

# CONGRESSIONAL BUDGET OFFICE

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## Average Federal Tax Rates in 2007

June 2010

The accompanying tables update annual estimates by the Congressional Budget Office (CBO) of average tax rates—that is, households' tax liability divided by their income—and compare those estimates for 2007 with estimates from 2006. This report's tables show average tax rates for various income categories for the four largest sources of federal revenue—individual income taxes, social insurance (payroll) taxes, corporate income taxes, and excise taxes—and for the four taxes combined. The tables also present average before-tax and after-tax household income; the number of households in each income category; and shares of taxes, income, and households for each fifth (quintile) of the income distribution and for the top 10 percent, 5 percent, and 1 percent of households. A page on CBO's Web site, "[Federal Taxes by Income Group](#)," includes publications on this topic, CBO's estimates of average federal tax rates for the years 1979 to 2007, and other information on household income and taxes.

### Estimates for 2007

In 2007, the overall average federal tax rate was 20.4 percent (see Table 1). Individual income taxes, the largest component, were 9.3 percent of household income. Social insurance taxes (also called payroll taxes) were the next-largest source, with an average rate of 7.4 percent. Corporate income taxes and excise taxes were smaller, with average tax rates of 3.0 percent and 0.6 percent, respectively.

The federal tax system is progressive—that is, average tax rates generally rise with income. Households in the bottom fifth of the income distribution paid 4.0 percent of their income in federal taxes, the middle quintile paid 14.3 percent, and the highest quintile paid 25.1 percent. Average rates continued to rise within the top quintile: The top 1 percent faced an average rate of 29.5 percent.

Higher-income groups earn a disproportionate share of pretax income and pay a disproportionate share of federal taxes. In 2007, the highest quintile earned 55.9 percent of pretax income and paid 68.9 percent of federal taxes; the top 1 percent of households earned 19.4 percent of income and paid 28.1 percent of taxes. The share of taxes paid by high-income groups exceeded their share of income because average tax rates rise with income. In all other quintiles, the share of federal taxes was less than the income share. The bottom quintile earned 4.0 percent of income and paid 0.8 percent of taxes, and the middle quintile earned 13.1 percent of income and paid 9.2 percent of taxes.

Much of the progressivity of the federal tax system derives from the individual income tax. In 2007, the bottom quintile's average rate for the individual income tax was -6.8 percent, which means that refundable earned income and child tax credits exceeded the income tax owed by that group. On average, households in the second quintile also received more in credits than they paid in individual income taxes. The average income tax rate was 3.3 percent for the middle quintile and 6.2 percent for the fourth quintile. For the highest quintile, the rate was 14.4 percent. The top 1 percent, on average, paid 19.0 percent of their income in individual income taxes.

Average rates for payroll taxes rise gradually across most of the income distribution, then fall at the top. The average payroll tax rate for the lowest quintile was 8.8 percent. That rate was 9.5 percent for the second quintile, 9.4 percent for the middle quintile, and 9.5 percent for the fourth quintile. The increase occurs because nontaxable transfer payments (for example, spending for Medicare, Medicaid, and most Social Security benefits) make up a larger share of income at the bottom of the distribution. The payroll tax rate was 5.7 percent for the highest quintile. That rate is lower than others in part because much of the wages in that quintile are above the maximum income subject to Social Security taxes (\$97,500 in 2007) and in part because capital income, such as interest, dividends, and capital gains, is a larger share of income at the top. Social insurance taxes account for the largest share of taxes paid by households in all but the top quintile.

The impact of the corporate income tax also rises with income, because CBO assumes in this analysis that the tax is borne by those who receive capital income, and capital income is a larger share of income at the top of the distribution. The incidence of the corporate income tax is uncertain, and various models suggest that at least some of the tax is borne by workers in the form of reduced earnings, in which case the tax would not be as progressive as shown in CBO's analysis. The effect of excise taxes, relative to income, is greatest for lower-income households, which tend to spend a greater proportion of their income on such goods as gasoline, alcohol, and tobacco, which are subject to excise taxes.

Average tax rates in 2007 changed only slightly from those in 2006 (see Table 2). There were no significant changes in the income tax law between those years, and differences in the income distribution were not enough to cause large changes in average rates. The overall average rate fell by 0.3 percentage points from 2006 to 2007. The largest contributor was a decline of 0.5 percentage points in the average corporate tax rate, which was caused by falling corporate profits and associated reductions in taxes. Payroll taxes also fell by 0.1 percentage point, mainly because of rapid growth in wages above the Social Security taxable maximum. Excise taxes fell by 0.1 percentage point, largely because of changes in the telephone excise tax.<sup>1</sup> Those declines were partially offset by

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<sup>1</sup> Because of court rulings, the Treasury stopped collecting the excise tax for most telephone service in August 2006. In 2007, the Treasury began to issue refunds for earlier years' collections. CBO treated those refunds as negative excise taxes in the year they were issued.

an increase of 0.2 percentage points in the average individual income tax rate, which occurred in part because real income growth pushed more and more income into higher tax brackets.

The changes in average tax rates from 2006 to 2007 were uneven across income quintiles. The rate for the lowest quintile declined by 0.5 percentage points, largely because of declining excise taxes. The second quintile's average tax rate increased by 0.4 percentage points, as rates for both the individual income tax and the payroll tax crept up. The average rate for the middle and fourth quintiles changed only slightly, reflecting an increase in the average rate for individual income taxes and small decreases in the average rate paid for other taxes. The largest decline in average tax rates—0.7 percentage points—applied to taxpayers in the highest quintile. That change was attributable mostly to the reduction in payments of corporate income taxes. The pattern continued up the income scale; the average rate for the top 1 percent declined by 1.8 percentage points, mostly because of lower corporate income taxes.

## **Methodology**

CBO uses a multistep methodology to estimate the distribution of income and taxes on the basis of data contained in the Census Bureau's Current Population Survey (CPS) and in the Statistics of Income (SOI) recorded by the Internal Revenue Service. CBO estimates federal taxes for each household in the sample on the basis of income, demographic characteristics, and existing laws in the relevant year. Households are then grouped into quintiles on the basis of income, and then income, taxes, and average tax rates (the amount of tax liability divided by income) are tabulated for each quintile.

## **Sources of Data**

CBO's analysis of average tax rates draws information on income from two primary sources. The SOI samples more than 300,000 individual income tax returns and reports much of the information that taxpayers provide on those returns. The March supplement to the CPS contains data on demographic characteristics and income for almost 100,000 households.

CBO statistically matches each SOI record to a corresponding CPS record on the basis of demographic characteristics and income. The matching process begins by dividing all records in the CPS and the SOI into demographic subgroups by household composition, considering the marital status of the head of the household, the number of children, and the number of elderly members. Because income measures in the SOI and CPS are not directly comparable, CBO uses a regression equation for each demographic subgroup (estimated using data from the SOI) to calculate a predicted income for each record for each source of data. All CPS and SOI records are ranked by predicted income within demographic subgroups, and the two files are then matched, starting at the top of the income distribution: The SOI record with the highest predicted income is matched with the CPS record with the highest predicted income—after their sample weights are taken

into account.<sup>2</sup> The SOI record with the next highest predicted income is then matched with the corresponding CPS record, and the process is repeated until all SOI records in the demographic subgroup have been paired with CPS records.

Each pairing results in a new record that takes on the demographic characteristics of the CPS record and the income reported in the SOI. Some types of income, such as most transfer payments and in-kind benefits (such as employer-provided health insurance, Medicare and Medicaid benefits, and food stamps), appear only in the CPS; values for those items are drawn directly from that survey. Because not all households must file tax returns, some do not appear in the SOI; thus, the CPS reflects more households. After all SOI records have been matched to CPS records, the remaining survey records are recorded as nonfilers, and the income values are taken directly from the CPS. CBO then estimates the tax liability for each matched record.

### Who Pays Taxes?

CBO's analysis of average tax rates assumes that households bear the burden of the taxes that they pay directly, such as individual income taxes (including taxes on interest, dividends, and capital gains) and the employee's share of payroll taxes. The analysis assumes—as do the analyses of most economists—that the employer's share of payroll taxes is passed on to employees in the form of lower wages than would otherwise be paid. Therefore, the amount of those taxes is included in employees' income, and the taxes are counted as part of employees' tax burden. CBO estimates payroll taxes and individual income taxes, including refundable tax credits, by applying the tax law for the relevant year to each of the sample tax returns from the SOI.

Excise taxes are assumed to fall on households according to their consumption of taxed goods (such as gasoline, tobacco, and alcohol). Excise taxes that affect intermediate goods, which are paid by businesses, are attributed to households in proportion to their overall consumption. CBO assumes that each household spends the same on taxed goods as is spent by similar households that are shown in the Consumer Expenditure Survey to have comparable income.

Far less consensus exists about how to attribute corporate income taxes (and taxes on capital income generally). In this analysis, CBO assumes that corporate income taxes are borne by owners of capital in proportion to their income from interest, dividends, capital gains, and rents. Over the long term, however, some models suggest that at least part of the burden falls on labor income.<sup>3</sup>

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<sup>2</sup> Because different subgroups are sampled at different rates in both the SOI and the CPS, each record is assigned a sample weight indicating its relative size within the population represented by the database. The matching process takes account of those weights by effectively considering each record to be replicated by the number of times indicated by its weight.

<sup>3</sup> See, for example, Jennifer C. Gravelle, *Corporate Tax Incidence: Review of General Equilibrium Estimates and Analysis*, CBO Working Paper 2010-03 (May 2010), and William C. Randolph, *International Burdens of the Corporate Income Tax*, CBO Working Paper 2006-09 (August 2006).

## Measuring Income

This analysis focuses on households' adjusted pretax comprehensive income, which includes all cash income (taxable and tax-exempt), taxes paid by businesses (which are imputed to individuals, as noted above), employees' contributions to 401(k) retirement plans, and the value of in-kind income received from various sources (such as employer-paid health insurance premiums, Medicare and Medicaid benefits, and food stamps). The calculations use the Census Bureau's fungible value measure to determine the cash equivalent of Medicare and Medicaid benefits.<sup>4</sup>

## Income Quintiles

In a series of steps, CBO combines the income and taxes of households to create tables showing distributions of income and taxes among income groups and types of households. The first calculation adjusts for household size by dividing household income by the square root of household size to take account of the differing needs of larger and smaller households.<sup>5</sup> Then, households are ranked by their (adjusted) income and grouped into quintiles that contain equal numbers of people (because household sizes vary, however, separate quintiles generally contain different numbers of households). Overall income and taxes are tabulated for each quintile and for smaller groupings at the top of the distribution.

## Types of Households

Separate tables, [available on CBO's Web site](#), show average tax rates and income for three types of households: those with members under age 18 (households with children), those headed by a person age 65 or older and with no member under age 18 (elderly childless households), and all others (nonelderly childless households). The tables group households into quintiles by position in the income distribution within the entire population, not within each of the three types of households, so each type of household need not be evenly spread across the income quintiles.

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<sup>4</sup> A full description of the methods used to value noncash benefits is provided in Bureau of the Census, *Measuring the Effect of Benefits and Taxes on Income and Poverty: 1992*, Current Population Reports, Series P60-186RD (September 1993), pp. viii to ix and Appendix B, pp. B-1 to B-5, [www2.census.gov/prod2/popscan/p60-186rd.pdf](http://www2.census.gov/prod2/popscan/p60-186rd.pdf).

<sup>5</sup> Larger households need more income than smaller households to achieve the same standard of living. At the same time, however, economies of scale in at least some areas of consumption—housing, in particular—mean that two people do not need twice the income to live as well as one person living alone. CBO tries to account for this by dividing household income by the square root of household size. That adjustment implies that each additional person increases a household's needs, but at a decreasing rate. CBO uses adjusted income only to rank households in the income distribution; the values for average income are unadjusted for household size.

**Table 1.**  
**Distribution of Federal Taxes and Household Income, 2007**

	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile	All Households	Top 10 Percent	Top 5 Percent	Top 1 Percent
<b>Average Tax Rate (Percent)</b>									
All Federal Taxes	4.0	10.6	14.3	17.4	25.1	20.4	26.7	27.9	29.5
Individual Income Taxes	-6.8	-0.4	3.3	6.2	14.4	9.3	16.2	17.6	19.0
Social Insurance Taxes	8.8	9.5	9.4	9.5	5.7	7.4	4.5	3.3	1.6
Corporate Income Taxes	0.4	0.5	0.8	1.1	4.6	3.0	5.7	6.8	8.8
Excise Taxes	1.6	1.0	0.8	0.7	0.4	0.6	0.3	0.2	0.1
<b>Share of Tax Liabilities (Percent)</b>									
All Federal Taxes	0.8	4.4	9.2	16.5	68.9	100	55.0	44.3	28.1
Individual Income Taxes	-3.0	-0.3	4.6	12.7	86.0	100	72.7	61.0	39.5
Social Insurance Taxes	4.8	10.8	16.6	24.7	42.9	100	25.4	14.4	4.1
Corporate Income Taxes	0.6	1.4	3.3	6.8	86.8	100	80.0	73.0	57.0
Excise Taxes	11.0	14.1	18.1	22.2	34.3	100	20.7	12.7	4.7
<b>Income (Dollars)</b>									
Average Pretax Income	18,400	42,500	64,500	94,100	264,700	96,000	394,500	611,200	1,873,000
Average After-Tax Income	17,700	38,000	55,300	77,700	198,300	76,400	289,300	440,500	1,319,700
Share of Pretax Income	4.0	8.4	13.1	19.3	55.9	100	42.0	32.3	19.4
Share of After-Tax Income	4.9	9.4	14.1	20.0	52.5	100	38.7	29.3	17.1
Minimum Adjusted Income <sup>a</sup>	0	20,500	34,300	50,000	74,700	n.a.	102,900	141,900	352,900
<b>Memorandum:</b>									
Number of Households									
(Millions)	24.6	22.2	22.9	23.0	23.7	116.9	11.9	5.9	1.2

Source: Congressional Budget Office.

Notes: n.a. = not applicable.

Average tax rates are calculated by dividing taxes by comprehensive household income. A negative income tax rate results when refundable tax credits, such as the earned income and child tax credits, are greater than the income tax owed by people in that group.

Comprehensive household income equals pretax cash income plus income from other sources. Pretax cash income is the sum of wages, salaries, self-employment income, rents, taxable and nontaxable interest, dividends, realized capital gains, cash transfer payments, and retirement benefits plus taxes paid by businesses (corporate income taxes and the employer's share of Social Security, Medicare, and federal unemployment insurance payroll taxes) and employees' contributions to 401(k) retirement plans. Other sources of income include all in-kind benefits (Medicare and Medicaid benefits, employer-paid health insurance premiums, food stamps, school lunches and breakfasts, housing assistance, and energy assistance).

Income categories are defined by ranking all people by their comprehensive household income adjusted for household size—that is, divided by the square root of the household's size. (A household consists of the people who share a housing unit, regardless of their relationships.) Quintiles, or fifths, contain equal numbers of people. Households with negative income are excluded from the lowest income category but are included in totals.

Individual income taxes are allocated directly to households paying those taxes. Social insurance, or payroll, taxes are allocated to households paying those taxes directly or paying them indirectly through their employers. Corporate income taxes are allocated to households according to their share of capital income. Federal excise taxes are allocated to them according to their consumption of the taxed good or service.

- a. The minimum adjusted income is the lower income boundary for each quintile. Because incomes are adjusted by dividing income by the square root of household size, an adjusted income range implies different unadjusted income for different size households. To compute the unadjusted income range for a particular size household, the adjusted income must be multiplied by the square root of the household size: 1.414 for a two-person household, 1.732 for a three-person household; 2.0 for a four-person household, or 2.236 for a five-person household. For example, in 2007, the highest quintile had adjusted income above \$74,700. A two-person household would need income above \$105,600 to fall into that quintile, and a four-person household would need income in excess of \$149,400.

**Table 2.**  
**Distribution of Federal Taxes and Household Income, 2006**

	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile	All Households	Top 10 Percent	Top 5 Percent	Top 1 Percent
Average Tax Rate (Percent)									
All Federal Taxes	4.5	10.2	14.2	17.5	25.8	20.7	27.6	29.1	31.3
Individual Income Taxes	-6.6	-0.8	3.0	6.0	14.1	9.1	15.9	17.4	18.9
Social Insurance Taxes	8.5	9.3	9.4	9.6	5.8	7.5	4.6	3.4	1.6
Corporate Income Taxes	0.5	0.6	0.8	1.2	5.4	3.5	6.7	8.0	10.6
Excise Taxes	2.1	1.2	0.9	0.8	0.4	0.7	0.3	0.3	0.2
Share of Tax Liabilities (Percent)									
All Federal Taxes	0.8	4.1	9.0	16.5	69.3	100	55.4	44.7	28.4
Individual Income Taxes	-2.8	-0.8	4.4	12.9	86.3	100	72.8	60.9	39.1
Social Insurance Taxes	4.4	10.3	16.6	25.0	43.5	100	25.7	14.5	4.0
Corporate Income Taxes	0.6	1.4	3.2	6.6	87.4	100	80.6	73.6	57.3
Excise Taxes	11.8	14.6	18.0	21.6	33.6	100	20.6	12.9	5.0
Income (2007 Dollars)									
Average Pretax Income	17,700	40,500	62,300	92,000	256,000	93,300	377,700	582,400	1,790,800
Average After-Tax Income	16,900	36,300	53,500	75,900	189,900	74,000	273,500	412,900	1,230,900
Share of Pretax Income	3.9	8.3	13.2	19.5	55.7	100	41.7	31.9	18.8
Share of After-Tax Income	4.7	9.4	14.3	20.3	52.2	100	38.1	28.5	16.3
Minimum Adjusted Income <sup>a</sup>	0	19,400	33,000	48,800	73,100	n.a.	100,900	138,900	341,800
<b>Memorandum:</b>									
Number of Households (Millions)	23.8	22.3	23.0	23.0	23.6	116.1	12.0	5.9	1.1

Source: Congressional Budget Office.

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