U.S. Tax Progressivity and Redistribution

David Splinter

U.S. federal taxes have become more progressive since 1979, largely due to more generous tax credits for lower income individuals. Though top statutory rates fell substantially, this affected few taxpayers and was offset by decreased use of tax shelters, such that high-income average tax rates have been relatively stable. Redistribution, which accounts for both taxes and transfers, has also increased according to Congressional Budget Office data. Measures of progressivity and redistribution, however, capture different aspects of policy. Over the longer run, earlier decreases suggest a U-shaped tax progressivity curve since World War II, with the minimum occurring in 1986.

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The prevailing narrative says that increasing market income inequality was exacerbated by decreasing tax progressivity (Piketty and Saez, 2007; Saez and Zucman, 2019). But over the last four decades, estimates using Congressional Budget Office (2019) data show a pronounced increase in federal tax progressivity. Estimates of redistribution, which account for both taxes and transfers, show a similar increase. These estimates suggest that market income inequality increases were moderated—not exacerbated—by both taxes and transfers.

Tax progressivity was defined nearly three-quarters of a century ago by Musgrave and Thin: "A rate structure is progressive where the average rate of tax (i.e., tax liability as a percentage of income) rises when moving up the income scale" (1948, p. 498). In recent years, federal taxes meet this requirement: average federal tax rates of the bottom quintile are often slightly negative and for high incomes they rise to more than 30 percent. This pattern of progressive taxes for a given year is seen in numerous estimates, as discussed in the following section, but none highlight recent progressivity trends for all federal taxes. Starting with CBO data that currently extend between 1979 and 2016, I find that the Kakwani index of tax progressivity increased by 46 percent. Since 1986, tax progressivity more than doubled. Redistribution shows similar increases.

The prevailing narrative fails to fit with these findings for three reasons: (1) few tax progressivity studies account for recent increases in tax credits, (2) technical choices made in some studies, and (3) a focus on the long-run decline in top individual income tax rates. This paper addresses these by providing more recent estimates that capture the effect of more generous tax credits, using data based on mainstream tax incidence assumptions, and explaining why top tax rate changes have had little impact on overall tax progressivity.

First, many prior studies of tax progressivity changes only went through the early 1990s or 2000s (Kasten, Sammartino, and Toder, 1994; Alm, Lee, and Wallace, 2005; Strudler, Petska, and Petska, 2005; Piketty and Saez, 2007). But much of the increase in tax progressivity, in part from the growth in tax credits, happened over the last two decades and therefore is not widely appreciated. Some studies considered more recent years, although they used an income definition that is inconsistent over time (income reported on individual tax returns) and only accounted for changes in individual income taxes. Still, the findings are clear: federal income tax progressivity and effective progression increased by around one-third between 1960 and 2008 (Mathews, 2014; Feenberg, Ferriere, and Navarro, 2017) and among working-age adults progressivity increased by nearly two-thirds between 1985 and 2015 (Splinter, 2019a).

A second basis of the prevailing narrative is due to specific technical choices. Piketty and Saez (2007) estimates went through 2004, however, they did not provide measures summarizing progressivity over the entire income distribution and excluded the bottom quintile from their analysis. This masked progressivity increases from tax credit expansions. Moreover, unlike prior studies—including Reynolds and Smolensky (1977), Pechman (1985), Feldstein (1988), and others—they did not account for corporate tax sheltering. This resulted in exaggerated top average tax rates in the 1960s and 1970s. While Saez and Zucman (2019) addressed this sheltering by including corporate retained earnings in their income definition, they made other technical choices that have been called into question. Kopczuk (forthcoming) described their estimates as "based on highly unusual incidence assumptions." For example, they allocated all corporate taxes to shareholders, instead of standard allocations that include workers and other capital owners. This made taxes appear more progressive in earlier decades. Splinter (2019b) discussed issues with their

income imputations and definition, which shifted income from the bottom to the top of the distribution, and others noted their exclusion of the refundable portion of tax credits. These made taxes appear less progressive in recent years. Instead, this paper presents tax progressivity estimates that capture the entire income distribution and uses CBO data that follow mainstream tax incidence assumptions.[1]

A third basis of the prevailing narrative is the decrease in top individual income tax rates, which seems to conflict with the observed increase in tax progressivity. In earlier decades, however, top rates had little effect on tax progressivity because few paid the top rate and average tax rates were much lower than statutory rates, in part due to tax sheltering. For example, in 1962 the top rate applied to fewer than 500 tax returns and, despite a top statutory rate of 91 percent, the top-one-percent average federal income tax rate was only 16 percent. This top average rate remained relatively unchanged over time because of policy-induced decreases in the use of tax shelters, which significantly broadened the high-income tax base. By 1990, the top statutory tax rate decreased to 28 percent, but the top-one-percent average income tax rate *increased* to 20 percent.[2] Despite an interest in top statutory rates (Piketty, Saez, and Stancheva, 2014; Scheve and Stasavage, 2016), a narrow focus on top rates can cause erroneous conclusions about long-run trends in overall tax progressivity.

Tax progressivity measures, however, should be distinguished from redistribution measures. Whereas progressivity is independent of the tax level, redistribution changes with the tax level. Gale and Obstfeld (2019) explain that "a tax system where Bill Gates pays $1 and everyone else pays zero is extremely progressive (the rich pay 100 percent of the tax!) but would provide little redistribution." Because these measures capture different aspects of public policy, increasing tax progressivity does not necessarily coincide with increased redistribution (Hemel and Rozema, 2017). For example, the individual income tax provisions of the 2017 Tax Reform and Jobs Act (TCJA) appear to have simultaneously *increased* progressivity and *decreased* redistribution (Kallen and Mathur, 2019; Splinter, 2019a). Despite the TCJA making individual income taxes more progressively distributed, in part from doubling child tax credits,[3] a smaller amount of more progressive taxes can still cause a regressive change in after-tax incomes. I raise this point because popular measures, such as after-tax income changes, are sometimes treated as progressivity measures. However, after-tax income changes fluctuate with tax levels and should be considered measures of redistribution (for more details, see the online appendix). This paper contributes to the empirical literature on tax-and-transfer redistribution, which includes Reynolds and Smolensky (1977), Lambert (1985), OECD (2011), and Burkhauser, Larrimore, and Simon (2012).

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[1] To illustrate how some of these issues affect estimated tax rates, this paper's online appendix shows a step-by-step reconciliation between the Saez and Zucman (2019) and CBO estimates. Limitations of the CBO income and population definitions are discussed in footnote 6 and Auten and Splinter (2019b).

[2] Auten and Splinter (2019a) discussed effects of tax shelters and estimated top-one-percent average federal income tax rates of 16 percent in 1962, 20 percent in 1990, and 25 percent in 2015. Similar rates were estimated by Pechman (1985): 14 to 16 percent in 1966; and CBO: 20 percent in 1990 and 24 percent in 2015.

[3] The progressive effect of the TCJA's individual income tax provisions are expected to decline over time due to indexing changes and were offset by a corporate income tax rate decrease.

I. TAX PROGRESSIVITY

This section presents estimates of average tax rates and tax progressivity. First, estimates by researchers, government agencies, and think tanks show that federal taxes are highly progressive in recent years. Second, I discuss changes in CBO's average tax rates. Average tax rates are an income group's total tax incidence divided by their total income. These tax rates have fallen across the income distribution, but disproportionately at the bottom, causing taxes to become more progressive since 1979. Third, I present estimates of two measures of distribution-wide tax progressivity: the Kakwani index (based on Lorenz curves) and the tax elasticity (based on a regression of taxes and pre-tax income). Both show large increases in tax progressivity. Finally, I discuss the disconnect between trends in top statutory rates and average rates.

A. Are Federal Taxes Progressive?

Figure 1 presents six recent estimates of average federal tax rates (hereafter, tax rates) over the income distribution. These federal tax estimates include individual income, payroll, and corporate taxes and some include excise and estate taxes. Tax rates increase with income, consistent with a tax system being progressive.[4] The estimates use different income definitions, but all show a similar upward trend: federal tax rates increase from a negative or negligible rate for the bottom quintile, to around 14 percent for the middle quintile, and 33 percent for the top one percent. Tax rates are slightly higher for the top tenth of one percent.

The estimates in Figure 1 differ across various studies. Some of the differences in tax rates arise from how much non-taxable income is included in the denominator—the broader the income measure, the lower the tax rate. Piketty and Saez (PS, 2007) estimates are for an earlier year and use a narrow income definition, which contributes to these being the highest average tax rates. CBO, the Joint Committee on Taxation (JCT), Treasury's Office of Tax Analysis (OTA), and the Tax Policy Center (TPC) use intermediate income definitions, resulting in middle-ranged tax rates. Auten and Splinter (AS, 2019a) use national income, the broadest income definition, generally resulting in lower tax rates. Other differences arise from the allocation of corporate taxes, the unit of observation used to set income groups, the sharing unit (tax unit or household), and how incomes are adjusted to account for the size of the tax unit or household.[5]

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[4] Tax *progression* refers to the statutory rate schedule while tax *progressivity* to how this schedule—along with exclusions, deductions, and credits—relates to the pre-tax income distribution (Lambert, 1993). This paper follows a conventional ability-to-pay perspective (equal average tax rates represent a proportional system), as compared to a per-person perspective (equal head taxes are proportional), a benefit perspective (taxes are compared to government benefits received), or a consumption perspective (taxes are compared to consumption).

[5] Corporate taxes are included and allocated as follows. To labor income, CBO, JCT, and AS allocate 25 percent, OTA and TPC about 20 percent (Rosenberg, 2013), and PS none. For the non-labor component, CBO allocates to capital income reported on tax returns, JCT to business owners, AS to all corporate owners, OTA and TPC three-quarters to shareholders and one-quarter to all capital, and PS by all capital. PS and JCT set quintiles to each include the same number of tax units and rank by tax unit income. OTA sets quintiles to each include the same number of tax units and ranks observations by size-adjusted income. CBO, AS, and TPC (supplementary estimates) set quintiles to each include the same number of individuals and rank observations by size-adjusted income. Cronin, DeFilippes, and Lin (2012) discuss this equivalence scale. OTA estimates include the institutional population and OTA and TPC estimates use tax units rather than households for the sharing unit, likely explaining some of the gaps with CBO estimates.

B. Trends in Tax Rates Since 1979

All subsequent results use CBO data or estimates based on CBO data. These data are largely based on confidential samples of individual income tax return filers, who are statistically matched to records in the Census Bureau's Current Population Survey (CPS). To account for the entire resident population, unmatched CPS records are retained because they represent non-filers. Federal taxes consist of individual and corporate income taxes, payroll taxes, and excise taxes. Market income consists of labor income, including employer contributions to payroll taxes and health plans, taxable business and capital income, including capital gains realizations and imputed corporate taxes, and other sources.[6] CBO presents data for eight income groups: the bottom four quintiles, P80–90, P90–95, P95–99, and the top one percent. Following CBO's approach, described in Perese (2017), each income group's average tax rate divides all their federal taxes by all their market income plus social insurance benefits (results are similar when also including means-tested transfers).

Figure 2 presents average federal tax rates for the top, middle, and bottom quintiles. Between 1979 and 2016, tax rates decreased across the income distribution: for the top quintile by 0.6 percentage points (27.1 to 26.5 percent), for the middle quintile by 5.2 percentage points (19.1 to 13.9 percent), and for the bottom quintile by 7.6 percentage points (9.3 to 1.7 percent). The larger decline for those with lower incomes implies an increase in tax progressivity. Although a crude measure of progressivity, the gap between tax rates of the top and bottom quintiles increased by 39 percent over this period and since 1986 increased by 110 percent, suggesting a substantial increase in tax progressivity.

Decreases in individual income taxes drove the overall decline in bottom- and middle-quintile tax rates. The bottom-quintile decrease of 7.6 percentage points resulted from average income tax rates decreasing from zero to –11 percent and corporate tax rates decreasing about half a percentage point, with offsetting payroll and excise tax rate increases (Figure A1). The middle-quintile decrease of 5.2 percentage points resulted from average income tax rates decreasing four percentage points and corporate tax rates decreasing about one percentage point. The temporary middle-quintile decrease between 2008 and 2012 resulted from policies in response to the Great Recession: recovery rebates in 2008, making work pay credits in 2009 and 2010, and a payroll tax holiday in 2011 and 2012.

The long-run trend towards more negative income tax rates among the bottom-quintile was caused by expanded refundable tax credits, especially the earned income tax credit. The earned income tax credit was increased and indexed to inflation by the Tax Reform of 1986 and further increased by legislation in 1990 and 1993 (each change corresponding with declines in bottom-quintile tax rates). Middle-quintile tax rates also decreased due to tax credits, especially the child

[6] A quarter of corporate income taxes are imputed to individuals by their labor income and three-quarters by their interest, dividends, rents, and capital gains adjusted for year-to-year variation (but ignoring capital income in retirement accounts). CBO market income excludes some sources in national income—such as employee contributions to health plans and imputed rent (Auten and Splinter, 2019b)—and much of the nursing home population, which understates the growth in social insurance benefits (Social Security, Medicare, unemployment insurance, and workers' compensation). CBO estimates, and nearly all others, ignore endogenous effects of taxes and transfers, such as excess burdens resulting from how policy affects labor supply, prices, the number of separate households, and other behavior.

tax credit. The child tax credit began in 1998, doubled with 2001 legislation, and became increasingly refundable with 2009 legislation (each change corresponding to declines in middle-quintile tax rates).[7]

The top-quintile tax rate decrease of 0.6 percentage point mostly resulted from average corporate tax rates decreasing 1.5 percentage points and offsetting payroll tax increases of 1.1 percentage points. While long-run changes were modest, business cycles and tax policy changes—especially those in 1981, 1986, 2001–03, and 2013—caused top-quintile tax rates to fluctuate over time. These fluctuations were often larger for the top one percent. For example, top-one-percent average tax rates increased five percentage points in 2013, in part due to the introduction of the 3.8 percent net investment income tax as well as the additional Medicare tax and phaseouts of itemized deductions and personal exemptions (Auten, Splinter, and Nelson, 2016). While the increase in the top individual tax rate was another factor, changes in top statutory tax rates have historically had a small impact on overall progressivity, as discussed later.

C. Increasing Tax Progressivity Since 1979

Changes in average tax rates for specific income groups provide an incomplete view of progressivity changes. To account for changes across the entire population, I present estimates of the Kakwani index, the most commonly used measure of population-wide tax progressivity, and the tax elasticity.[8]

The *Kakwani index* is based on Lorenz curves. These curves show the cumulative share of income received by a cumulative share of the income-ranked population. The further a Lorenz curve is below the 45-degree line, the less equal is the distribution. Figure 3 shows Lorenz curves for both pre-tax income and federal taxes. The areas between these curves and the 45-degree line are used to calculate the Gini coefficient (based on the pre-tax income curve) and the tax concentration index (based on the federal tax curve). The difference between the tax concentration and Gini indexes—or, equivalently, twice the area between the two curves—equals the Kakwani index (Slavov and Viard, 2016).

The *tax elasticity* provides a straightforward measure of progressivity. I estimate it as the slope resulting from regressing the natural log of federal taxes on the natural log of pre-tax income. For comparability with other progressivity measures, this slope is then deducted by one so that the tax elasticity is zero for proportional taxes and positive for progressive taxes. A tax elasticity of about one in recent years implies that, on average, as incomes double so do average tax rates—meaning the amount of taxes quadruples. For example, in 2016 average household incomes about double between the second and fourth quintiles ($45,000 to $110,000) and so do tax rates (9 to 18 percent), while federal taxes more than quadruple ($4,000 to $20,000).

Figure 4 shows the evolution of these two measures of tax progressivity when indexed to 1979 levels. Between 1979 and 1986, the Kakwani index decreased 34 percent (from 0.14 to 0.10) and the tax elasticity decreased 39 percent (from 0.47 to 0.28). Between 1986 and 2016, the Kakwani index increased 120 percent (from 0.10 to 0.21) and the tax elasticity increased 245 percent (from 0.28 to 0.98). For the entire period between 1979 and 2016, the Kakwani index

[7] Some changes were phased in over time, as described in Crandall-Hollick (2016).

[8] Kakwani (1977) introduced his eponymous index, and a version of local tax elasticity (liability progression) was introduced by Musgrave and Thin (1948). Snowbarger and Kirk (1973) present tax elasticity estimates.

increased 46 percent (from 0.14 to 0.21) and the tax elasticity increased 110 percent (from 0.47 to 0.98).[9] While relative changes in the Kakwani index and tax elasticity were similar until 2008, the larger tax elasticity increase since 2008 resulted from this measure's sensitivity to the ends of the income distribution. Recent swings in bottom-quintile average federal tax rates were significant: they plummeted from six to zero percent in years just before and after 2008, causing the tax elasticity spike, and then increased to only two percent.

Long-run tax progressivity increases mostly resulted from the individual income tax. A simple decomposition makes this clear. When removing the effect of average individual income tax rate changes by holding them at 1979 levels and allowing other tax rates to move over time, the Kakwani index decreased by 11 percent. Meanwhile, when isolating the effect of the individual income tax by holding average payroll, corporate, and excise tax rates at 1979 levels and allowing individual income tax rates to move over time, the Kakwani index increased by 54 percent (as compared to 46 percent when all tax rates fluctuate).

Policy changes to individual income taxes are reflected in overall progressivity changes. The progressivity decline between 1979 and 1986 resulted from the 1981 tax rate cuts, bracket creep due to high inflation rates, and a narrowing tax base, in part from accelerated depreciation. Many of these regressive effects were reversed by indexing income tax brackets to inflation in 1985 and base-broadening with the Tax Reform Act of 1986, as well as increasing standard deductions and personal exemptions (Pechman, 1990; Wallace, Wasylenko, and Weiner, 1991). Over the longer run, tax progressivity increased since the mid-1980s because of more generous tax credits. For example, bottom-coding individual income tax rates at zero shows that at least two-thirds of the Kakwani index increase since 1986 (and about half since 1979) was due to the refundable portion of tax credits. Using a more detailed decomposition based on counterfactual tax rates, Splinter (2019a) estimated that tax policy changes explained nearly all the 1985 to 2015 Kakwani index increase for individual income taxes, while demographic and income inequality changes had little (or offsetting) effects. Policy changes included expansions in standard deductions and exemptions, but nearly all the progressivity increase was due to more generous tax credits.

While this study presents estimates of tax progressivity changes since 1979, prior studies considered earlier decades. Between 1945 and 1966, Mathews (2014) found that federal individual income tax progressivity declined, with the Kakwani index decreasing by one quarter. But overall federal progressivity declined even more due to a decrease in progressive corporate taxes and an increase in regressive payroll taxes as a share of GDP. Between 1966 and 1980, Pechman (1985) found that federal taxes again became less progressive, in part from the continuing decrease in corporate taxes and increase in payroll taxes. Combining these earlier tax progressivity decreases with the more recent increases suggests a long-run U-shaped federal tax progressivity curve since World War II, with the minimum occurring in 1986.

[9] The Suits index, another popular measure based on Lorenz curves, shows similar trends as the Kakwani index (see online data).

D. Top Tax Rates Do Not Measure Progressivity

Despite clear increases in federal tax progressivity, there remains a notion that it declined. In part, this follows from a decrease in corporate taxes and an increase in payroll taxes—but the most widely discussed statistic is the decline in top federal individual income tax rates. Since the early 1960s, the top income tax rate fell from 91 to 39.6 percent. But Figure 5 shows that top-one-percent *average* income tax rates did not fall with the top rate—instead, they increased, or at least remained flat. This disconnect between top statutory rates and average rates follows from two effects: a small share of taxpayers being subject to the top rate and reduced use of corporate tax shelters.

Both the number of taxpayers and the share of income subject to the top rate was insubstantial in the early 1960s, meaning it had an irrelevant impact on overall progressivity. In the early 1960s, the top rate was paid by only 0.001 percent of tax units, or fewer than 500 tax returns. Except for a few years with two rate brackets, the share paying the top rate remained small: 0.06 percent in 1979 (top rate of 70 percent), 0.31 percent in 1985 (top rate of 50 percent), and 0.60 percent in 2016 (top rate of 39.6 percent).

The low top-one-percent average tax rates in the 1960s and 1970s resulted from extensive sheltering of income from individual-level taxes by retaining profits inside of corporations (Clarke and Kopczuk, 2017; Auten and Splinter, 2019a). Including this sheltered income and corporate taxes in pre-tax income significantly lowers top average tax rates in earlier decades. Meanwhile, more recently this has a smaller effect due to the declining use of this high-income tax shelter and corporate tax levels. Consequently, broader income definitions flatten out top average tax rate trends relative to those based on taxable income. For example, McClelland and Airi (2020) estimated long-run average individual income tax rates for top groups using an adjusted gross income definition, therefore excluding the effects of corporate tax sheltering and corporate taxes. Accounting for this missing income would lower their estimated rates, especially pre-1990, such that top average income tax rates using a more consistent income definition are nearly constant since World War II.[10]

II. REDISTRIBUTION

Tax progressivity presents an incomplete picture of how government policy redistributes resources. One must also account for government transfers. Considering both addresses the possibility of nearly equivalent programs being provided either as tax reductions or transfer increases. In this section, I present estimates of tax-and-transfer redistribution rates and the Reynolds–Smolensky index. These measures parallel the tax rates and Kakwani index seen in the previous section, but in addition to taxes these measures also account for transfers.[11]

[10] For example, in 1955 there was $17.6 billion of corporate retained earnings (NIPA table 1.12 line 12). Allocating this amount proportional to taxable dividends (and removing capital gains included in AGI) increases McClelland and Airi's top-one-percent income by about one third, which lowers their average income tax rate from 32 to 24 percent. A similar allocation of three-quarters of the $20.8 billion of corporate taxes (NIPA table 3.2 line 8) further reduces the tax rate to 18 percent. Piketty and Saez (2007) estimates of top tax rates in earlier decades also decrease when accounting for corporate retained earnings.

[11] This analysis excludes the redistributive effects of non-transfer government spending, such as for roads, police, and schools. See discussions in CBO (2013) and Auten and Splinter (2019a).

A. Tax-and-transfer Redistribution Rates

Following an approach used by Pechman (1985), I define the *redistribution rate* as taxes less transfers divided by market income. Redistribution rates are similar to average tax rates, but for the numerator they deduct transfers from taxes and for the denominator deduct any transfers from income—therefore, redistribution rates show percentage differences between market and disposable income. For example, a redistribution rate of –100 percent means taxes and transfers double market income

Figure 6 shows average redistribution rates for 2016. The bottom-quintile redistribution rate of –337 percent means taxes and transfers more than *quadruple* the market income of the bottom quintile, increasing the average bottom-quintile household income from $9,000 to $39,000. For the second quintile, average transfers of $20,000 per household are more than half of average market income of $37,000, and after offsetting taxes of $4,000, their redistribution rate is –43 percent.[12] Higher income groups receive fewer transfers relative to market income, making their redistribution rates similar to their average tax rates.

Between 1979 and 2016, changes in top- and middle-quintile redistribution rates resemble the changes in tax rates seen in Figure 3. For the bottom quintile, however, the redistribution rate changed by 163 percentage points (from –174 to –337 percent). These estimates fit with the Burkhauser et al. (2019) finding of a dramatic decrease in the fraction of individuals below the absolute poverty threshold when accounting for taxes and transfers.

B. Increasing Redistribution Since 1979

The Reynolds–Smolensky (RS) index measures redistribution as the decrease in income inequality levels due to taxes and transfers. Specifically, the RS index deducts the concentration index of after-tax/transfer income from the Gini coefficient of market income, as seen in Figure 7. Hence, this is a parallel measure to the Kakwani index, which is also the difference between a concentration index and Gini coefficient. As compared to the estimates for tax progressivity—for which I followed the CBO approach of using market income plus social insurance benefits—the Gini coefficient here is based on market income to capture the redistributive effect of all government transfers. For the concentration index, individuals are also ranked by market income.[13]

Figure 8 shows that between 1979 and 2016 the RS index of tax-and-transfer redistribution increased 59 percent (from 0.13 to 0.21). Since 1986, it increased 66 percent.[14] These long-run changes, however, miss fluctuations over the business cycle. Whereas tax progressivity increased because of the gradual expansion of tax credits, resulting in an upward stair-step pattern over time, redistribution usually spiked following recessions—such as in 1991, 2001, and 2008—and then

[12] Redistribution rate = (taxes – transfers)/market income. For the bottom quintile: ($0 – $30,000)/$9,000 = –337 percent. For the second quintile: ($4,000 – $20,000)/$37,000 = –43 percent.

[13] By using concentration indexes, I follow the original approach of Reynolds and Smolensky (1977), which is comparable to that used for the Kakwani index. Using the after-tax/transfer Gini coefficient, rather than the concentration index, would account for re-ranking effects and lowers redistribution growth since 1979 by a quarter.

[14] Transfers include both social insurance benefits and means-tested transfers. When removing the effect of social insurance benefits on redistribution (by including them in pre-tax/transfer income), this nearly halves redistribution levels and results in RS percentage increases since 1979 of 64 percent and since 1986 of 113 percent. RS tax-only redistribution estimates are discussed in the online appendix.

fell with economic expansions. Despite some timing differences, both taxes and transfers have contributed to the long-run increase in redistribution.

Because redistribution accounts for not only the distribution of taxes, but also tax levels (i.e., the population-wide average tax rate), the small decrease in average tax levels since 1979 contributed to less redistribution growth. Similarly, the share of transfers going to the middle of the distribution has increased, in part due to recent Medicaid expansions related to the Affordable Care Act. Relative to a constant distribution of transfers, this proportional reallocation also contributed to less redistribution growth. On the other hand, the annual measures presented here ignore the effects of unfunded government spending. If taxes were increased proportionally to account for government deficits, this would imply larger redistribution growth.

Using annual measures has several limitations from a lifetime perspective, as noted by Reynolds and Smolensky (1977), Fullerton and Rogers (1993), and Auerbach, Kotlikoff, and Koehler (2019). Importantly, annual measures provide an incorrect view of the longer-run redistributive effect of payroll taxes and the benefits they fund. These benefits are progressive relative to their associated payroll taxes—even when controlling for differential mortality (CBO, 2006)—and therefore the regressive tax component provides an incomplete measure of overall social insurance progressivity. An alternative annual framework is to account for expected annual social insurance wealth accruals, i.e., the discounted present value of the expected increase in benefits (Sabelhaus and Volz, 2020).

III. CONCLUSION

This paper presents new estimates of both tax progressivity and redistribution between 1979 and 2016. Compared to other studies, these estimates are more recent, account for all federal taxes and the entire income distribution, and rely on mainstream tax incidence and income allocation assumptions. Federal tax progressivity increased 46 percent with the Kakwani index and 110 percent with the tax elasticity. Considering the effects of federal taxes and all transfers, the Reynolds–Smolensky index of redistribution increased 59 percent. Tax progressivity fell sharply in the early 1980s, meaning since 1986 it increased more dramatically, with the Kakwani index doubling and the tax elasticity tripling. More generous refundable tax credits in this period were a primary cause of increasing tax progressivity. Over the longer run, studies showing earlier progressivity decreases suggest a U-shaped tax progressivity curve since World War II, with the minimum occurring in 1986.

For recent decades, these findings are consistent with other estimates showing that taxes and transfers have offset a significant portion of the increase in market income inequality, as shown by OECD (2011), Auten and Splinter (2019a), Elwell, Corinth, and Burkhauser (2020), and CBO. In addition, changes in taxes and transfers dramatically reduced the number of individuals below real poverty thresholds (Burkhauser et al., 2019) and subject to individual income taxes (Heim, Lurie, and Pearce, 2017; Splinter, 2019a). These long-term patterns of redistribution moved independently from the decrease in top individual income tax rates because relatively few tax returns are subject to top rates. Moreover, high top rates in earlier decades accompanied significant income sheltering—but this sheltering declined as the gap between corporate and individual tax rates narrowed, such that corrected average top tax rates have been relatively flat since 1960.

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The author has no financial arrangements that might give rise to conflicts of interest with respect to the research reported in this paper.

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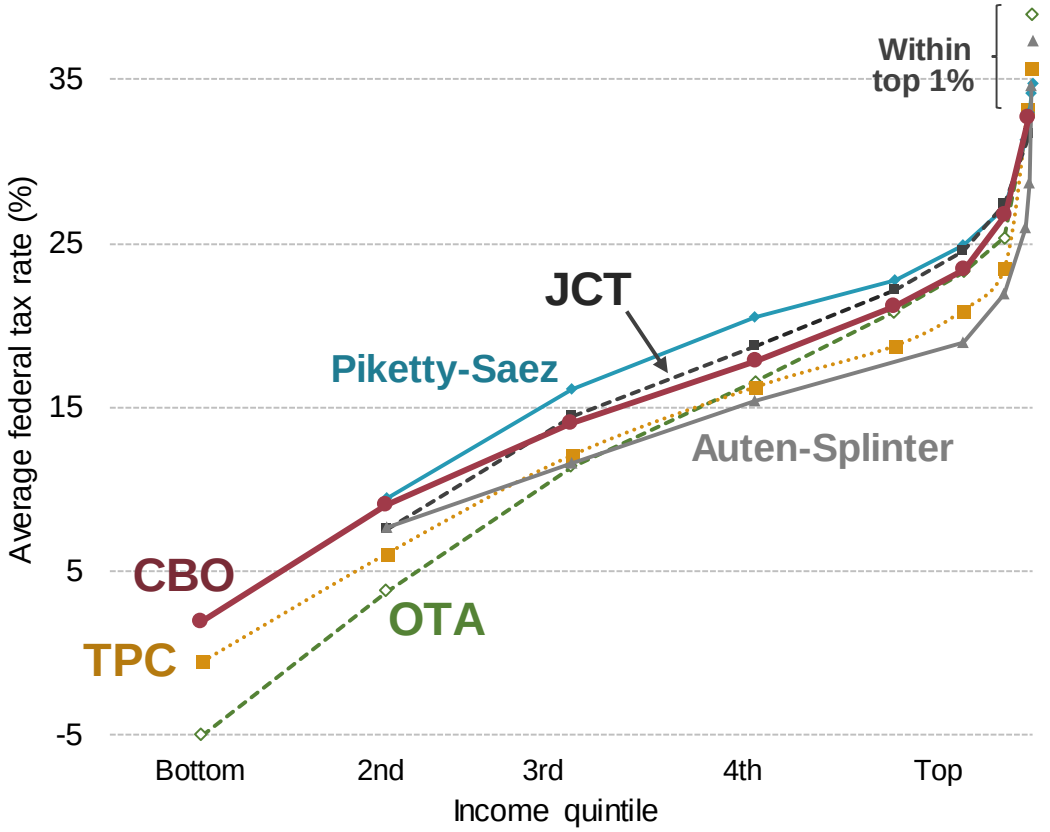
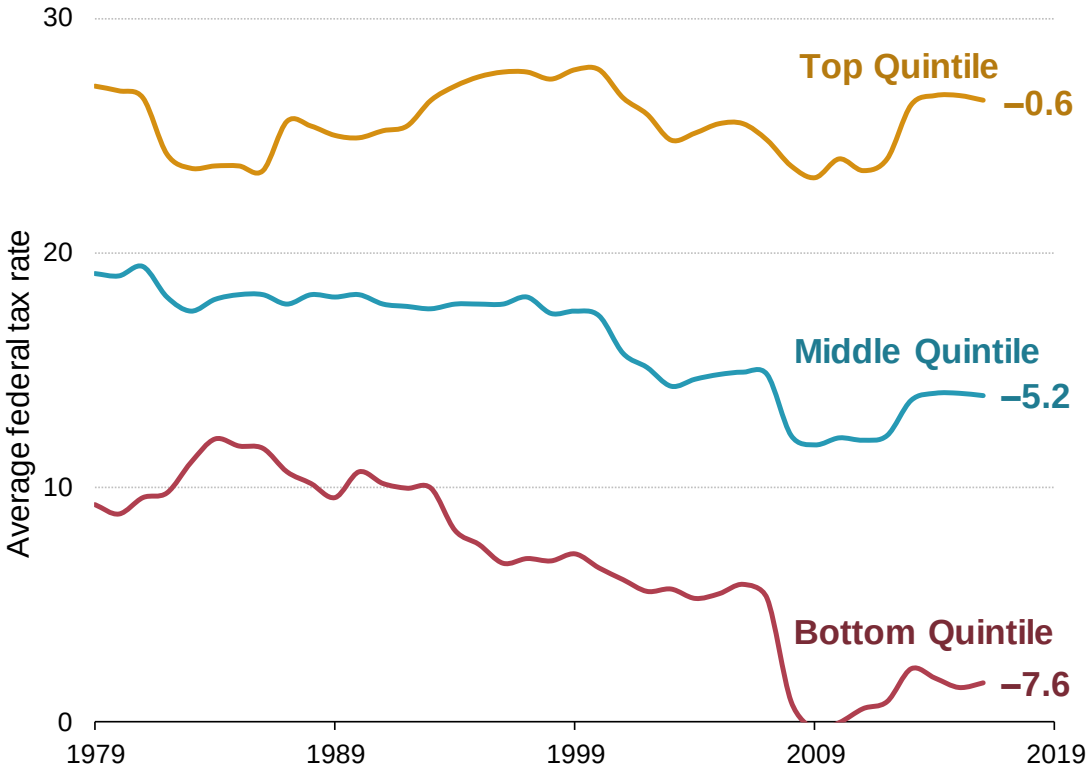
FIGURE 1
Average Federal Tax Rates by Income Group, 2014 and recent years



Sources: JCT, TPC, OTA, CBO, Piketty and Saez (2007), and Auten and Splinter (2019a).
Notes: Average tax rates are taxes divided by income, defined by Piketty-Saez as fiscal income plus payroll and corporate taxes, AS as pre-tax/after-transfer national income, JCT as expanded income, TPC and OTA as expanded cash income, and CBO as market income plus social insurance benefits. Incomes include realized capital gains, although AS instead include corporate retained earnings. AS and TPC include income accrued in retirement accounts. AS taxes include non-federal corporate and estate taxes and their bottom 50% rate is placed in the 2nd quintile bin and P50–90 rate in the 4th quintile. Rates are for 2014, but OTA and JCT for 2015 and Piketty-Saez for 2004. See text and online data for additional details.

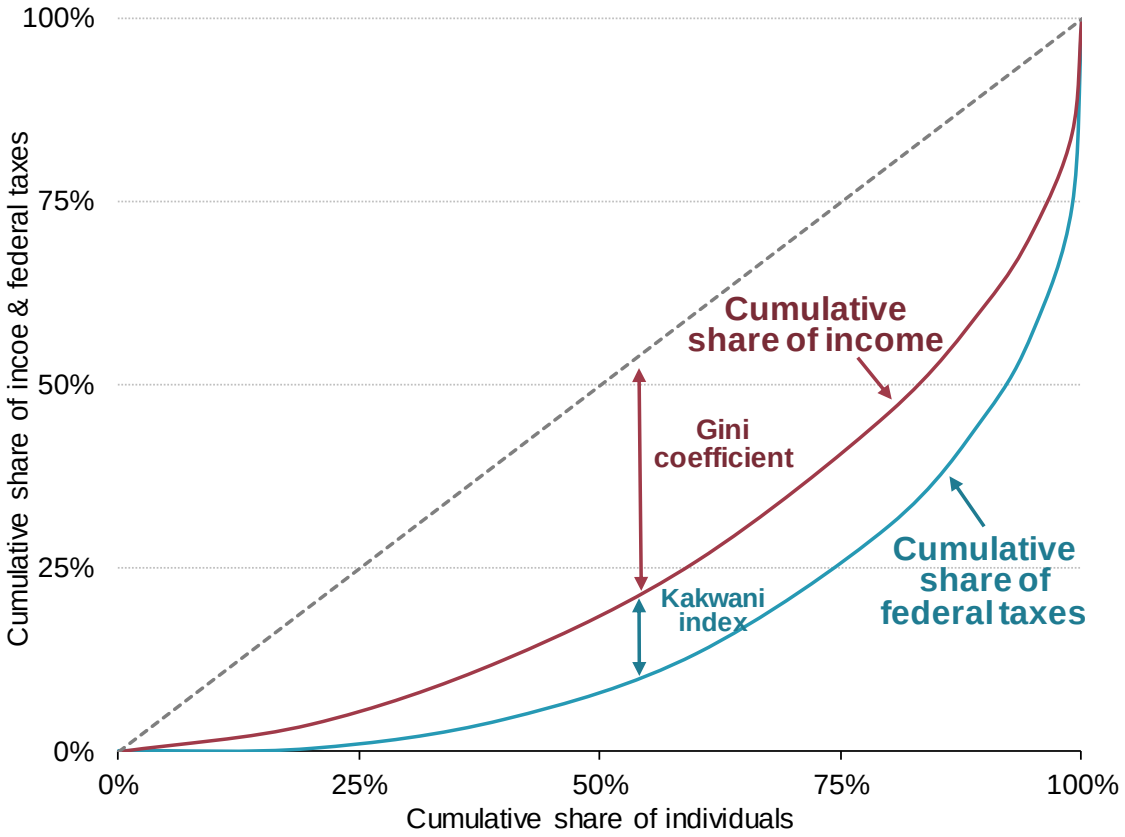
FIGURE 2

Average Federal Tax Rates by Income Group, 1979–2016



Source: CBO. *Notes*: Percentage point changes between 1979 and 2016 shown at right. Average tax rates are taxes divided by income (market income plus social insurance benefits).

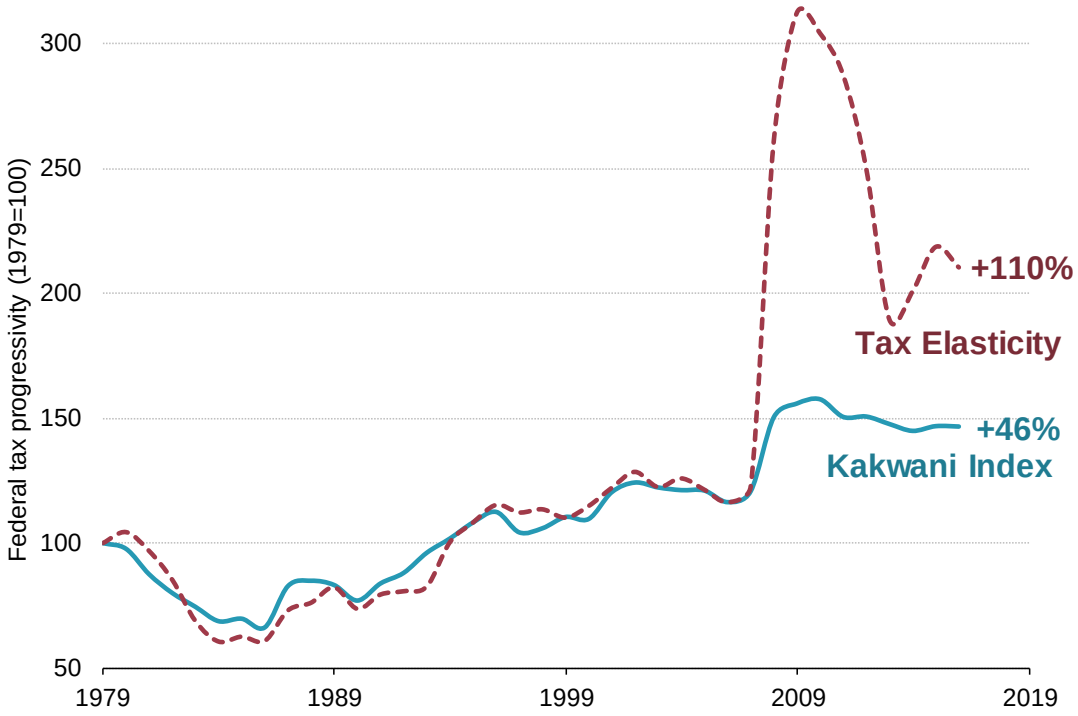
FIGURE 3
Kakwani Index of Federal Tax Progressivity, 2016



Source: Author's presentation of CBO data. *Notes*: Income is market income plus social insurance benefits. The Gini coefficient and Kakwani index are two times the area between the curves.

FIGURE 4

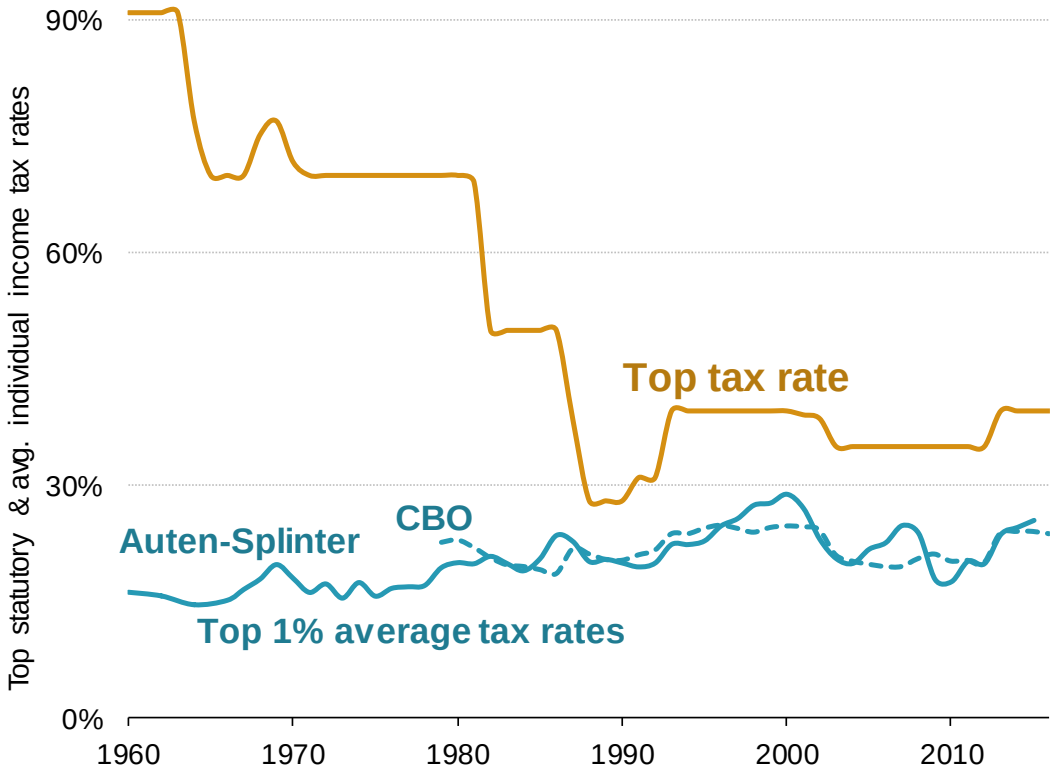
Increase in Federal Tax Progressivity, 1979–2016 (1979=100)



Source: Author's calculations using CBO data. *Notes*: Income is market income plus social insurance benefits.

FIGURE 5

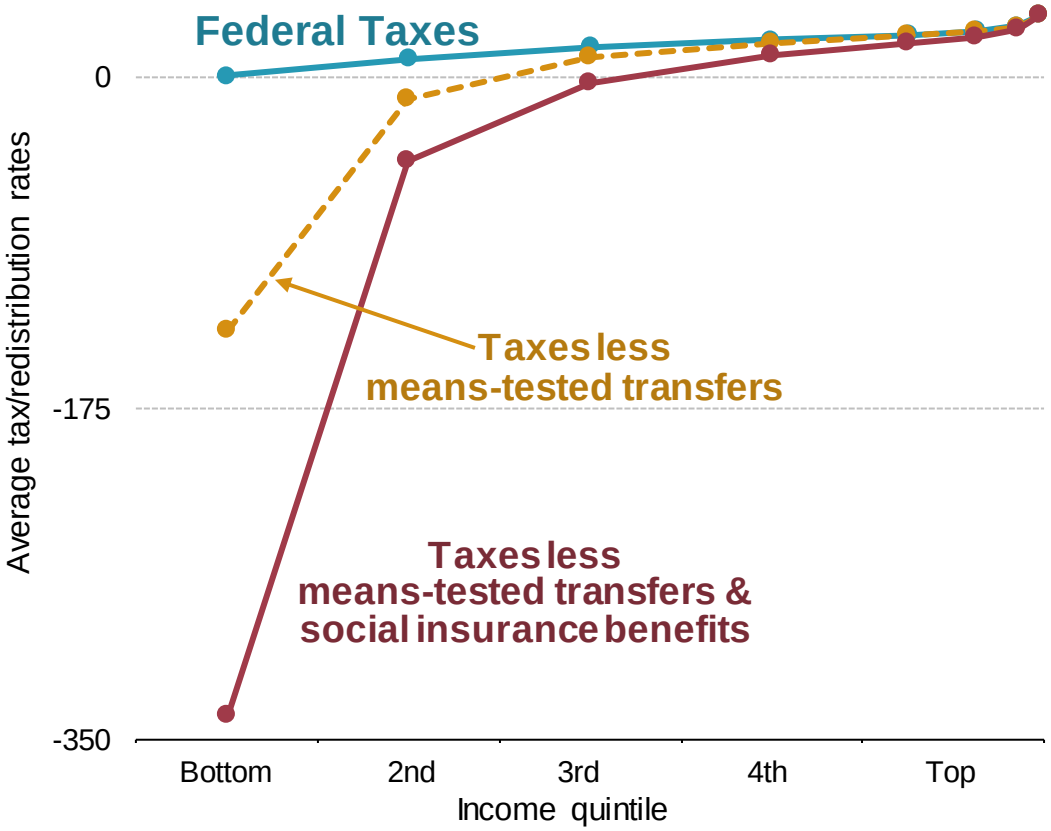
Top Marginal Tax Rates Are Not a Measure of Tax Progressivity



Source: CBO, TPC, Auten and Splinter (2019a).
Notes: Average tax rates are federal individual income taxes divided by income.

FIGURE 6

Average Redistribution Rates (federal taxes less transfers) as a Share of Market Income, 2016

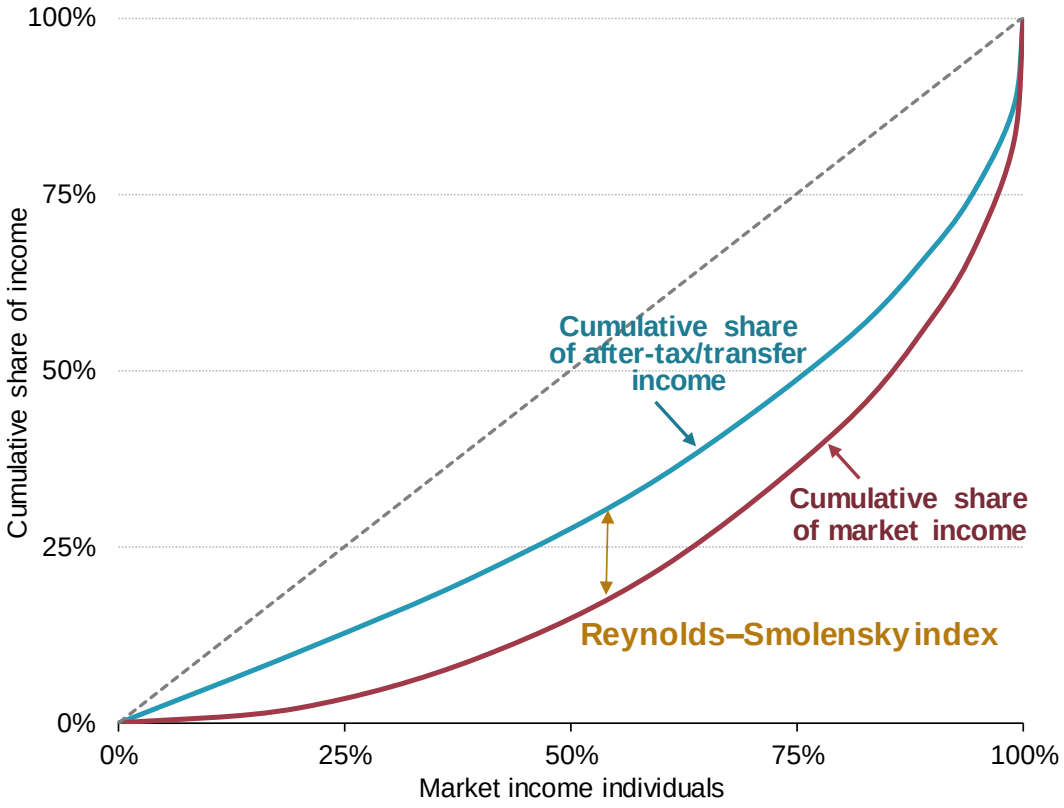


Source: Author's calculations using CBO data.

Notes: Individuals are ranked by size-adjusted household market income. Means-tested transfers include Medicaid, SNAP, SSI, etc. Social insurance benefits include Social Security, Medicare, unemployment insurance, and workers' compensation.

FIGURE 7

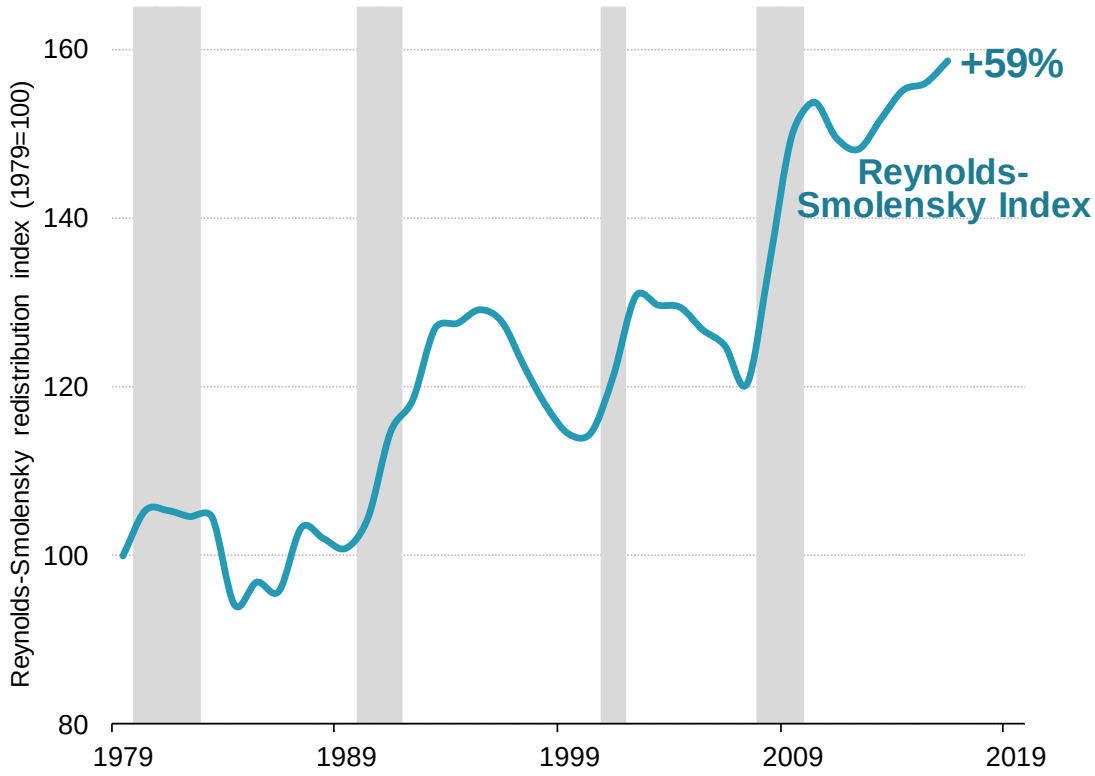
Reynolds–Smolensky Tax-and-Transfer Redistribution Index, 2016



Source: Author's calculations using CBO data.
Notes: Individuals are ranked by size-adjusted household market income for both curves. The RS index is two times the area between the curves.

FIGURE 8

Increase in Reynolds-Smolensky Tax-and-Transfer Redistribution Index, 1979–2016 (1979=100)

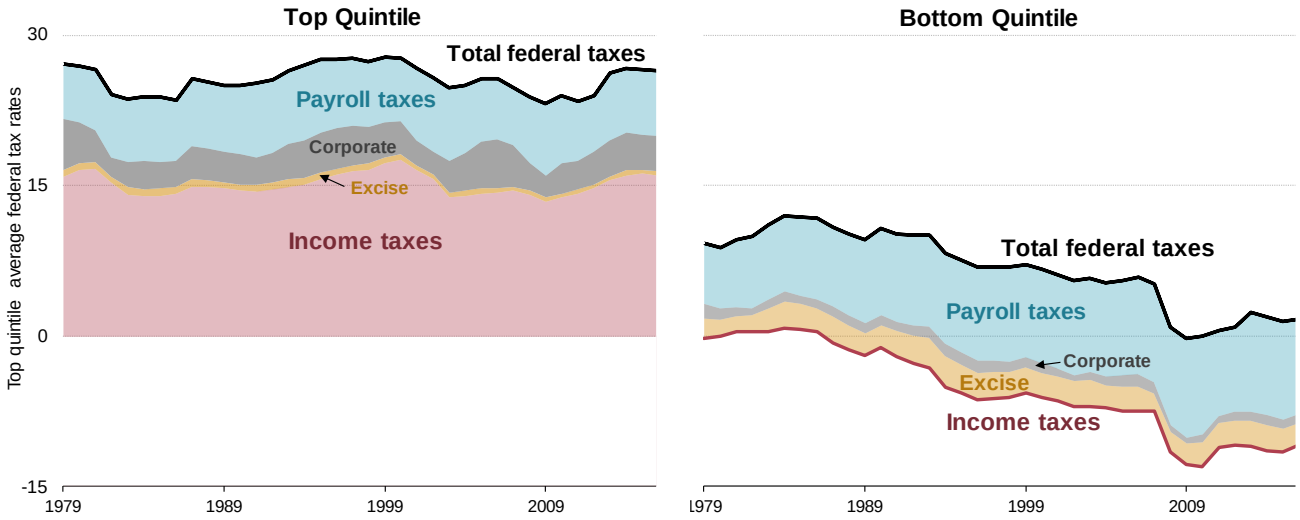


Source: NBER and Author's calculations using CBO data. *Notes*: Individuals are ranked by size-adjusted household market income. Years are shaded if a recession occurs during at least one quarter.

Appendix A

FIGURE A1

Average Federal Tax Rates by Type of Tax and Income Group, 1979–2016



Source: CBO. *Notes*: Average tax rates are taxes divided by income (market income plus social insurance benefits). Individuals are ranked by size-adjusted household income.