployment insurance, as a result of paying payroll taxes. In this analysis, average payroll tax rates capture the taxes paid in a given year and do not capture the benefits households may receive in the future.

- **Corporate income taxes.** Corporate income taxes are levied on the profits of U.S.-based corporations organized as C corporations. In its analysis, CBO allocated 75 percent of corporate income tax in proportion to each household's share of total capital income (including capital gains) and 25 percent to households in proportion to their share of labor income.
- **Excise taxes.** Sales of a wide variety of goods and services are subject to federal excise taxes. Most revenues from excise taxes are attributable to the sale of motor fuels (gasoline and diesel fuel), tobacco products, alcoholic beverages, and aviation-related goods and services (such as aviation fuel and airline tickets).

Average federal tax rates are calculated as federal taxes divided by income before transfers and taxes.

Income after transfers and taxes is income before transfers and taxes plus means-tested transfers minus federal taxes.

Income groups are created by ranking households by their size-adjusted income before transfers and taxes. A household consists of people sharing a housing unit, regardless of their relationships. The income **quintiles** (fifths) contain approximately the same number of people but slightly different numbers of households. Similarly, each full **percentile** (hundredth) contains approximately the same number of people but a different number of households. If a household has **negative income** (that is, if its business or investment losses are larger than its other income), it is excluded from the lowest income group but included in totals.

About This Document

This report by the Congressional Budget Office was prepared at the request of the Chairman of the Senate Finance Committee. In keeping with CBO's mandate to provide objective, impartial analysis, the report makes no recommendations.

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CBO continually seeks feedback to make its work as useful as possible. Please send any comments to communications@cbo.gov.



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