Income Inequality in the United States: Extensions and Updates

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April 2025

Abstract

Auten and Splinter (2024) estimated national income inequality using tax data. This paper extends our estimates to cover the years 2020–2022. During the pandemic, fiscal relief offset all the increase in distribution-wide inequality and most of the increase in top 1% income shares. Once pandemic-era relief ended in 2022, however, after-tax income inequality increased. In addition, this paper incorporates several improved methods and uses recently revised national accounts data. Collectively, these updates have only modest effects on top income shares. Finally, sensitivity tests show a narrow range around our baseline top income shares. Top income shares declined in the late 1960s and increased in the late 1980s and 1990s with little net change. From 1962 to 2019, top 1% after-tax income shares increased only up to one percentage point. Since 2019, both pre-tax and after-tax top 1% shares increased another percentage point.

Keywords: Income inequality, tax data, income underreporting, Covid recession, PPP, stimulus checks, redistribution, tax progressivity, top one percent, pandemic policy
JEL: D3, E01, H2, H5, J3

A detailed data spreadsheet is at https://davidsplinter.com/AutenSplinter-2025.xlsx

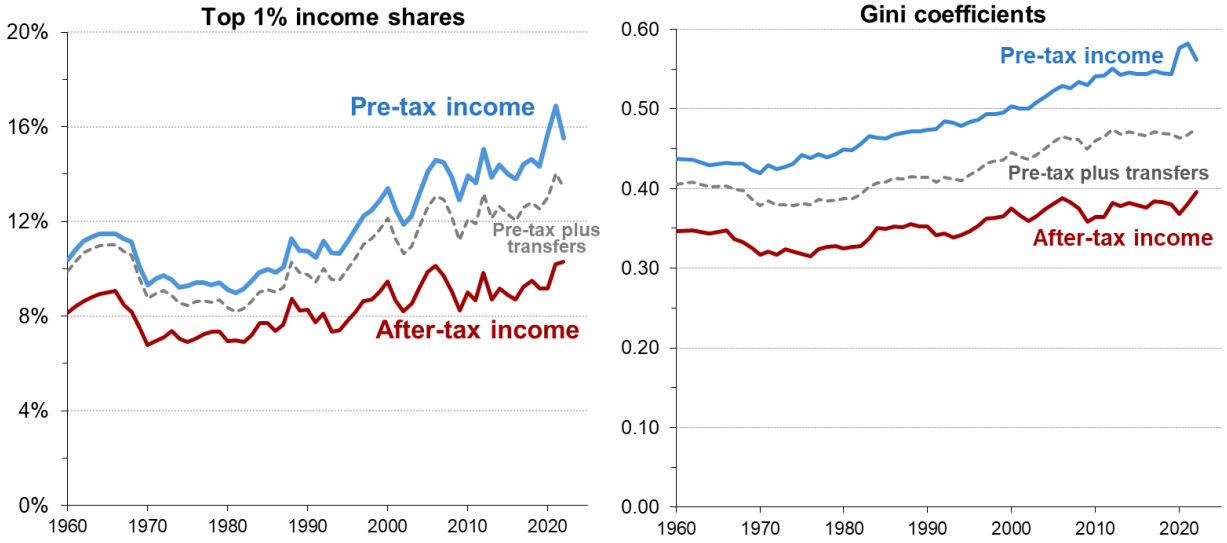
For helpful comments, we thank Tom Barthold and Matthew Comey. *Auten*: This research was conducted while the author is an employee at the U.S. Department of the Treasury. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author and do not necessarily reflect the views or official positions of the U.S. Department of the Treasury. *Splinter*: This paper embodies work undertaken for the staff of the Joint Committee on Taxation, but as members of both parties and both houses of Congress comprise the Joint Committee on Taxation, this work should not be construed to represent the position of any member of the Committee.

This paper updates and extends Auten and Splinter (2024), which estimated the distribution of national income in the United States from 1960 through 2019. New estimates for 2020–2022 show the significant changes in income inequality and redistribution during the Covid pandemic recession and recovery. In addition, updated and improved methods have only modest effects on top income shares. Finally, extending original sensitivity tests to include more alternative assumptions shows that our estimates are robust.

During the pandemic period, there was a large swing increase in inequality of market income but also policies that mitigated that increase. The top 1% share of pre-tax income jumped 2.6 percentage points (pp) between 2019 and 2021 (Figure 1, left side). After accounting for government policies, however, the top 1% share of after-tax income increased only 1.0 pp during this period. Fiscal policy therefore offset over half of this top inequality increase. As the economy recovered and wages of lower-income workers rose more rapidly in 2022, half of those increases in top 1% shares of pre-tax income were reversed. This decline in market income inequality, however, was offset by the end of government support measures. As a result, top share of after-tax income was unchanged in 2022 relative to the prior year and at about the same level as the 2006 business cycle peak.

Gini coefficients, which capture distribution-wide income inequality, followed a similar pattern for pre-tax income (Figure 1, right side). In contrast to top shares, this measure shows that government transfers offset all the increase in pre-tax inequality during the pandemic. In 2020, pandemic fiscal relief *fully* mitigated the largest one-year increase in overall pre-tax income inequality. Once temporary government support measures ended, however, overall after-tax inequality increased. Note that the change in pre-tax income inequality was more pronounced during the pandemic than prior recessions. This resulted in part from increasing then decreasing wage inequality as discussed by Autor, Dube, and McGrew (2024). This decline in wage inequality was previously noted by Larrimore, Mortenson, and Splinter (2023a), which also showed that the withdrawal of temporary fiscal relief likely increased after-tax inequality. These results are confirmed here using more comprehensive measures of income and transfers.

Figure 1: United States national income inequality



Notes: Extended and updated Auten and Splinter (2024) estimates. *Sources:* Authors' calculations using tax data.

Sensitivity tests show our estimates to be robust even when considering multiple alternative assumptions that either all increase or decrease top income shares. These extend our original sensitivity tests to cover all years and include more alternative assumptions with various size adjustments and allocations of government deficits, government consumption, corporate excess depreciation, and corporate retained earnings. Lower-bound top 1% after-tax income shares average 1.5 pp below our baseline estimates, while upper-bound estimates are only 0.7 pp above. This smaller difference relative to the upper bound suggests our baseline estimates are likely in the upper end of the plausible range under alternative assumptions.

This paper also incorporates several methodological improvements and data updates relative to Auten and Splinter (2024). Specifically, this paper applies a more appropriate multiplier for allocating undetected underreported income, a new allocation of excess depreciation (i.e., amounts reported for tax purposes exceeding economic depreciation in national accounts) based on partnership data linked to individual tax returns, an improved allocation of non-filer underreporting, accounting for tax-exempt partnership owners, and using the recently revised national accounts data. Incorporating these updates and improvements results in only small increases in recent top 1% income shares: half a percentage point for pre-tax incomes and one-third of a percentage point for after-tax income.

The next section examines how pandemic fiscal policies offset increases in market income inequality and discusses our approach for non-standard policies such as the Paycheck Protection Program (PPP). Section II examines the robustness of our results by applying sets of alternative assumptions that either all increase or all decrease top income shares. Section III provides a step-by-step explanation of our updated estimation approach.

I. Extend estimates to 2022 and incorporate pandemic policies

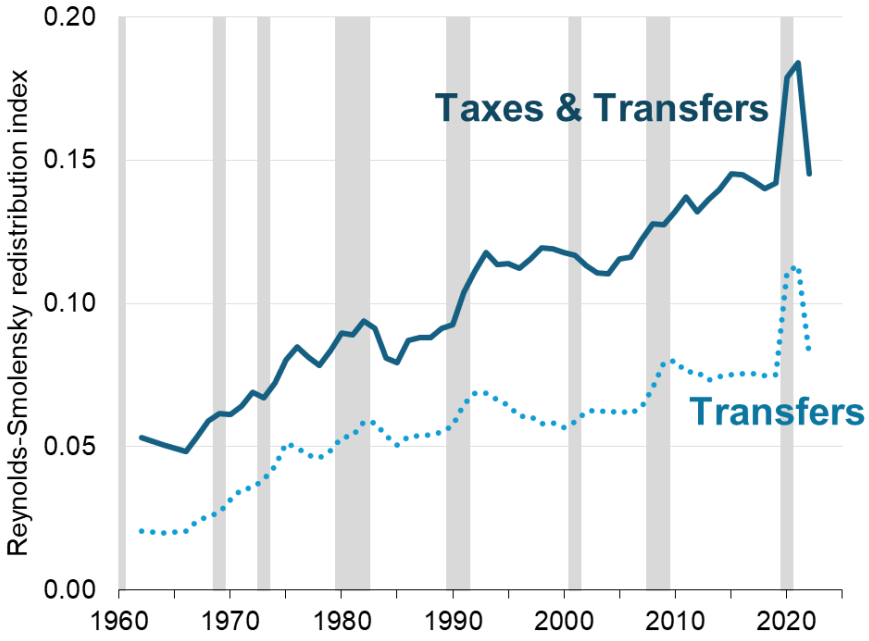
The Auten and Splinter (2024) estimates covered 1960 to 2019. This paper extends the analysis through 2022 to incorporate the pandemic recession and recovery. The largest one-year increases in top 1% shares of pre-tax income occurred in 2012 and 2020.[1] Unlike the 2012 jump in pre-tax inequality, the 2020 pre-tax increase was largely offset by the large pandemic fiscal policy response (Figure 1). During the pandemic and early recovery between 2019 and 2021, top 1% pre-tax income shares increased by 2.6 percentage points (pp). This pattern was similar to previous economic recoveries: increases of 2.4 pp and 2.1 pp in the in the three years after 2003 and 2009.[2] But unlike prior recoveries, half of the pandemic increase in top income shares reversed itself by 2022.

Changes in after-tax top income shares were more muted: flat in 2020, increasing 1.1 pp in 2021, and flat in 2022. After-tax inequality measured with Gini coefficients showed more sensitivity to fiscal relief: a decrease of one percentage point in 2020, a return

[1] The 2012 increase was partly due to the acceleration of income from 2013 to 2012 ahead of the increase in the top individual income tax rate in 2013 (Auten, Splinter, and Nelson 2016).

[2] Parker and Vissing-Jorgensen (2010) examined the effect of business cycles on high-income income shares, suggesting it increased after the Tax Reform Act of 1986, but that partly results from their use of fiscal income that ignores corporate retained earnings before that reform.

Figure 2: Redistribution from transfers and taxes, 1962 to 2022



Notes: Years are shaded if a recession occurs during the year. *Sources*: Authors' calculations using tax data and NBER.

to pre-pandemic levels in 2021, and a jump in 2022 when fiscal relief ended. This is similar to prior findings by Blanchet, Saez, and Zucman (2022) and Larrimore, Mortenson, and Splinter (2023a).[3]

The surge and withdrawal of fiscal relief is illustrated in Figure 2. This figure shows the redistribution effects of taxes and transfers using the Reynolds–Smolensky index, which approximates how much these policies decrease Gini coefficients.[4] Almost all pandemic fiscal relief came from temporary transfers, such as stimulus checks, rather than taxes (the difference between the two lines). Even without these temporary policies, redistribution from transfers still increased between 2019 and 2022, perhaps from sustained increases in SNAP and expansions to health-insurance premium tax credits (Splinter, Elwell, and Xu 2025). Appendix Figures A1 and A2 show alternative measures of redistribution, decreases in Gini coefficients and average redistribution rates. These measures also show the long-run increase in redistribution and higher post-pandemic level of transfers.

In 2020 and 2021, four pandemic fiscal policies were implemented, each about $800 billion: (1) expanded unemployment insurance benefits, (2) stimulus payments, (3) the PPP, and (4) aid to state and local governments. Unemployment insurance benefits increased dramatically during the pandemic recession, in part from various expansions, and were highly progressive. Using administrative data that capture significant amounts

[3] Our pre-tax inequality estimates may be higher than other estimates because we remove the progressive effects of the PPP from wages and profits and shift them to transfers, as discussed below.

[4] The Reynolds-Smolensky index is the difference between the Lorenz curve concentration indexes for income before taxes and transfers and income after taxes and transfers, both using tax units ranked by pre-tax income (see Splinter 2020).

missing from survey data (about half was missing, largely from the bottom of the distribution), Larrimore, Mortenson, and Splinter (2023b) showed the highly progressive nature of unemployment benefits during the pandemic. This current paper uses comparable tax data that includes Form 1099-G unemployment compensation among tax return filers.

During the COVID pandemic period, about $800 billion of highly progressive stimulus payments were made (Splinter 2023). These consisted of three rounds of payments by the IRS (Economic Impact Payments), each of which could result in additional recovery rebate credits when individual filed tax returns. Our analysis first includes these stimulus payments with transfers. Then, to accurately capture the impact of stimulus on the income distribution, it is essential to account for incomplete reporting of stimulus on tax returns. Therefore, we calculate the full stimulus amounts based on the relevant factors: number of filers and dependents (or adults in the case of non-filers), filing status, and income-based phase outs. These amounts are then scaled to match target totals. Second-round stimulus, which was mostly paid in the last week of calendar year 2020, are attributed to 2021 to conform to the national accounts.

The Paycheck Protection Program (PPP) provided forgivable loans to support employee retention and other expenses at small businesses, but its effects differ from normal fiscal policy. Standard fiscal policy is excluded from national income and our pre-tax income measure. Therefore, it is only included in our measure of after-tax income. Economic effects of the PPP, however, are included in national income. This is because the PPP led to higher wages and small business income, both of which are part of national income. To control for this, the Bureau of Economic Analysis deducts PPP spending as a negative "subsidy" in the national accounts. To account for distributional consequences, our analysis allocates these negative subsidies such that PPP effects shift from our pre-tax to after-tax measure. Specifically, most negative subsidies are allocated by PPP-induced wages and owner profits. Later, when incorporating other cash transfers, this allocation is reversed to restore the original PPP-induced wages and owner profits. As a result, our after-tax measure includes all reported wages and profits. Ignoring these effects would understate pre-tax income inequality and understate the degree of redistribution during the pandemic. Note that PPP-induced wages and owner profits are not directly observed in any data. This analysis therefore relies on distributional estimates from Splinter et al. (2025), which applied an event-study approach to linked data between PPP loans and population tax data to estimate the distributional impact of PPP loans.[5] Total PPP amounts are based on the deviation of national accounts business subsidies and transfers from surrounding

[5] These estimates link forgiven PPP loans to employers and then to workers and business owners. Linked administrative data show a modest progressive effect with respect to income, in contrast to estimates in Autor et al. (2022) that relied on assumed owner income distributions including capital income from large businesses ineligible for PPP loans. PPP fraud among actual businesses—e.g., reporting incorrect numbers of employees (Beggs and Harvison 2023)—is accounted for in the Splinter et al. (2025) distributions, but that analysis did not match seven percent of PPP amounts, for which distributions are uncertain with some benefits going to fake firms (Griffin, Kruger, and Mahajan 2023).

years: $640 billion in 2020 and $530 billion in 2021. This also accounts for similar programs, such as over $100 billion of employee retention tax credits, which had comparable distributional impacts (Goodman 2023).

Since federal aid to state and local governments was relatively ineffective at preserving jobs, no separate adjustment is made in our estimates for this program. Aid to state and local governments cost about $600,000 per job-year preserved (Clemens, Hoxie, and Veuger 2025), whereas the PPP preserved about 4 million job-years at a cost of $140,000 per job-year (Dalton 2023; Splinter et al. 2025).

Wages of non-filers are adjusted to account for the impact of the pandemic. Non-filer wages are based on demographic-specific data from Form W-2 in 2018. During the pandemic, the bottom of the distribution experienced significant wage losses followed by disproportionate wage growth (Larrimore, Mortenson, and Splinter 2023a; Autor, Dube, and McGrew 2024). To capture these effects, beginning with wages indexed with the average wage growth index, we make the following adjustments: estimated 2020 non-filer wage growth is reduced by 20 percentage points and estimated 2021 and 2022 non-filer wage growth is increased by 10 percentage points. Finally, it's worth noting that these estimates are preliminary and will be updated as additional data become available, such as 2022 information returns, and after revisions to national accounts data.

II. Sensitivity to alternative assumptions

Estimates of top income share are sensitive to certain assumptions. As noted by Clarke and Kopczuk (forthcoming), "It would be better to think about inequality estimates as representing bounds that emerge under different assumptions." Recognizing this, Auten and Splinter (2024) conducted sensitivity tests of how varying assumptions affected top 1% income shares. These sensitivity tests were limited to select years and specific assumptions, but Figure 3 presents estimates for all years and shows the upper and lower bounds from changes in up to five assumptions. These five assumptions represent those with the weakest empirical evidence and the bounds result from the extremes of the reasonable range for each assumption.[6]

These bounds provide a more comprehensive picture of how different assumptions affect our estimates of top income shares. For after-tax income, the upper-bound top shares average only 0.7 percentage points (pp) above our baseline estimates, while the lower-bound top shares average 1.5 pp below our baseline estimates. For pre-tax income, the range between the upper and lower bounds is narrower, suggesting less uncertainty in this measure.

[6] Varying these assumptions also addresses four of the alternatives to our approaches proposed by Piketty, Saez, and Zucman (2024, PSZ). One of the other adjustments proposed by PSZ is now incorporated into our updated estimates (excess depreciation to partnership owners). Auten and Splinter (2025) provides a discussion and our supplementary appendix reviews prior updates that incorporated suggestions from PSZ, see https://davidsplinter.com/AutenSplinter-SupplementaryAppendix.pdf.

The relevant baseline assumptions are to: (1) size-adjust incomes for ranking purposes using the standard approach of dividing income by the square-root of the number of individuals (filers and dependents) in a tax unit,[7] (2) allocate government deficits in proportion to the share of federal taxes paid,[8] (3) allocate corporate excess depreciation to individuals by C corporation ownership, (4) allocate non-retirement corporate retained earnings 75% by dividends and 25% by capital gains, given the evidence that dividends serve as a better proxy of corporate ownership (Joint Committee on Taxation 2013; Smith et al. 2023), and (5) allocate government consumption 50% equally to individuals (per capita) and 50% by after-tax income. This last assumption is consistent with about one-third of this spending going towards relatively equally-distributed schooling (Riedel and Stichnoth 2022) and some additional amounts for public goods.

To generate an upper bound on recent top income shares, we use the following assumptions: (a) no size adjustment of tax-unit incomes for ranking (i.e., no economies of scale), (b) exclude government deficits, (c) maintain corporate excess depreciation as under the baseline assumptions, (d) allocate non-retirement corporate retained earnings 100% by dividends and 0% by capital gains, and (e) allocate government consumption 40% per capita and 60% by after-tax income, which is a lower bound on the per capita share given the share of school funding.

To generate a lower bound on recent top income shares, we use the following alternative assumptions: (i) rank tax units by dividing income by the number of individuals in the tax unit (i.e., full economies of scale), (ii) allocate deficits by federal income taxes, (iii) allocate corporate excess depreciation to S corporations by the depreciation distribution when linking partnership-level data to owners,[9] (iv) allocate non-retirement corporate retained earnings 50% by dividends and 50% by capital gains, and (v) allocate government consumption 75% per capita and 25% by after-tax income.

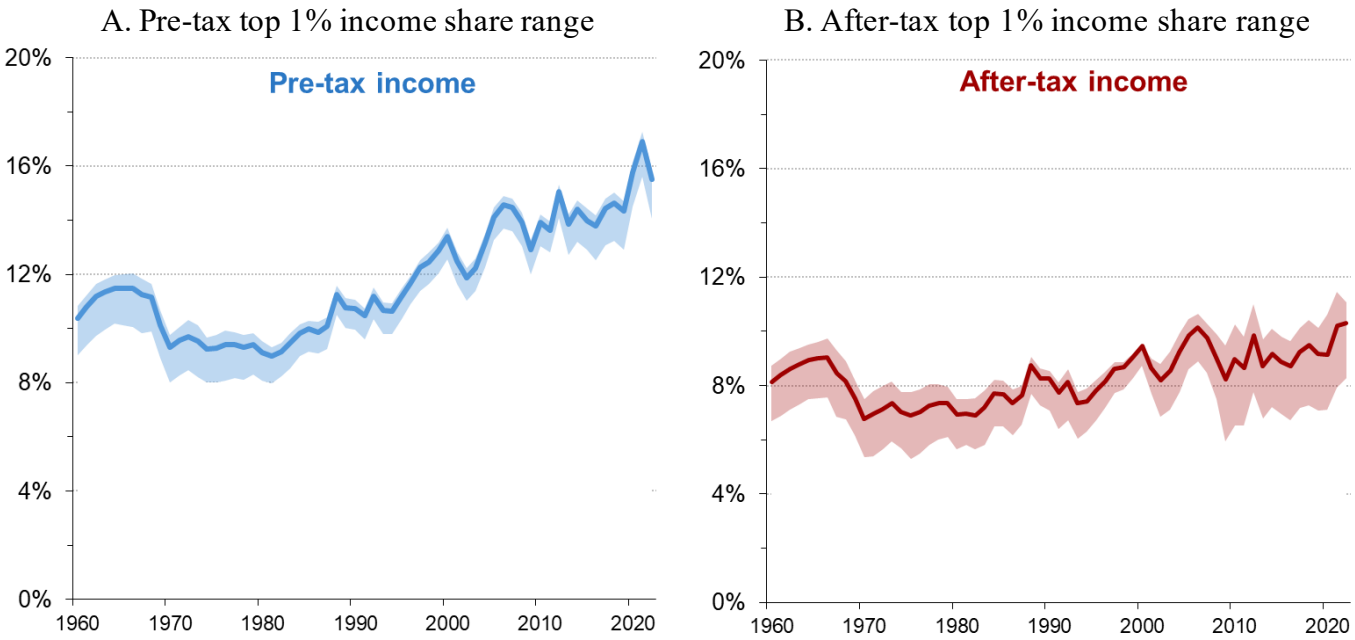
Using these sets of upper and lower-bound assumptions, our estimates of top 1% pre-tax income shares in 2022 are between 14.0% and 15.9% (Figure 3A). This is a difference of 1.5 pp below and 0.4 pp above our baseline estimate. The average lower bounds are twice as far below the baseline (1.0 pp) as the upper bounds are above the baseline (0.4 pp). This suggests our baseline estimates are in the upper range of sets of alternative assumptions that all increase or decrease top income shares. In addition, these sensitivity tests suggest the plausible ranges for our estimates are relatively narrow, especially compared with the range of estimates from other studies seen in Figure 4B.

[7] Since the size adjustment is only for ranking purposes, incomes sum will still sum to national income totals.

[8] This assumption is consistent with historical evidence, for example, see Ferriere and Navarro (2020).

[9] This shifts income from C corporation owners to certain S corporation owners. S corporation excess depreciation is only available for 2012 to 2018 (Bureau of Economic Analysis 2024a). Here, we include both S corp. capital consumption and intellectual property depreciations adjustments, ignore this adjustment before 2011, and apply the 2018 amount in later years. See Auten and Splinter (2025) for details.

Figure 3: Narrow range of top 1% income shares with alternative assumptions



Notes: These figures show ranges resulting from up to five alternative assumptions that either increase or lower top shares in 2022, as described in the text, and are not confidence intervals. *Sources:* Authors' calculations using tax data.

Our sensitivity analysis suggests after-tax top 1% income shares in 2022 range between 8.3% and 11.1%, or 2.0 pp below and 0.8 pp above our baseline estimate (Figure 3B). On average, the after-tax lower bound is twice as far below the baseline (1.5 pp) as the upper bound is above the baseline (0.7 pp). The range of estimates for after-tax measures is larger than pre-tax measures because only the after-tax measure incorporates different allocations of government deficits and government consumption. Still, these sensitivity tests suggest the plausible ranges for our after-tax estimates are relatively narrow.

Our analysis likely underestimates earlier-period top 1% shares, so that our baseline increases in long-run inequality are somewhat overestimated. Consider evidence of three sources of missing top incomes. First, improved reporting requirements for foreign accounts and income have led to more reported offshore income since 2014. Estimates in Auten and Splinter (2024) suggest top 1% shares before then may have been up to 0.3 pp higher than afterward. Second, our underreporting distribution in early decades is based on the 1988 special IRS audit study, but research suggests high-income underreporting rates were larger in the 1960s. Applying the implied effects from Troiano (2017) would increase our 1962 top 1% income share by an additional 0.7 pp (for details, see Auten and Splinter 2024). Third, accounting for business deductions used for personal consumption, such as with expense accounts, would also increase top incomes in earlier decades. Applying half the total estimated expense account spending to the top would increase our top 1% shares

in the 1960s by an additional 0.5 pp.[10] Including these three sources of missing top income in the 1960s suggests after-tax top 1% income shares increased by less than half a percentage point between 1962 and 2022.[11]

III. Updates to estimates

This paper makes five updates to the Auten and Splinter (2024) methods, which turn out to have little net effect on top 1% income shares. Figure 3A shows our original estimates (grey dashed lines) are very close to the updated series. The updated estimates also continue to fall within the ranges of other estimates, except for the PSZ estimate, as seen in Figure 4B.[12] To compare our estimates with those from the Congressional Budget Office (CBO), which uses the same underlying tax return data, Figure 3A shows CBO estimates that exclude capital gains to make them more comparable to national income.[13] Our estimates are higher than CBO's before the Tax Reform Act of 1986 because our analysis accounts for corporate retained earnings missing from individual tax returns. While our estimates are nearly identical to CBO's over the next two decades, our top 1% income shares exceed CBO's by one percentage point since 2010.

Table 1 presents the effects of our five updates on top income shares, each added sequentially. In 1979, these updates have negligible effects. In 2019, the top pre-tax income share increases 0.5 pp and the after-tax share increases 0.4 pp. These effects result about equally from four changes: updating the undetected underreported income multiplier, allocating excess depreciation using a linked partnership depreciation distribution, revised National Income and Product Accounts (NIPA) data, and accounting for tax-exempt partnership owners. A separate update that adjusts non-filer underreporting has a relatively small effect. Each update is discussed in more detail below.

[10] "[Expense] accounts allowed for tax-exempt personal consumption that was deducted by businesses and fairly unregulated until tax code changes since 1969 severely limited the tax benefits of expense accounts. In the late 1950s, however, about one percent of national income was spent through expense accounts (Rothschild and Sobernheim 1958)." (Auten and Splinter 2024, online appendix p. 29).

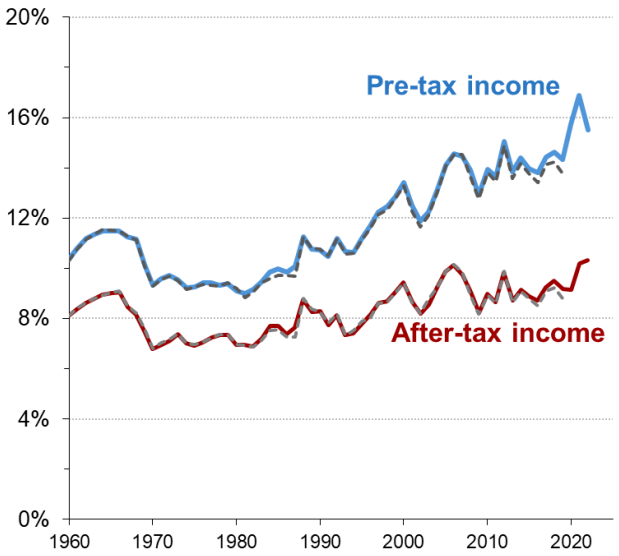
[11] These sources were left out of our baseline because they are hard to measure accurately. It is also unclear how to allocate federal defense spending, which Simon Kuznets sometimes suggested removing from economic measures. Removing defense spending also increases our baseline top 1% after-tax share more in earlier years, by 0.4 pp in 1962, and only 0.1 pp in 2022. Along with the other three sources discussed above, removing defense spending suggests no change in top 1% after-tax income shares between 1962 and 2022.

[12] Different estimates often use different income definitions, data sources, and grouping approaches. For example, BEA targets personal income starting with CPS data and CBO targets expanded fiscal income using tax data. CBO, PSZ, and AS have the same number of individuals or adults in each percentile, but BEA percentiles have the same number of households, per OECD (2024). The unequal-sized groups include more individuals in the top 1% than lower-income percentiles, increasing BEA's top 1% shares relative to equal-sized groups by the number of individuals.

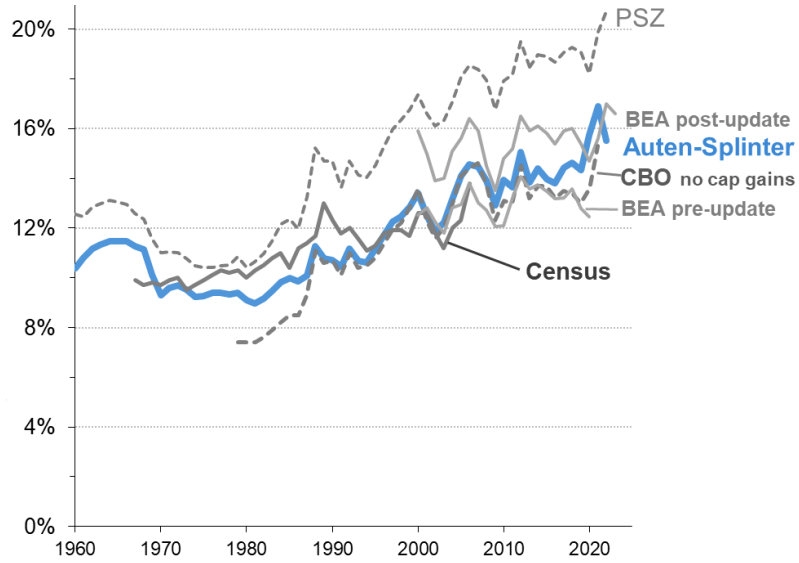
[13] Including capital gains would double count certain business profits and include (non-economic) inflationary gains.

Figure 4: Top 1% income shares

A. Prior and updated estimates



B. Auten–Splinter pre-tax estimates are mid-range



Notes: Panel A: dashed lines in left figure are original Auten and Splinter (2024 estimates). Panel B: All estimates exclude capital gains realizations. *Sources*: Authors' calculations using tax data; Auten and Splinter (2024); Piketty, Saez, and Zucman (2018, PSZ, with updated methods, accessed from Zucman's website March 14, 2023, values for 2020–2022 from Blanchet, Saez, and Zucman 2022, realtimeinequality.org accessed Feb. 25, 2025); Burkhauser et al. (2012, Census), Bureau of Economic Analysis (2024c and pre-update estimates accessed Sept. 2024, BEA); Congressional Budget Office (2025, CBO).

Table 1: Updates and top 1% income shares

	Pre-tax income				After-tax income			
	1979		2019		1979		2019	
	Share	Change	Share	Change	Share	Change	Share	Change
Auten-Splinter (2024) baseline	**9.41**	---	**13.79**	---	**7.37**	---	**8.80**	---
1. Lower underreporting multiplier	9.45	0.05	13.97	0.19	7.37	0.00	8.92	0.12
2. Allocate excess depreciation by bonus & linked partnership deprec.	9.46	0.01	14.14	0.16	7.38	0.01	9.00	0.08
3. Nonfiler underreporting	9.40	-0.06	14.10	-0.04	7.35	-0.03	8.96	-0.04
4. Revised NIPA data	---	---	14.20	0.10	---	---	9.06	0.10
5. Tax-exempt partnership owners	---	---	14.33	0.13	---	---	9.18	0.12
All updates	**9.40**	**0.00**	**14.33**	**0.55**	**7.35**	**-0.02**	**9.18**	**0.38**

Notes: See text for more discussion. *Sources*: Author's calculations using tax data.

1. Lower undetected underreporting multiplier and correct proprietor adjustments

Multipliers scale up *detected* underreporting in the special IRS audit studies to account for *undetected* underreporting (Auten and Splinter 2021). Our original analysis applied an overall multiplier of 3.3 to detected underreporting to give total underreporting. This is the historical multiplier used to scale up detected underreporting in IRS tax gap studies (IRS 2022). This section presents evidence that the national accounts use a lower multiplier of about 2.0. After reducing the multiplier and correcting proprietor adjustments, top 1% income shares in 2019 increase by less than 0.2 pp.

The BEA does not state the underreporting multiplier used for national accounts. Therefore, our approach is to estimate the implied NIPA undetected underreporting multiplier, i.e., the amount of NIPA misreporting divided by the amount of detected underreporting. These two measures are harmonized by focusing on non-farm proprietor underreporting and wage underreporting among filers, as the IRS special audit studies exclude non-filer underreporting. The numerator of the multiplier is calculated by subtracting non-filer underreporting from the explicit NIPA misreporting amounts (i.e., non-farm proprietor and wage misreporting). Non-filer underreporting is estimated to be about 15% of total underreporting, leading to the adjusted NIPA misreporting totals in Table 2 column 4.[14]

Table 2: Implied NIPA multiplier for wage and proprietor income (undetected underreporting as share of detected underreporting)

Year	Estimated NIPA misreporting				IRS audit studies (filers only)				Implied NIPA multiplier
	Nonfarm propriet.	Wages	Non-filers	NIPA total	Detected net underrep.	Other sources	Over-reported income	Detected underrep. prop/wage	
	Tab 7.14	Tab 7.18	estimate	(1)+(2)-(3)	audit studies	estimate	estimate	(5)-(6)+(7)	(4)÷(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2006	552	74	62	564	369	151	46	264	2.1
2007	529	75	57	548	349	143	44	250	2.2
2008	376	74	50	400	340	139	42	243	1.6
2009	414	67	67	414	323	132	40	231	1.8
2010	566	65	90	541	306	125	38	219	2.5
2011	581	67	102	545	288	118	36	206	2.6
2012	588	74	120	542	341	140	43	244	2.2
2013	591	77	126	541	368	151	46	263	2.1
2014	618	83	133	568	459	188	57	328	1.7
2015	604	92	132	565	419	172	52	300	1.9
2016	593	99	132	560	460	188	57	329	1.7
2017	605	106	115	596	500	205	63	358	1.7
Average									**2.0**

Notes: Billions of nominal dollars. *Sources*: Nonfarm proprietor misreporting from NIPA table 7.14, wage misreporting from table 7.18 (accessed Feb 19, 2025). Non-filer amounts are based on information returns and 5% for off-the-books income (Auten and Splinter 2024). IRS audit study detected amounts from NRP data (2017 interpolated), overreported income is one-eighth of net underreporting per Guyton et al. (2021), and other sources share based on Table A1 of Guyton et al. (2021).

[14] NIPA non-farm proprietor misreporting (net underreporting) is based on the IRS special audit studies for filers and other sources for non-filers, such as Census Bureau links between survey and tax data, and accounts for about half of non-farm proprietor income. As in our study, NIPA non-farm proprietor underreporting is based on special audits for 2001, 2006, 2008-2010, 2011-2013, 2014-2016 (Bureau of Economic Analysis 2024b). The 15% non-filer share is consistent with IRS (2019), where the individual income tax gap was $31 billion for non-filers and $245 billion for filers.

The denominator of the multiplier is estimated using detected non-farm proprietor and wage net underreporting in the IRS detailed audit studies (Table 2, columns 5 to 8). Total detected net underreporting in these studies is the difference between audit-corrected adjusted gross income (AGI) and reported AGI. But this measure includes income sources beyond just non-farm proprietors and wages. To account for this, our approach is to remove 41% of the detected underreporting associated with those other income sources and then add back overreported income, as multipliers are not applied to overreported income. Estimates from Guyton et al. (2021) are used for these adjustments. Dividing the estimated NIPA misreporting by the adjusted detected underreporting, results in implied NIPA multipliers that average 2.0.

The original multiplier used in Auten and Splinter (2024) was too high and crowded out adjustments to proprietor income. This is because proportional scaling targeted the total combined amount of underreporting plus proprietor adjustments.[15] When splitting underreporting between wage and business income this rescaling also dropped proprietor adjustments. As seen here, however, that had only minor effects. To address these issues, the updated method separately targets the full amounts in national income of non-farm proprietor misreporting, excess depreciation, and residual non-farm proprietor income. However, a limitation of both our original and updated approaches is from allocating underreporting using a distribution that includes underreported capital gains. This is because our audit-study based estimates uses the detailed estimates from Auten and Langetieg (2020), which include capital gains underreporting in adjusted gross income. An alternative method removing underreported capital gains, which are not in national income, would modestly lower our estimated top 1% share of underreporting.

2. Excess depreciation allocated by bonus and linked partnership depreciation

Capital consumption adjustments, or excess depreciation, accounts for the normally faster depreciation in tax data relative to national accounts. Piketty, Saez, and Zucman (2024, p. 5) noted, "Ideally, partnership excess depreciation should be allocated to the ultimate individual owners of the corresponding partnerships. In practice, it is not possible to fully trace the ultimate ownership of partnerships…" Subsequently, Auten and Splinter (2025) traced a large share of partnership depreciation to owners by extending the analysis of Love (2021). These new estimates reveal a relatively modest share of partnership depreciation going to the top 1%. Allocating most excess depreciation by this partnership depreciation distribution increases recent top 1% after-tax income shares by about 0.1 pp. This small effect is because depreciation reduces net income, so businesses with more excess depreciation tend to have lower reported net incomes. In other words, excess depreciation and net income are inversely related, as depreciation increases then net income decreases.[16]

[15] Proprietor adjustments are capital consumption adjustments (i.e., excess depreciation) and residual adjustments that include removing net income from foreign sources and certain meal expenses from tax-reported incomes.

[16] Auten and Splinter (2024, online appendix p. 21) explained that "when allocating by expensing, capital consumption adjustments tend to go lower in the distribution than net business income." This was a reason for our original method, which allocated most excess deprivation by depreciation reported on tax returns (although mostly from sole proprietorships).

To estimate the partnership excess depreciation distribution, Auten and Splinter (2025) first estimated that 39% of partnership depreciation went to the top 1% of tax returns in 2019. This used population data to allocate partnership entity-level depreciation on Form 1065 line 16c to domestic individual tax returns in proportion to partner ownership shares on Forms K-1. This estimate is adjusted to account for excess depreciation tending to reduce one's current-year income more than regular depreciation, which spreads depreciation over more years. This approach indicates 33% of partnership excess depreciation went to the top 1% of tax returns in 2019, referred to here as the linked partnership excess depreciation distribution.[17]

Our allocation method matches the empirical data both before and after re-ranking effects from adding excess depreciation. Specifically, the top 1% of tax returns by reported fiscal income has 33% of this depreciation in our estimates. To test for re-ranking effects from adding excess depreciation to income, this paper follows a suggestion from Gabriel Zucman and add seven-tenths of linked partnership depreciation to reported income. This increases the top group's partnership depreciation share to 59% in our microdata, which approximates the 60% after re-ranking estimate observed in the population data.

Our updated allocation of excess depreciation first adds back 85% of bonus depreciation observed on individual tax returns. This leverages micro-level evidence of excess depreciation. The small cutback is because some of this expensing represents economic depreciation. The linked partnership distribution is then linked to the remaining non-bonus amounts of excess depreciation.

Alternative excess depreciation distributions could also be applied to corporations. However, the national accounts currently only report the combined income amounts of income of both C and S corporations. Bureau of Economic Analysis prototype estimates recently reported separate C and S corporation excess depreciation, but these only covered six years. Since our study spans six decades, using these estimates is problematic. As noted by Auten and Splinter (2024, online appendix p. 21), "these prototype estimates are only for 2012 through 2017 and therefore cannot be used for our full analysis at this time." Furthermore, the prototype estimates have already undergone significant revisions (Bureau of Economic Analysis 2024a) and have not been officially adopted for use in the national accounts. Due to these limitations, this paper's updates to baseline estimates do not use the prototype estimates for S corporation excess depreciation adjustments. Including them, however, would modestly decrease top 1% income shares if allocated by the empirical distribution of S corporation depreciation (Auten and Splinter 2025). S corporation adjustments are therefore incorporated in the lower-bound sensitivity test in Section II.

[17] The linked partnership excess depreciation distribution is 25%, 8%, 13%, 6%, 15%, 33% to the negative, bottom 50%, P50–90, P90–95, P95–99, and top 1% of tax returns ranked by fiscal income. Amounts are allocated proportionally to the absolute value of partnership net income within each income group.

3. Improved estimates of non-filer income

This paper includes an improved method of estimating non-filer income to better reflect the likely distribution of this income. Previously, non-filer underreporting was allocated by non-filer income on information returns, such as Form W-2 and those for dividends and interest. This approach was problematic because it allocated underreporting that does not appear on information returns by the distribution of income that does appear on information returns, even though this underreported income is likely lower in the distribution. To address this issue, the non-filer underreporting allocation is updated to being proportional across non-filing tax units under age 65. Note that non-filer underreporting is only 5% of total underreported amounts, so this update has only limited effects on top income shares.

4. Revised NIPA data

The Bureau of Economic Analysis regularly revises NIPA data. This paper updates our estimates to reflect the most recent NIPA data revisions and revised data from the Federal Reserve Financial Accounts for inflation adjustments. These revisions have only modest effects on our estimates, as seen in Table 1. But certain tax-related NIPA values appear incorrect for 2022. The total federal individual income taxes in NIPA ($2.6 trillion) significantly exceeds the amount based on tax data ($2.2 trillion). This discrepancy arises from two factors. First, it appears the NIPA value was extrapolated from prior-year taxes that spiked due to a one-time surge in capital gains realizations in 2021. Second, the 2022 tax data was not released until late 2024, likely delaying the incorporation of this data. To address this issue, the current NIPA value of federal individual income taxes is replaced with the more accurate tax-data amount of $2.2 trillion. State income taxes are adjusted by the same factor (from $0.6 trillion to $0.5 trillion) and refundable credits reduced to better approximate the tax data. In future updates, we expect to be able to use the revised NIPA values for 2022.

5. Account for fiduciary and tax-exempt partnership income

The national accounts measure of partnership income makes various adjustments to entity-level income to better reflect economic income, as seen in NIPA table 7.14. However, some partnership income does not flow through to individual tax returns because it goes to fiduciaries (estates and trusts) or tax-exempt owners (non-profits and retirement funds). Our original method did not directly account for those partnership owners. To address this, we recategorize some fiduciary and tax-exempt income to account for missing partnership income from these sources. This treats partnership income more consistently with other investment income (dividends, retained earnings, and interest), and results in small changes to our top 1% income shares.[18]

[18] Some of this partnership income was indirectly accounted for in the original method because corrected fiscal income without a source was assumed to be primarily from partnerships. This update removes most uncategorized income.

The best estimates of partnership income by owner type are from Love (2021), which traced about 99% of this income to owners for 2011–2019. The adjustments in this section are applied since 2011, the first year analyzed in that study.[19] Fiduciaries, which include trusts and estates, account for 9% of partnership income. Our analysis accounts for this by changing our fiduciary "other" income (i.e., not interest or dividends) from being categorized as rents to being categorized as partnership income and continues to distribute it by fiduciary income reported on individual tax returns.

Tax-exempt owners include universities, charitable organizations, foundations, and retirement funds. Love (2021) estimated these tax-exempt owners account for around 10% of partnership income, which includes some foreign-based accounts having tax-exempt owners.[20] This share is divided evenly between non-profits and retirement funds, allocating 5% of entity-level partnership net income like non-profit income and 5% like defined benefit retirement allocations. These tax-exempt partnership owners provide another reason to not scale up reported partnership income to account for amounts not reported on individual tax returns (Auten and Splinter 2025).

IV. Summary

This extension and update to Auten and Splinter (2024) incorporates several improved methods and revised national income data. It shows the large fluctuations in U.S. income inequality during the pandemic recession and recovery. While increased government transfers fully offset distribution-wide inequality increases during the pandemic, by 2022 government relief measures ended and inequality was higher than before the pandemic. The long-run increase in government redistribution, however, has continued in recent years.

A limitation of tax data for estimating the distribution of national income is that approximately 40% of national income is not observed on tax returns. This missing income results from various factors, including tax noncompliance and differences in how income is reported in tax data compared to national accounts. Our updated approach incorporates improved methods for allocating differences between these two income definitions. Studies of the distribution of national income remain works in progress. These estimates can continue to improve from incorporating additional data, such as the new partnership depreciation distributions used here. Indeed, the Auten and Splinter methods were updated many times between 2016 and 2024 to incorporate more data, as discussed in our supplementary appendix.

[19] Before 2011, the partnership income is a smaller share of total income and the tax-exempt share is likely smaller.

[20] Johannsson et al. (2024) directly identified $49 billion of offshore partnership assets owned by non-profit organizations in 2018, but accounting for unmatched TINs suggests higher amounts and estimates by Auten suggest total tax-exempt offshore partnership assets may have been as much as $200 billion.

The adjustments in this paper have relatively small effects on our estimate of the distribution of income. For comparison, an update to Piketty, Saez, and Zucman (2018) in the treatment of retirement accounts lowered their top 1% income share estimates by about one percentage point. Revisions to personal income distribution estimates by the Bureau of Economic Analysis (2024c) led to changes in top 1% shares of more than two percentage points. The updates and improvements introduced in this paper change the Auten and Splinter estimates much less than these recent examples.

Sensitivity tests also show the Auten and Splinter estimates of top 1% income share to be robust to many alternative assumptions, with an average of about half of a percentage point above and more than one percentage points below our main estimates. This suggests our estimates are likely in the upper-end of the plausible range of estimates. As in our original estimates, after-tax top 1% income shares declined in the late 1960s and increased in the late 1980s and 1990s. However, after-tax top income shares are little changed relative to the early 1960s.

References

Auten, Gerald, and Patrick Langetieg. 2020. "The Distribution of Underreported Income: What We Can Learn from the NRP." Working paper. Current version www.irs.gov/pub/irs-soi/23rpdistributionunderreportednrp.pdf

Auten, Gerald, and David Splinter. 2021. "Comment: Tax Evasion at the Top of the Income Distribution: Theory and Evidence." Working paper.

Auten, Gerald, and David Splinter. 2024. "Income Inequality in the United States: Using Tax Data to Measure Long-Term Trends." *Journal of Political Economy* 132(7): 2179–2227.

Auten, Gerald, and David Splinter. 2025. "Reply to Comment by Piketty, Saez, and Zucman (2024): Income Inequality in the United States." Working paper.

Auten, Gerald, ad David Splinter, and Susan Nelson. 2016. "Reactions of High-Income Taxpayers to Major Tax Reforms." *National Tax Journal* 69(4): 935–964.

Autor, David, David Cho, Leland D. Crane, Mita Goldar, Byron Lutz, Joshua Montes, William B. Peterman, David Ratner, Daniel Villar, and Ahu Yildirmaz. 2022a. "The $800 Billion Paycheck Protection Program: Where Did the Money Go and Why Did It Go There?" *Journal of Economic Perspectives* 36 (2): 55–80.

Autor, David, Dube, Arindrajit, McGrew, Annie, 2024. "The Unexpected Compression: Competition at Work in the Low Wage Labor Market." NBER Working Paper 31010.

Beggs, William, and Thuong Harvison. 2023. "Fraud and Abuse in the Paycheck Protection Program? Evidence from Investment Advisory Firms." *Journal of Banking & Finance* 147: 106444.

Blanchet, Thomas, Emmanuel Saez, and Gabriel Zucman. 2022. "Real-Time Inequality." NBER working paper No. 30229.

Bureau of Economic Analysis. 2024a. "Prototype NIPA Estimates of Profits for S Corporations — Table Updates." May 15, 2024.

Bureau of Economic Analysis. 2024b. "Chapter 11: Nonfarm Proprietors' Income." December. Accessed Feb. 2025.

Bureau of Economic Analysis. 2024c "Summary of Methodological Updates: Distribution of Personal Income Statistics." December. Accessed Feb. 2025.

Burkhauser, Richard V., Shuaizhang Feng, Stephen P. Jenkins, and Jeff Larrimore. 2012. "Recent Trends in Top Income Shares in the United States: Reconciling Estimates from March CPS and IRS Tax Return Data." *Review of Economics and Statistics* 44(2): 371–388.

Clarke, Conor, and Wojciech Kopczuk. 2025. "Measuring Income and Income Inequality." Forthcoming. *Journal of Economic Perspectives*.

Clemens, Jeffrey, Philip G. Hoxie, and Stan Veuger. 2025. "Was Pandemic Relief Effective Fiscal Stimulus? Evidence from Aid to State and Local Governments." SSRN working paper.

Congressional Budget Office. 2025. "Sensitivity of the Distribution of Household Income to Capital Gains, 1979 to 2021." (data underlying figures) CBO report, Washington, DC.

Dalton, Michael. 2023. "Putting the Paycheck Protection Program into Perspective: An Analysis Using Administrative and Survey Data." *National Tax Journal* 76 (2): 393–437.

Ferriere, Axelle, and Gaston Navarro. 2020. "The Heterogeneous Effects of Government Spending: It's All about Taxes." Working paper.

Goodman, Lucas. 2023. "Delivering Aid to Business through the Payroll Tax System: The Case of the Employee Retention Credit." *National Tax Journal* 76(2): 439–463.

Gorman, William, Jamie McGuire, and David Splinter. 2024. "Who Evades Taxes? Understanding the U.S. Tax Gap." Presentation at University of Minnesota, Sept. 24, 2024

Griffin, John M., Samuel Kruger, and Prateek Mahajan. 2023. "Did FinTech Lenders Facilitate PPP Fraud?" *Journal of Finance* 78 (3): 1777–1827.

Guyton, John, Patrick Langetieg, Daniel Reck, Max Risch, and Gabriel Zucman. 2021. "Tax Evasion at the Top of the Income Distribution: Theory and Evidence." March. NBER working paper No. 28542

IRS. 2022. "Estimation of the Underreporting Tax Gap for Tax Years 2014–2016: Methodology." Publication 5784.

Niels Johannesen, Daniel Reck, Max Risch, Joel Slemrod, John Guyton, and Patrick Langetieg. 2024. "The Offshore World According to FATCA: New Evidence on the Foreign Wealth of U.S. Households." *Tax Policy and the Economy* 38: 61–99.

Johns, Andrew, and Joel Slemrod. 2010. "The Distribution of Income Tax Noncompliance." *National Tax Journal* 63(3): 397–418.

Joint Committee on Taxation. 2013. "Modeling the Distribution of Taxes on Business Income."

Larrimore, Jeff, Jacob Mortenson, and David Splinter. 2023a. "Earnings Business Cycles: The Covid Recession, Recovery, and Policy Response." *Journal of Public Economics* 225: 104983.

Larrimore, Jeff, Jacob Mortenson, and David Splinter. 2023b. "Unemployment Insurance in Survey and Administrative Data." *Journal of Policy Analysis and Management* 42(2): 571–579.

Love, Michael. 2021. "Where in the World Does Partnership Income Go? Evidence of a Growing Use of Tax Havens." Working paper. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3985535

OECD (2024), *OECD Handbook on the Compilation of Household Distributional Results on Income, Consumption and Saving in Line with National Accounts Totals*. OECD Publishing, Paris, https://doi.org/10.1787/5a3b9119-en.

Parker, Jonathan A., and Annette Vissing-Jorgensen. 2010. "The Increase in Income Cyclicality of High-income Households and its Relation to the Rise in Top Income Shares." *Brookings Papers on Economic Activity* 41:1–70.

Piketty, Thomas, and Emmanuel Saez. 2003. "Income Inequality in the United States, 1913-1998." *Quarterly Journal of Economics* 118(1): 1–39.

Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman. 2024. "Income Inequality in the United States: A Comment." August 16, 2024, version. Accessed on September 19, 2024.

Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman. 2018. "Distributional National Accounts: Methods and Estimates for the United States." *Quarterly Journal of Economics* 133(2): 553–609.

Riedel, Lukas, and Holger Stichnoth. 2022. "Government Expenditure in the DINA Framework: Allocation Methods and Consequences for Post-tax Income Inequality." ZEW Working Paper no. 22-004.

Rothschild, V. Henry, and Rudolf Sobernheim. 1958. "Expense Accounts for Executives." *Yale Law Journal* 67(8): 1363–1392.

Smith, Matt, Owen Zidar, and Eric Zwick. 2023. "Top Wealth in America: New estimates under Heterogeneous Returns." *Quarterly Journal of Economics* 138(1): 515–573.

Splinter, David. 2020. "U.S. Tax Progressivity and Redistribution." *National Tax Journal* 73(4): 1005–1024.

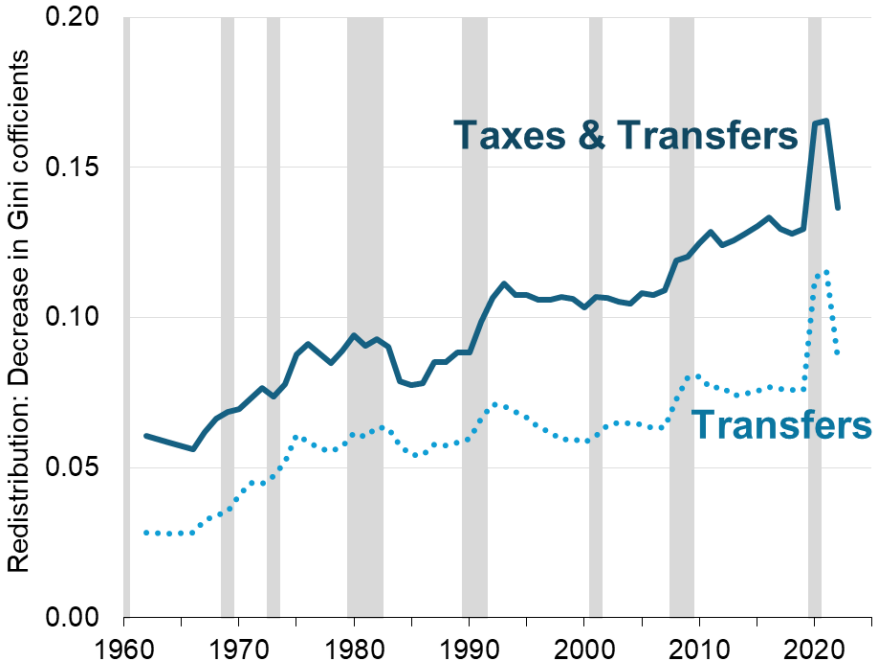
Splinter, David. 2023. "Stimulus Checks: True-Up and Safe-Harbor Costs." *National Tax Journal* 76(2): 349–366.

Splinter, David, James Elwell, and Lin Xu. 2025. "Advance Tax Credits: Reconciliations and Repayments." Working paper.

Splinter, David, Eric Heiser, Michael Love, and Jacob Mortenson. 2025. "The Paycheck Protection Program: Progressivity and Tax Effects." Working paper, 2025.

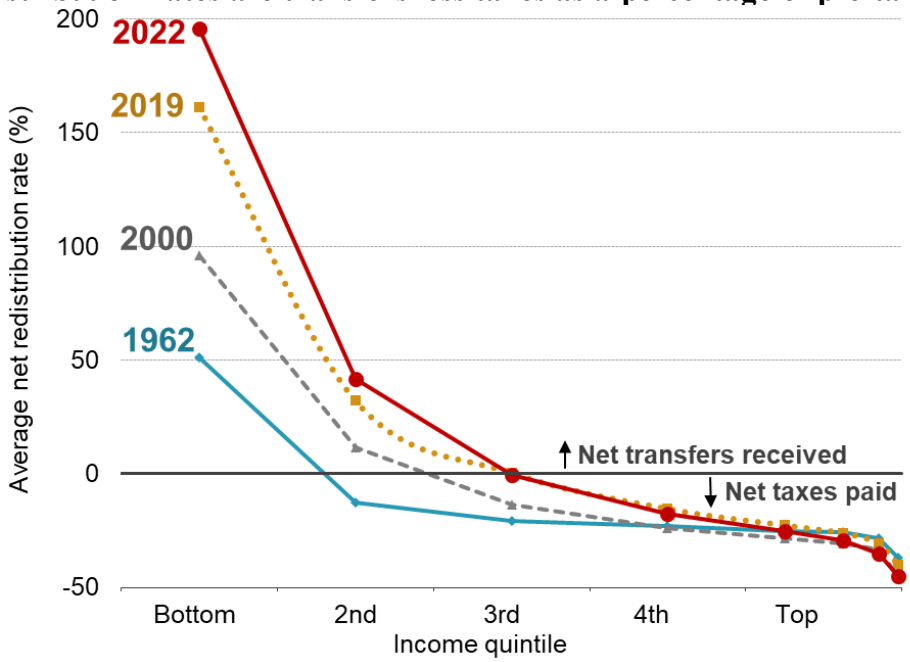
Troiano, Ugo. 2017. "Do Taxes Increase Economic Inequality? A Comparative Study Based on the State Personal Income Tax." NBER working paper No. 24175.

Figure A1: Gini coefficient decreases from transfers and taxes, 1962 to 2022



Notes: Years are shaded if a recession occurs during the year. This shows the difference between the Gini coefficients of income before taxes and transfers and income after taxes and transfers (no government deficits or consumption). This includes some re-ranking of tax units from pre-tax to after-tax income, which decreases estimated redistribution relative to a fixed rank approach (as seen in Figure 2). *Sources*: Authors' calculations using tax data and NBER.

Figure A2: Redistribution increased
(redistribution rates are transfers less taxes as a percentage of pre-tax income)



Notes: Average net redistribution rates are all cash and non-cash transfers (excluding government consumption) less taxes (federal, state, & local taxes, including payroll taxes) divided by pre-tax income of each income group. The top quintile is divided into four groups: P80–90, P90–95, P95–99, and top 1%. *Sources*: Authors' calculations using tax data.

Table A1: Top 1% income shares and Gini coefficients

	Top 1% Income Shares			Gini Coefficients		
	Pre-tax Income	Pre-tax income plus transfers	After-tax income	Pre-tax Income	Pre-tax income plus transfers	After-tax income
1960	0.104	0.099	0.081	0.437	0.405	0.346
1961						
1962	0.112	0.107	0.086	0.436	0.408	0.348
1963						
1964	0.115	0.110	0.089	0.430	0.402	0.343
1965						
1966	0.115	0.110	0.091	0.432	0.404	0.347
1967	0.113	0.107	0.085	0.431	0.399	0.337
1968	0.111	0.106	0.082	0.431	0.397	0.333
1969	0.101	0.096	0.075	0.423	0.388	0.325
1970	0.093	0.088	0.068	0.420	0.379	0.317
1971	0.096	0.090	0.070	0.430	0.385	0.321
1972	0.097	0.091	0.071	0.424	0.380	0.317
1973	0.095	0.089	0.074	0.427	0.380	0.323
1974	0.092	0.086	0.070	0.431	0.379	0.321
1975	0.093	0.085	0.069	0.442	0.381	0.318
1976	0.094	0.086	0.070	0.438	0.380	0.314
1977	0.094	0.087	0.073	0.443	0.387	0.324
1978	0.093	0.086	0.073	0.439	0.384	0.326
1979	0.094	0.087	0.073	0.443	0.386	0.327
1980	0.091	0.084	0.069	0.449	0.388	0.325
1981	0.090	0.082	0.070	0.448	0.388	0.327
1982	0.092	0.083	0.069	0.456	0.393	0.328
1983	0.095	0.086	0.072	0.465	0.402	0.338
1984	0.098	0.090	0.077	0.464	0.407	0.351
1985	0.100	0.091	0.077	0.463	0.408	0.350
1986	0.099	0.090	0.074	0.468	0.413	0.353
1987	0.101	0.092	0.076	0.470	0.412	0.351
1988	0.113	0.103	0.087	0.472	0.415	0.355
1989	0.108	0.099	0.082	0.472	0.414	0.352
1990	0.107	0.097	0.083	0.473	0.414	0.352
1991	0.105	0.094	0.077	0.474	0.408	0.341
1992	0.112	0.100	0.081	0.485	0.414	0.344
1993	0.107	0.095	0.073	0.483	0.412	0.339
1994	0.106	0.095	0.074	0.479	0.410	0.341
1995	0.112	0.100	0.078	0.483	0.417	0.346
1996	0.117	0.105	0.082	0.486	0.423	0.353
1997	0.122	0.110	0.086	0.494	0.432	0.362
1998	0.125	0.113	0.087	0.494	0.435	0.363
1999	0.129	0.116	0.090	0.495	0.435	0.365
2000	0.134	0.122	0.095	0.504	0.445	0.376
2001	0.125	0.113	0.087	0.500	0.440	0.366
2002	0.119	0.106	0.082	0.501	0.436	0.359
2003	0.122	0.109	0.085	0.508	0.443	0.365
2004	0.132	0.118	0.092	0.515	0.451	0.374
2005	0.141	0.126	0.099	0.523	0.458	0.381
2006	0.146	0.131	0.101	0.529	0.465	0.388
2007	0.145	0.129	0.097	0.526	0.462	0.383
2008	0.139	0.122	0.090	0.534	0.461	0.375
2009	0.129	0.112	0.082	0.530	0.450	0.358
2010	0.139	0.121	0.090	0.540	0.460	0.364
2011	0.136	0.119	0.087	0.541	0.465	0.364
2012	0.150	0.131	0.098	0.551	0.474	0.381
2013	0.138	0.121	0.087	0.542	0.468	0.378
2014	0.144	0.126	0.092	0.546	0.471	0.382
2015	0.140	0.123	0.089	0.544	0.468	0.379
2016	0.138	0.120	0.087	0.543	0.467	0.376
2017	0.144	0.126	0.092	0.547	0.471	0.384
2018	0.146	0.128	0.095	0.545	0.469	0.383
2019	0.143	0.125	0.092	0.544	0.468	0.380
2020	0.158	0.130	0.091	0.576	0.463	0.368
2021	0.169	0.140	0.102	0.582	0.467	0.381
2022	0.155	0.134	0.103	0.562	0.476	0.396