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EXPANDED INCOME

A NEW ANNUAL INCOME CLASSIFIER FOR DISTRIBUTIONAL TAX ANALYSIS

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ABSTRACT

Published IRS tables generally sort taxpayers by Adjusted Gross Income (AGI) for purposes of reporting tax statistics. Distributional analyses of tax policy in government agencies and non-profits, however, typically use more expansive income classifiers to better reflect households' true economic income or, alternatively, potentially taxable income. In this paper, we introduce a new income measure—Expanded Income (EI)—as a classifier for tax analysis. EI is generally broader than the income classifiers used by Joint Committee on Taxation, the Treasury Department, the Congressional Budget Office and Tax Policy Center and thus is closer to a Haig-Simons comprehensive income measure than are other classifiers. EI includes estimates of annualized unrealized capital gains, imputed income from owner-occupied housing, unreported business income, inheritances received, Medicare, Medicaid, and other items. We construct EI using the Survey of Consumer Finance (SCF), NBER's TAXSIM calculator, and other data sources. We show that aggregate EI is about 90 to 100% larger than aggregate AGI since 2000. The largest proportional differences between EI and AGI occur at the top and the bottom of the EI distribution. The largest single component of the difference between AGI and EI is unrealized capital gains, which have exceeded 30% of AGI in some recent years. Re-ranking tax units using EI greatly reduces the share of taxes paid at the top of the income distribution, and increases the share paid in the second and third quintiles.

AUTHOR NOTES

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I. Introduction

Determining who bears the burden of taxation is one of the oldest and most controversial issues in economics. To address this question, it is often useful to classify individuals or households by a measure of their current economic status. In principle, the main alternative measures are either consumption or income. In practice, the government agencies and nonprofit institutions that provide distributional analysis tend to use measures of income as proxies for economic status.

Adjusted gross income (AGI) may appear, at first glance, to be the most obvious classifier, especially because it is listed directly on the income tax form. AGI, however, is subject to well-known problems as a classifier. AGI omits several sizable components of income, making it difficult to compare households at a given point in time. And the legal definition of AGI can vary over time because of changes in tax law, making it difficult to make meaningful comparisons of households over time.

In light of these issues, the government agencies—the Congressional Budget Office (CBO), Joint Committee on Taxation (JCT), and the Department of the Treasury's Office of Tax Analysis (OTA)—and the nonprofit institutions—such as the Urban-Brookings Tax Policy Center (TPC)—that explore distributional analysis tend to use broader measures of income as their classifier. Although all these measures are broader than AGI, they omit several sizable components of a comprehensive income measure—including non-cash forms of income such as imputed rents on owner-occupied housing and unrealized capital gains.

To address these shortfalls, in this paper, we develop a new measure, which we call "Expanded Income" (EI). EI is a generally broader measure of income than used in the organizations listed above. Like the other measures, EI includes a variety of forms of cash income that are omitted from AGI (such as employer and employee contributions to payroll taxes and retirement plans, inside build up in retirement plans, tax-exempt interest), corporate income taxes, near-cash items such as the Supplemental Nutrition Assistance Program (SNAP—formerly, food stamps), as well as employer- and government-provided health insurance. Unlike the other measures, EI includes a variety of additional forms of income, including (1) untaxed closely held business income, (2) an annualized measure of unrealized capital gains, (3) imputed rental income on owner-occupied housing, (4) net child support income, (5) inheritances received and (6) the value of Medicare and Medicaid benefits. These additions make EI closer than other classifiers to a Haig-Simons income measure and affect the level and distribution of measured income and taxes.

To develop EI estimates, we use data from several waves of the Survey of Consumer Finances (SCF), a public-use triennial household survey that contains information on household demographics, income, and wealth. We split the household data into tax units using a methodology developed in Gale et al. (2022a, b). We supplement the data with information from several additional sources. We develop estimates of AGI and EI using the core income variables in the SCF and a variety of adjustments, imputations, and alignments using several micro and macro data sets. The SCF is well-suited for estimating these income components because it oversamples high-income households and contains detailed information on business values and income, the asset values that determine capital gains and rental income, child support flows, and inheritances received. To calculate federal income tax liabilities, we apply the data to NBER's TAXSIM model (Feenberg and Coutts 1993).

Our main findings are as follows. First, aggregate EI is about 90 to 100% larger than aggregate AGI across SCF years 2001 to 2022. Second, over the same period, EI has grown somewhat faster than AGI. Third, the largest proportional differences between EI and AGI occur at the top and the bottom of the EI distribution. In particular, our estimates of untaxed business incomes, unrealized capital gains, and inheritances are highly concentrated among the affluent. Fourth, the largest component of the difference between AGI

and EI is unrealized capital gains, which have exceeded 30% of AGI in some recent years. Fifth, using EI as the income measure, rather than AGI, generates lower average individual income tax rates among the highest-income taxpayers, reduces their share of tax burdens, and raises the share paid by tax filing units in the second and third EI quintiles.

Section II provides definitions of EI and other income measures. Section III reports a variety of characteristics of EI and its relation to other measures. Section IV reports some implications for the level and distribution of tax burdens. Section V is a short conclusion. Appendix I discusses the construction and validation of our estimates of tax units, AGI, and taxes, including a description of how we use data on the Forbes 400 to supplement SCF data. Appendix II provides details on the construction of EI.

II. Defining EI and other measures of income

Table 1 shows the income components included and excluded in the distributional classifiers used by various organizations. The comparison in Table 1 starts with Adjusted Gross Income (AGI), then covers the Congressional Budget Office (CBO) "Income Before Taxes and Transfers" measure, the Joint Committee on Taxation (JCT) "Expanded Income" measure, the Office of Tax Analysis (OTA) "Cash Income" measure, and the Tax Policy Center (TPC) "Expanded Cash Income" measure. Table 1 shows what is included and excluded from each income classifier across five broad types of income: labor, tax preferred retirement, capital, government transfers, and private transfers.

Although the details of the CBO, JCT, OTA, TPC and our new (EI) classifiers differ, there are several common features. For example, the alternative classifiers generally add incomes that represent real resource flows but are excluded from AGI to achieve various policy goals. For example, the five distributional classifiers all include employer-provided health benefits and employer-paid Social Security and Hospital Insurance (HI) taxes, tax-exempt interest, corporate income tax liability, and nontaxable Social Security benefits.

There are notable differences between the alternative classifiers as well, some of which are philosophical, and some of which are data driven. For example, the decision to include contributions to and inside build-up within tax preferred retirement plans is generally philosophical because the eventual withdrawals are taxable and included in AGI, and it can be argued counting both untaxed and taxable flows constitutes double counting, at least in a lifetime sense. The counter argument in Rosenberg (2013) is that an annual classifier should include both taxable and untaxed flows, after correcting for within-year double counting. Other differences between the classifiers, such as the decision to include pre-tax employee-paid health premiums, is more tied to the available data and modeling approach used to construct the alternative classifiers.

On net, the income concept most similar to our Expanded Income (EI) measure in terms of components is the TPC's classifier, "Expanded Cash Income" (ECI) (Rosenberg 2013). As the table shows, ECI is generally a more comprehensive measure than those used by the government agencies but is less comprehensive than EI. In particular, EI includes measures of unrealized gains, unreported business income, imputed rental income from owner-occupied housing, and inheritances received that are omitted by classifiers used by other organizations.

Given our construction of AGI (see Appendix I), we calculate EI in two steps. First, we calculate ECI by following TPC's calculations (Rosenberg 2013). That is, we start with AGI and add untaxed employer-provided benefits, employer payroll taxes for Social Security and Medicare, untaxed retirement contributions and inside buildup, tax-exempt interest, corporate income tax liability, nontaxable Social Security, and means-tested transfers.

Second, given our estimate of ECI, we construct EI. The change in descriptor from ECI to EI tells most of the story. Our EI measure goes beyond ECI to include non-cash incomes, such as our annualized measure of unrealized capital gains, the imputed rent of owner-occupied housing, and government health transfers. We also include some forms of cash income that are not included in ECI—untaxed closely held business incomes, inheritances received, and net child support. As shown below, these adjustments expand the total amount of income used for classification and add disproportionately to the top of the EI distribution.

From a theoretical perspective, adding the additional income components moves the EI measure closer to the Haig Simons benchmark income concept (see Haig 1921; Simons 1938). In simplest terms Haig-Simons income captures consumption plus the change in net worth, which is the total resource flow for a given individual over a given period. As such, Haig-Simons income is widely accepted as the proper benchmark for measuring the distributional burden of taxes (see Joint Committee on Taxation, 2012).

The textbook version of Haig-Simons income seems simple, but real-world application is bit more complicated. Some of the nuances were recognized by Haig and Simons themselves. For example, if the value of an asset goes up, but the owner never intends to sell the asset and consume, is that really a form of income to the individual? Our measure of EI counts all capital gains, which is consistent with a specific interpretation of the Haig-Simons income concept that assigns the value of eventual bequests to the decedent.

The lifetime versus annual income concept also raises the issue of asset price volatility. Our measure of capital gains automatically includes the realized component of capital gains because that is part of AGI. We also generate an estimate of annualized total capital gains, and then define unrealized gains by subtracting realized gains from the annualized total gains during the year. The annualized capital gains concept uses the average capital gains rates over our sample period applied to the observed asset holdings at the beginning of the year and thus avoids the large fluctuations that would occur if we used the actual capital gains rates for each year.

The treatment of private wealth transfers is another key implementation issue. In general, Haig-Simons income is described for a given individual over a given period. Our measure of EI includes inheritances received, because the individual making the transfer is (by construction) not included in the data. The treatment of wealth transfers between two living individuals is more nuanced. We count legally required transfers (alimony and child support) as offsetting reductions in income for the payer and increases in income for the payee. By ignoring other wealth transfers (such as gifts or voluntary support) we are implicitly assigning the consumption value of the transfer to the individual making the transfer.

III. Characteristics of EI relative to other income measures

A. MAGNITUDE OF AGGREGATE EI, ECI, AND AGI

Table 2 shows how our estimates of total EI and ECI compare to our estimate of total AGI across SCF survey years. Estimated total ECI is a little more than one third larger than total AGI, with little trend over time, consistent with TPC's measure of ECI (Rosenberg 2013). Our estimate of EI is quite a bit larger, roughly twice as large as AGI across survey years.

Figure 1 shows that EI has grown a bit faster than AGI over time, and that the ratio of EI to AGI has risen from about 180% in tax year 2000 (represented by the 2001 SCF) to about 195% in tax year 2021.[1]

B. MAGNITUDE OF COMPONENTS OF ECI AND EI NOT INCLUDED IN AGI

Table 2 also shows the magnitude of the components of EI that are not included in AGI. Untaxed labor and retirement-related incomes are the largest components of ECI not included in AGI. Employer-provided health insurance and deductible employee-paid health insurance premiums together add up to about 8 to 10% of AGI, and employer-paid payroll taxes around another 5 or 6%. Untaxed retirement plan contributions and inside buildup with Defined Benefit (DB) and Defined Contribution (DC) pensions—the sum of contributions to pension plans and the interest, dividends, and capital gains earned by retirement plans, net of retirement plan distributions (which are included in AGI)—equal 12 to 15% of AGI. ECI also includes two substantial untaxed forms of government transfers, the non-taxable part of Social Security and various means-tested cash and near cash transfers, that together amount to 5 or 6% of AGI. Finally, in terms of capital incomes, ECI includes nontaxable interest (less than 1% of AGI) and corporate income taxes (about 3% of AGI in recent years).

When the classifier is expanded from ECI to EI, capital income plays a much more sizable role. Unrealized capital gains—the difference between our estimate of total annualized capital gains and SCF respondent-reported taxable gains—is far and away the largest part of the gap between AGI and EI, equal in size to about 30% of AGI in recent years (and about two-thirds of the difference between ECI and EI). Untaxed closely held business income is roughly 8% of AGI in recent years, imputed rent on owner occupied housing is nearly 5%, and both are rising over time. Inheritance income adds another 2 to 5% to AGI, and Medicare and Medicaid income together add between 5 and 10% of AGI. Net child support income, in the aggregate, is (and should be) close to zero. It is negative in the Table because people who pay support are more likely to report it than people who receive it.

C. DISTRIBUTION OF AGGREGATE AGI, ECI, AND EI

Table 3 shows the distribution of aggregate AGI, ECI, and EI in tax year 2018 across the distribution of EI. Based on our SCF-TAXSIM estimates, the bottom quintile receives 4.9% of all AGI; the top quintile receives 55%, and the top 1% receives 16.2%.

Aggregate ECI is distributed more equally than AGI. The bottom quintile receives 5.6% of ECI, the top quintile receives 52%, and the top 1% receives 13.4%. This occurs because the components of ECI that are not in AGI are quite progressive. In the aggregate, of the additions to ECI relative to AGI, 7.3% go to the bottom quintile, 44.6% to the top quintile, and 6.5% to the top 1%.

In contrast, EI is distributed more unequally than AGI. The bottom quintile receives 5.2% of EI, the top quintile receives 56.6%, among which the top 1% receives 18%. The top 1% share of EI is substantially larger—18% versus 16.2%—than its share of AGI. This occurs because many the components of EI that are not included in ECI are distributed extremely unequally. In the aggre-

gate, 4.3% of those additions to ECI go to the bottom quintile, 67.1% to the top quintile, including 28.7% to the top 1%.

In the aggregate, of the total difference between EI and AGI, 5.5% goes to the bottom quintile, 58.2% to the top quintile, and 19.9% goes to the top 1%.

D. DISTRIBUTION OF COMPONENTS OF EI AND ECI NOT IN AGI

Table 3 also reports on how the various individual components added to AGI are distributed across the EI distribution.

Most of the adjustment from AGI to ECI involves items related to labor income or government transfers. Health insurance coverage and plan generosity rise with earnings. As a result, we estimate 59.5% of untaxed employer-provided benefits (compared to 74.1% of AGI and 73.8% of EI) benefits tax units in the top 40% of the EI distribution. This group also receives about 66% of the benefits of employer-paid payroll taxes. The benefits of tax-preferred retirement plans are even more skewed—with 86% of benefits going to the top 40% of tax units, including a whopping 47% going to the top 10% alone. (these estimates are consistent with Sabelhaus and Volz 2022).

The capital income components of ECI are much smaller than the labor- and retirement-based components, but (as expected) they are more skewed to the top income groups than the labor and retirement components. Tax-exempt interest is just under 1% of AGI, but virtually all of it flows to the top quintile and more than half flows to the top 1% of taxpayers. Corporate income taxes are also skewed to the top of the EI distribution, with 85% borne by the top 40%, including 68% borne by the top quintile. (We follow TPC (Nunns 2012) in allocating the corporate income tax—with 20% allocated proportionally to labor income, 60% proportionally to corporate equity holdings, and 20% proportionally to all capital income.)

The government transfers in ECI are (again, as expected) distributed towards lower EI groups. More than half of non-taxable Social Security accrues in the bottom half of the EI distribution, but there is a fair amount in the top of the distribution as well.[2] Unsurprisingly, means-tested government transfers such as SSI, TANF, and SNAP are also skewed towards the bottom of the EI distribution.

Medicare and Medicaid follow a similar pattern. Medicare is very evenly distributed, with approximately 20% falling to each EI quintile. Medicaid is slightly more skewed towards the bottom of the EI distribution, with 50% accruing to the bottom two quintiles and only 2.6% accruing to the top 10%. This is largely a function of how we allocate these forms of income—each SCF respondent that reports Medicare or Medicaid eligibility is allocated a proportional share of the total benefits recorded in that year.

In contrast to the adjustment from AGI to ECI, the largest components of the adjustment from ECI to EI are forms of capital income, concentrated at the top of the income distribution. We estimate that the untaxed component of SCF respondent-reported business incomes is heavily skewed towards the top of the EI distribution—81% accrue to taxpayers in the top quintile, and 37% in the top 1%.

Unrealized capital gains (and SCF reported realized capital gains) are similarly skewed towards the top of the EI distribution because wealth and EI are highly correlated. Imputed rent on owner occupied housing is also skewed towards the top of the distribution, though less so than unrealized capital gains and untaxed business income. Inheritance income is highly skewed towards the top of the distribution—over 90% of inheritance income accrues to taxpayers in the top EI quintile. Net child support is largely allocated to low-income taxpayers, although it is a negligible component of total EI.

E. THE JOINT DISTRIBUTION OF EI AND AGI

Changing the income classifier from AGI to EI changes the level of income, as noted above, and can also change the sorting of tax filing units across distributional groups. Table 4 shows a cross-tabulation of tax filing units by EI and AGI groups using tax-year 2018

data. Most observations in any EI (or AGI) percentile group are in the same percentile group when using the other classifier, as shown by the large values on the diagonal entries.

Taxpayers are more likely to move up two or more quintiles when switching from AGI to EI than vice-versa. This occurs because some tax filing units have low AGI but substantial amounts of untaxed income (unrealized capital gains or imputed rent, for example) and thus have high EI. In contrast, since EI includes AGI, there are no taxpayers with little EI and high AGI

F. EI RELATIVE TO AGI BY INCOME AND DEMOGRAPHIC CHARACTERISTICS

Figure 2 shows the ratio of aggregate EI/AGI when sorting tax filing units either by EI or by AGI. Across most of the income distribution—measured by either EI or AGI—the ratio is roughly similar—between 1.8 and 2. There are key differences in the tails, though.

When sorting by AGI, the ratio of EI/AGI in the first AGI decile is 22.9. (This figure is omitted from the graph because including it would fundamentally change the scale of the vertical axis and dominate other information in the chart.) The high ratio arises because many taxpayers have no or very little AGI, but they do have substantial untaxed sources of income—such as imputed rent, untaxed Social Security, inheritance income, Medicare and Medicaid, or unrealized capital gains. In contrast, when (properly) sorting by EI, the EI/AGI ratio is just above 2 in EI deciles 2-4 and at the top, somewhat higher than the rest of the distribution.

Figures 3-6 show the ratio of EI to AGI for different demographic measures.[3] Figure 3 shows that the ratio rises with age of the household head, which is not surprising given that EI is closely tied to wealth and wealth-to-income ratios rise over the life-cycle. Figure 4 shows that the ratio of EI of AGI is higher for married couples and lowest for heads of households, with single filers in between. Again, this result is not surprising, given the overall better economic condition, and older age, of married couples relative to unmarried individuals.

Figure 5 shows that the ratio of EI to AGI is higher for white tax units than Black tax units.[4] We explore this difference in great detail in Gale, Hall, and Sabelhaus (2024). In short, the difference largely reflects the fact that much of the difference between EI and AGI consists of capital income, which is distributed disproportionately to the top of the income distribution, and white tax units have both higher income and more capital income, controlling for overall income, than Black units.

Finally, Figure 6 presents a somewhat surprising result that the ratio of EI to AGI does not vary much by the highest educational attainment of the respondent or spouse.

IV. Implications for the levels and distribution of tax burdens

A new income classifier will create new results for the level and distribution of average tax rates. Figure 7 shows average tax rates over the income distribution using AGI and EI in tax year 2018. The blue bars sort taxpayers by AGI and reflect the ratio of group tax liability (after credits) to group AGI. The orange bars reflect our preferred (EI-based) measure of average tax rates; taxpayers are sorted by EI, and the measure of average tax rates is group tax liability (after credits) divided by group EI.

For all income groups, tax burdens are lower relative to income when using EI than when using AGI. This makes sense because aggregate EI is greater than aggregate AGI at all levels of income. However, the impact of moving from AGI to EI is not proportional across income groups. For taxpayers in the 80th to 90th percentiles, average tax rates using AGI are around 1.75 times as large as average tax rates using EI (11.1 vs. 6.4%), but for units in the top 1% tax rates on AGI are 2.3 times as large as tax rates on EI (26.0 vs. 11.5%).[5]

Figure 8 shows that, relative to using an AGI classifier, switching to an EI classifier reveals a tax system in which the top 1% bears less of the burden and moderate- and middle-income tax filing units in the second and third quintiles of the EI distribution bear more of the burden.

V. Conclusions

Defining income appropriately is an important step in classifying households by their current economic resources and thus can lead to more meaningful analysis of tax policy, income distribution, and other issues. In this paper, we construct a new income classifier—Expanded Income. EI includes AGI and various cash and near-cash items as well as major forms of untaxed income that are not cash substitutes, including imputed rent and unrealized gains. We find that aggregate EI is about 90-100% larger than AGI. Many individuals are in different quintiles in the income distribution when sorting by AGI versus EI. Relative to using AGI as an income measure, analysis using EI suggests that average tax burdens are lower among the extremely affluent and that tax burdens are distributed differently. These findings leave many avenues for future research.

TABLE 1

Distributional Classifiers and Their Components

	AGI	CBO	JCT[5]	OTA	TPC	EI
	Adjusted Gross Income	Income Before Transfers and Taxes	Expanded Income	Cash Income	Expanded Cash Income	Expanded Income
Labor Income[1]						
Taxable wages and salaries	X	X	X	X	X	X
Tax deductible employer-provided health and other benefits		X[4]	X	X	X	X
Tax deductible employee-paid health and other benefits					X	X
Employer-paid unemployment insurance tax		X		X		X
Employer-paid Social Security and HI payroll taxes		X	X	X	X	X
Tax-Preferred Retirement Income						
Employer contributions to tax-preferred retirement plans					X	X
Employee contributions to tax-preferred retirement plans		X			X	X
Inside build-up in tax-preferred retirement plans[2]					X	X
Taxable benefits and withdrawals from tax-preferred retirement plans	X	X	X	X	X	X
Capital Income						
Taxable interest	X	X	X	X	X	X
Tax-exempt interest		X	X	X	X	X
Ordinary dividends	X	X	X	X	X	X
Corporate income tax liability		X	X	X	X	X
Realized capital gains	X	X	X	X	X	X
Unrealized capital gains				X[6]		X
Taxable closely-held business income	X	X	X	X	X	X
Untaxed closely-held business income						X
Imputed rent on owner-occupied housing						X

TABLE 1 CONTINUED

	AGI	CBO	JCT[5]	OTA	TPC	EI
	Adjusted Gross Income	Income Before Transfers and Taxes	Expanded Income	Cash Income	Expanded Cash Income	Expanded Income
Government Transfers						
Unemployment insurance benefits	X	X	X	X	X	X
Taxable Social Security benefits	X	X	X	X	X	X
Nontaxable Social Security benefits		X	X	X	X	X
Medicare		X	X	X		X
Medicaid				X		X
Other government transfers[3]		X		X	X	X
Private Transfers						
Net alimony income received	X	X	X	X	X	X
Net child support income					X	X
Inheritance income						X

Notes:
1. Allocation of closely held business income and corporate income tax liability into labor versus capital income varies by classifier.
2. Net of taxable benefits and withdrawals from and contributions to tax-preferred retirement accounts.
3. Other transfers generally include items such as SSI, TANF, SNAP, workers comp, veteran benefits, and energy assistance.
4. Employer paid health insurance, as measured in Current Population Survey.
5. JCT includes certain AMT preference items and excluded income of U.S. citizens living abroad, and excludes dependent filers.
6. OTA includes unrealized capital gains evaluated at death and capital gains on housing under the taxable cap.

TABLE 2

Aggregate Components of Expanded Income ($billions)

Source of Income	2001	2004	2007	2010	2013	2016	2019	2022
Adjusted Gross Income (AGI)	**6,338.8**	**6,627.5**	**8,031.6**	**7,618.4**	**8,706.4**	**10,433.3**	**11,612.1**	**14,721.9**
Plus ECI components in excess of AGI								
Untaxed employer-provided benefits	494.8	640.4	758.9	831.9	904.7	995.3	1141.9	1190.1
Employer payroll taxes for Social Security and Medicare	400.3	433.2	484.3	484.0	454.7	591.5	671.2	763.5
Untaxed retirement plan contributions and inside buildup	872.8	921.0	1,081.2	1,151.8	1,228.4	1,417.2	1,575.9	1,759.3
Tax-exempt interest	55.9	59.3	71.0	64.5	67.3	82.5	97.3	87.2
Corporate income tax liability	236.1	215.7	436.4	205.0	336.9	398.3	299.4	419.4
Non-taxable Social Security benefits	274.5	320.4	353.8	413.2	492.9	558.9	581.3	670.9
SSI, TANF, and SNAP, and other means-tested transfers	61.1	94.9	150.5	192.8	226.8	241.6	215.0	251.4
Equals								
Expanded Cash Income (ECI)	**8,735.8**	**9,313.1**	**11,368.9**	**10,962.6**	**12,418.8**	**14,719.3**	**16,195.8**	**19,865.0**
Plus EI components in excess of ECI								
Untaxed closely-held business Income	439.3	455.7	690.4	626.4	728.6	902.1	952.3	1174.2
Unrealized capital gains	1621.0	2122.1	2689.0	2540.9	2596.9	3385.1	3787.8	5095.5
Imputed rent on owner occupied housing	135.5	173.1	108.8	319.8	431.3	479.7	538.2	668.8
Net child support income	-13.9	-12.6	-7.1	-14.6	-25.1	-40.2	-17.5	-65.1
Inheritance income	187.1	154.0	207.2	231.2	387.1	515.1	533.6	563.5
Medicare	216.6	274.0	394.9	490.3	552.0	632.2	729.4	869.6
Medicaid	165.3	220.9	251.6	310.8	352.5	451.5	499.0	619.1
Equals								
Expanded Income (EI)	**11,485.2**	**12,699.7**	**15,702.6**	**15,466.4**	**17,441.4**	**21,044.1**	**23,216.8**	**28,789.3**

TABLE 2 CONTINUED

Source of Income	2001	2004	2007	2010	2013	2016	2019	2022
Components as a Percent of AGI								
Untaxed employer-provided benefits	7.8%	9.7%	9.4%	10.9%	10.4%	9.5%	9.8%	8.1%
Employer payroll taxes for Social Security and Medicare	6.3%	6.5%	6.0%	6.4%	5.2%	5.7%	5.8%	5.2%
Untaxed retirement plan contributions and inside buildup	13.8%	13.9%	13.5%	15.1%	14.1%	13.6%	13.6%	11.9%
Tax-exempt interest	0.9%	0.9%	0.9%	0.8%	0.8%	0.8%	0.8%	0.6%
Corporate income tax liability	3.7%	3.3%	5.4%	2.7%	3.9%	3.8%	2.6%	2.8%
Non-taxable Social Security benefits	4.3%	4.8%	4.4%	5.4%	5.7%	5.4%	5.0%	4.6%
SSI, TANF, and SNAP, and other means-tested transfers	1.0%	1.4%	1.9%	2.5%	2.6%	2.3%	1.9%	1.7%
Equals								
Expanded Cash Income (ECI)	**137.8%**	**140.5%**	**141.6%**	**143.9%**	**142.6%**	**141.1%**	**139.5%**	**134.9%**
Plus EI components in excess of ECI								
Untaxed closely-held business Income	6.9%	6.9%	8.6%	8.2%	8.4%	8.6%	8.2%	8.0%
Unrealized capital gains	25.6%	32.0%	33.5%	33.4%	29.8%	32.4%	32.6%	34.6%
Imputed rent on owner occupied housing	2.1%	2.6%	1.4%	4.2%	5.0%	4.6%	4.6%	4.5%
Net child support income	-0.2%	-0.2%	-0.1%	-0.2%	-0.3%	-0.4%	-0.2%	-0.4%
Inheritance income	3.0%	2.3%	2.6%	3.0%	4.4%	4.9%	4.6%	3.8%
Medicare	3.4%	4.1%	4.9%	6.4%	6.3%	6.1%	6.3%	5.9%
Medicaid	2.6%	3.3%	3.1%	4.1%	4.0%	4.3%	4.3%	4.2%
Equals								
Expanded Income (EI)	**181.2%**	**191.6%**	**195.5%**	**203.0%**	**200.3%**	**201.7%**	**199.9%**	**195.6%**

SOURCE: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM. Aggregate SCF income estimates are calculated using tax unit weights. Data include members of the non-primary economic unit who were deemed to be filers. Estimates of TPC's ECI constructed using SCF data.

TABLE 3

Percent Distribution of EI Components Across the EI Distribution, Tax Year 2018

Source of Income	Quintile					Within Top Quintile			
	Bottom	Second	Middle	Fourth	Top	80-90	90-95	95-99	Top 1
Adjusted Gross Income (AGI)	4.9	8.7	12.3	19.1	55.0	14.3	9.7	14.8	16.2
Untaxed employer-provided benefits	6.0	14.2	20.3	27.9	31.6	16.5	7.7	5.8	1.5
Employer payroll taxes for Social Security and Medicare	8.6	12.0	15.3	21.8	42.3	16.0	9.4	11.1	5.8
Untaxed retirement plan contributions and inside buildup	1.2	4.5	9.0	18.5	66.9	19.7	15.7	23.4	8.2
Tax-exempt interest	0.3	0.4	0.3	2.0	96.9	2.2	7.3	28.8	58.5
Corporate income tax liability	2.1	4.8	8.3	17.0	67.8	16.5	12.7	21.0	17.7
Non-taxable Social Security benefits	20.4	29.3	27.8	16.0	6.6	3.4	1.9	1.0	0.3
SSI, TANF, and SNAP, and other means-tested transfers	29.4	39.7	21.6	6.3	3.0	2.5	0.3	0.2	0.0
ECI in excess of AGI	7.3	12.7	15.4	20.0	44.6	14.9	9.9	13.2	6.5
Expanded Cash Income (ECI)	5.6	9.8	13.2	19.3	52.0	14.5	9.7	14.4	13.4
Untaxed closely-held business Income	1.2	2.4	5.1	10.3	81.0	8.5	8.4	27.1	37.0
Unrealized capital gains	1.5	3.4	6.5	11.3	77.3	9.2	9.6	24.8	33.6
Imputed rent on owner occupied housing	2.8	6.3	12.0	15.7	63.2	13.3	11.0	24.2	14.7
Net child support income	54.9	2.0	(3.9)	20.1	26.9	(0.9)	4.2	8.5	15.1
Inheritance income	0.1	1.3	1.5	3.8	93.4	7.0	8.5	20.8	57.1
Medicare	16.7	21.8	23.6	20.1	17.7	8.6	4.6	3.6	1.0
Medicaid	21.4	28.6	23.0	16.6	10.4	7.8	1.8	0.8	0.0
EI in excess of ECI	4.3	7.0	9.3	12.2	67.1	9.1	8.4	20.9	28.7
EI in excess of AGI	5.5	9.3	11.7	15.3	58.2	11.4	9.0	17.9	19.9
Expanded Income (EI)	5.2	9.0	12.0	17.2	56.6	12.9	9.3	16.3	18.0

SOURCE: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM. Distributional breaks are calculated using population weights, and aggregate incomes are calculated using tax unit weights. Data include members of the non-primary economic unit who were deemed to be filers. Observations sorted by Expanded Income (EI).

TABLE 4

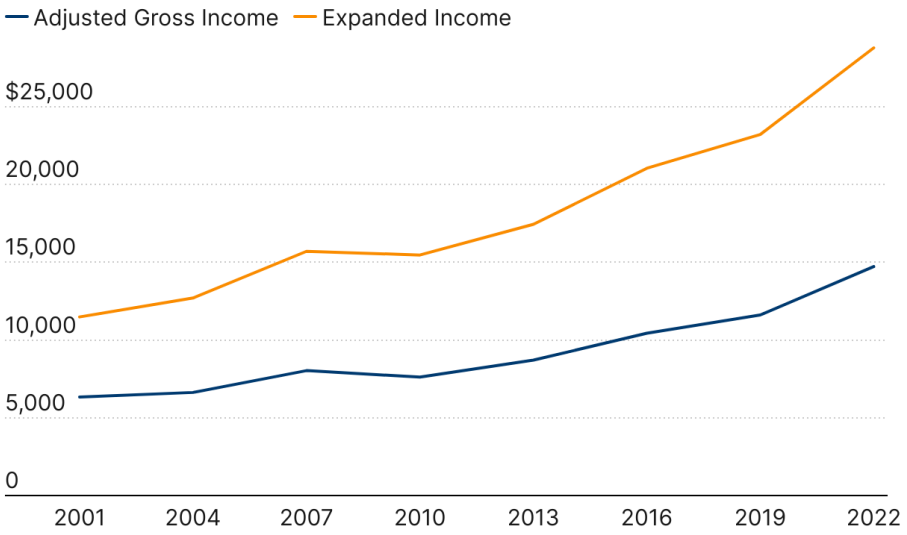
Percent Distribution of Individuals Across the AGI and EI Distributions, Tax Year 2018

		EI Quintile					Within Top EI Quintile				Total
		Bottom	Second	Middle	Fourth	Top	p80-90	p90-95	p95-99	Top 1	
AGI Quintile	Bottom	12.2	4.9	2.0	0.4	0.1	0.0	0.1	0.0	0.0	19.7
	Second	7.5	8.5	3.5	0.6	0.2	0.1	0.1	0.0	0.0	20.3
	Middle	0.3	6.6	10.1	2.7	0.3	0.3	0.0	0.0	0.0	20.0
	Fourth	0.0	0.0	4.4	13.2	2.4	1.9	0.3	0.2	0.0	20.0
	Top	0.0	0.0	0.0	3.0	17.0	7.7	4.5	3.8	1.0	20.0
Within Top AGI Quintile	p80-90	0.0	0.0	0.0	3.0	7.0	5.8	0.9	0.2	0.0	10.0
	p90-95	0.0	0.0	0.0	0.0	5.0	1.9	2.4	0.7	0.0	5.0
	p95-99	0.0	0.0	0.0	0.0	4.0	0.0	1.2	2.6	0.1	4.0
	Top 1	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.2	0.8	1.0
Total		20.0	20.0	20.0	20.0	20.0	10.0	5.0	4.0	1.0	100.0

NOTES: Percentile breaks calculated using total population
SOURCE: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM. Distributional breaks are calculated using population weights. Data include members of the non-primary economic unit who were deemed to be filers. Observations sorted by Expanded Income (EI) and Adjusted Gross Income (AGI).

FIGURE 1

Aggregate Values for AGI and EI Across SCF Years



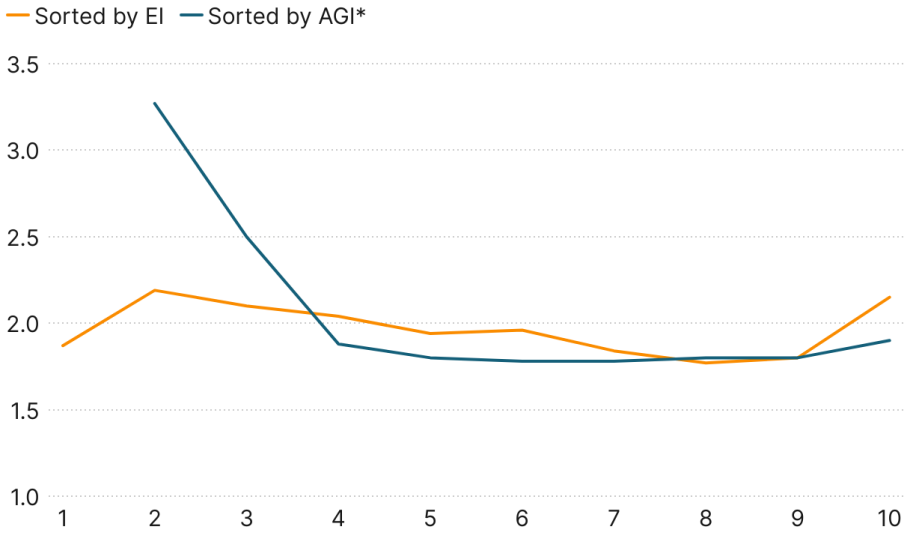
BROOKINGS

Source: Internal Revenue Service Statistics of income (SOI) and author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: Data exclude non-filing tax units and dependent filers but include members of the non-primary economic unit who were deemed to be filers.

FIGURE 2

Ratio of EI to AGI Across the Income Distribution, Tax Year 2018



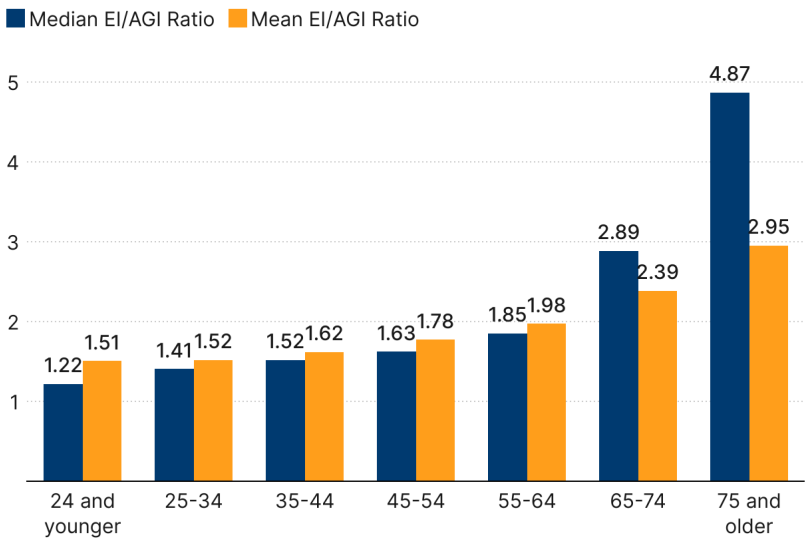
BROOKINGS

Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: *EI/AGI ratio omitted in AGI decile 1 for scale. Value: 22.9. Distributional breaks are calculated using population weights, and aggregate incomes are calculated using tax unit weights. Data include members of the non-primary economic unit who were deemed to be filers. Observations sorted by both Adjusted Gross Income (AGI) and Expanded Income (EI).

FIGURE 3

Ratio of EI to AGI by Age, Tax Year 2018



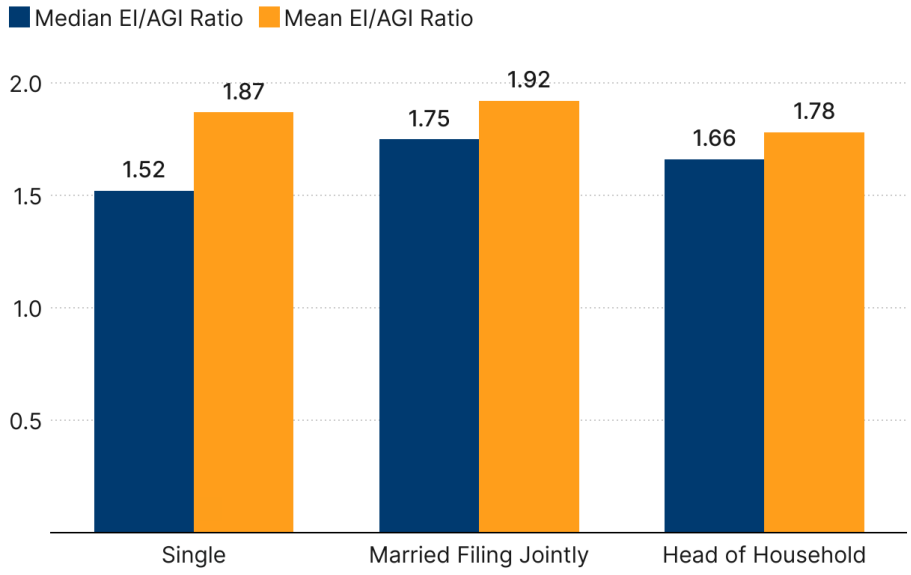
BROOKINGS

Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: Median EI/AGI ratios are calculated using tax unit weights, and mean EI/AGI ratios are weighted by income. Data include members of the non-primary economic unit who were deemed to be filers. Observations are sorted by the maximum age of each respondent/spouse tax unit.

FIGURE 4

Ratio of EI to AGI by Filing Status, Tax Year 2018



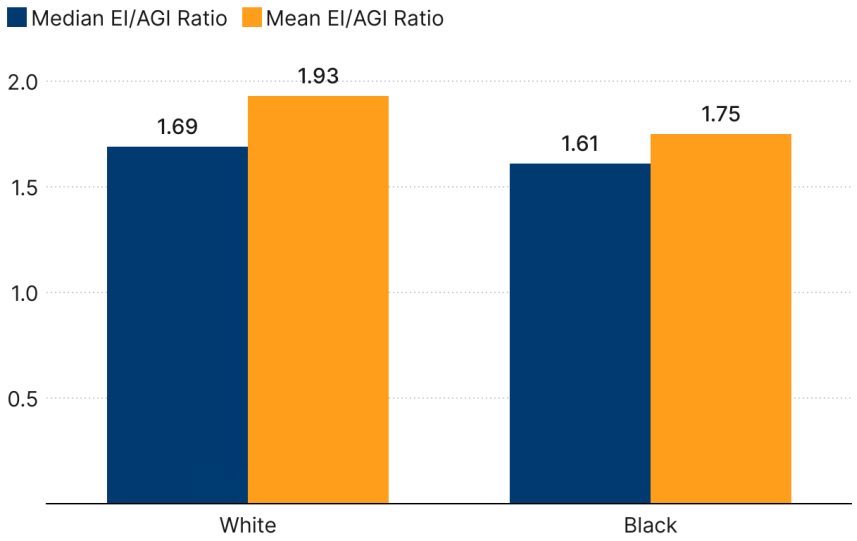
BROOKINGS

Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: Median EI/AGI ratios are calculated using tax unit weights, and mean EI/AGI ratios are weighted by income. Data include members of the non-primary economic unit who were deemed to be filers. Observations are sorted by the filing status of the SCF tax unit (following Gale et al. 2022a).

FIGURE 5

Ratio of EI to AGI by Race, Tax Year 2018



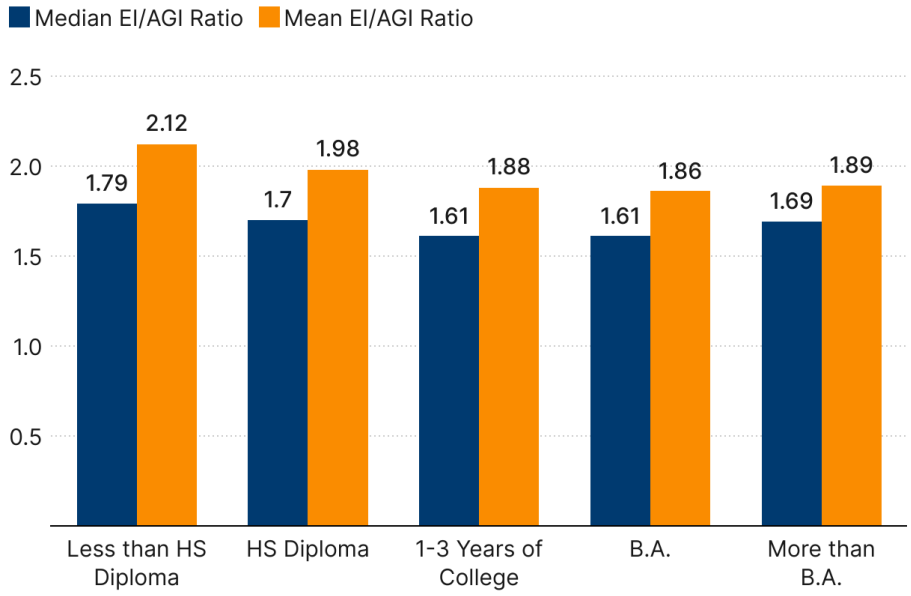
Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

BROOKINGS

Note: Median EI/AGI ratios are calculated using tax unit weights, and mean EI/AGI ratios are weighted by income. Data include members of the non-primary economic unit who were deemed to be filers. Observations are sorted by the self-reported race of the respondent.

FIGURE 6

Ratio of EI to AGI by Educational Attainment, Tax Year 2018

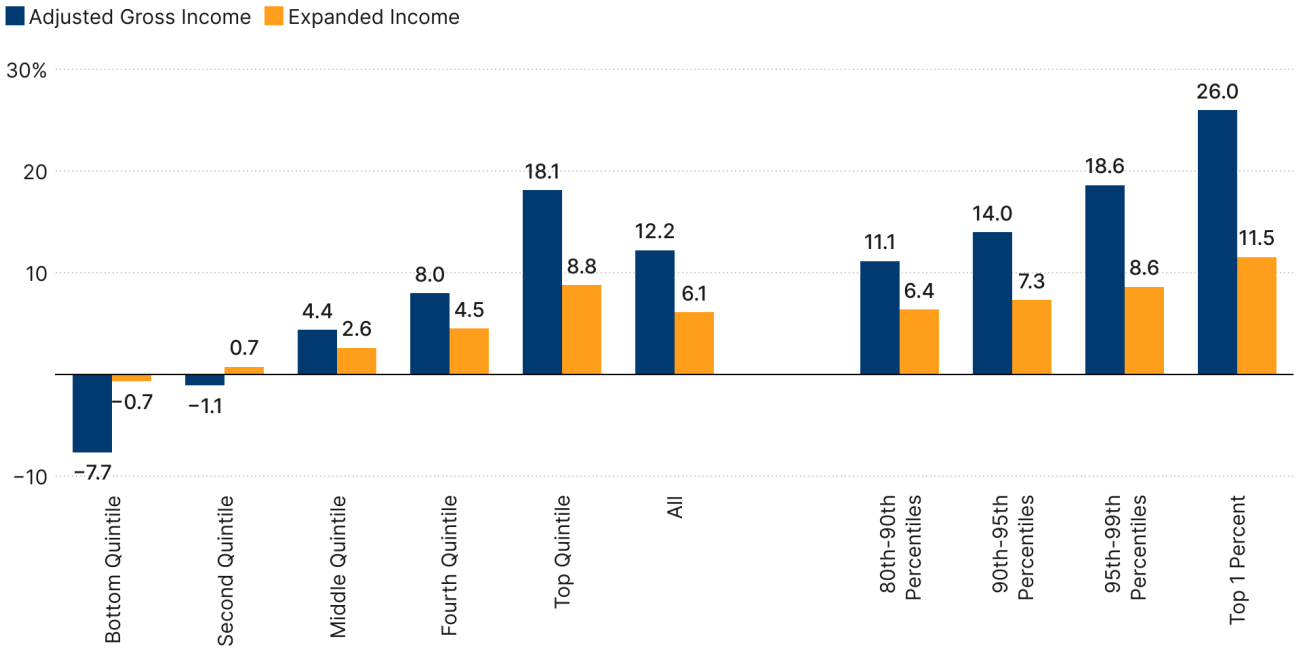


Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: Median EI/AGI ratios are calculated using tax unit weights, and mean EI/AGI ratios are weighted by income. Data include members of the non-primary economic unit who were deemed to be filers. Observations are sorted by the highest level of education achieved by either the respondent or spouse (as reported in the SCF).

FIGURE 7

Average Tax Rates Across the AGI and EI Distributions, Tax Year 2018



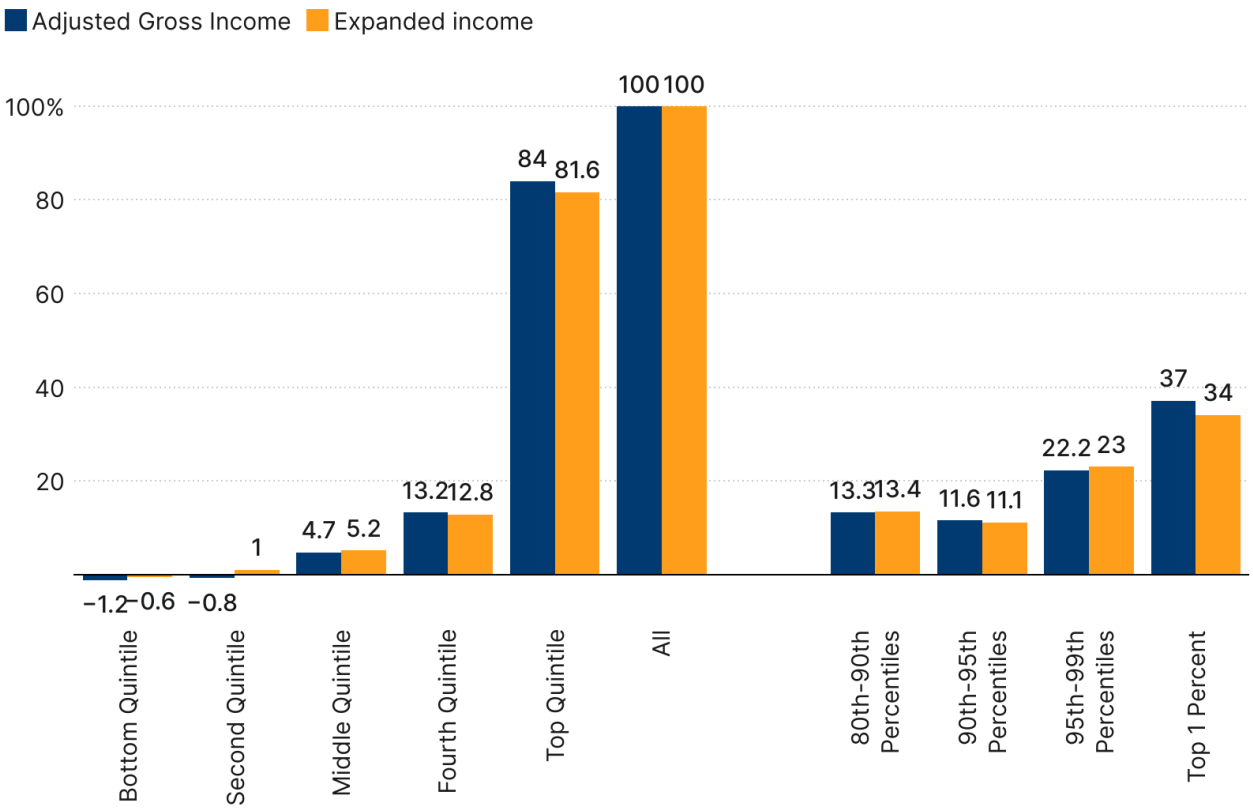
Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

BROOKINGS

Note: Distributional breaks are calculated using population weights, and aggregate incomes are calculated using tax unit weights. Data include members of the non-primary economic unit who were deemed to be filers. Average tax rates on AGI are sorted by AGI, and average tax rates on EI are sorted by EI.

FIGURE 8

Percent of Total Aggregate Tax Burdens Across the AGI and EI Distributions, Tax Year 2018



Source: Author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

BROOKINGS

Note: Distributional breaks are calculated using population weights, and aggregate incomes are calculated using tax unit weights. Data include members of the non-primary economic unit who were deemed to be filers. Aggregate tax burdens by income fractile are represented as a percent of the total aggregate tax burden.

Appendix I: Construction and Validation of Data on AGI and Taxes

This Appendix describes our construction of AGI for tax filing units and our estimation of federal individual income tax liability, given the level and sources of AGI, family characteristics, deductions, and credit eligibility.

A. FROM HOUSEHOLDS TO TAX FILING UNITS

We access data from nine waves (1998 to 2022) of the Survey of Consumer Finances (SCF). The SCF provides extensive, high-quality data on household income, wealth, and demographic characteristics. Tax liability, however, is based on tax filing units, not households. An income tax unit is defined as an individual or married couple who is required to file a tax return, or who would be required to file a tax return if their income were high enough, along with all dependents of that individual or married couple.

Thus, the first task is to create tax filing units out of SCF households. To do so, we build on the methodology developed in Gale et al. (2022a, b) and employed in Holtzblatt, et al. (2024). For households that generate the vast majority of income—including singles living alone and married couples with either no dependents or with children younger than 18—this process is simple. For other households, a variety of financial and demographic measures are used to estimate filing status.

B. CONSTRUCTING AGI

We construct AGI for each tax unit. The components of AGI are collected on tax forms, and thus the SOI data is of very high quality—indeed, many analyses of income inequality and income tax progressivity start with tax data. Also, the Survey of Consumer Finances (SCF) income module questions are generally written to capture income concepts that are consistent with AGI. The major components of AGI—accounting for almost all AGI—are available in the SCF. However, because the SCF's measures of income do not always align with tax concepts and because some variables—including net business income and respondent's age—are intentionally rounded or masked in the public version to avoid reidentification of the participants, we derive or estimate (using other variables in the data set) several items that are needed to determine AGI.

For example, SCF wages are generally reported as gross rather than taxable, so we subtract the respondent-reported employee pension contributions and our estimate of pre-tax employee contributions for employer health plans.[6] We impute Net Operating Losses (NOLs) for some SCF observations because NOLs are covered by the "other" income question in the survey and thus not well captured. Of special note is the treatment of non-corporate business income. Business income in the SCF matches figures in the National Income and Product Accounts (NIPAs), meaning the SCF is both conceptually and empirically well aligned with a comprehensive or "economic" measure of business incomes. Both SCF and NIPA, however, report business income that is twice as large as reported in the SOI data. There are many ways to align the SCF and SOI data. To date, we have reconciled these figures by reducing SCF business income by 50% for each tax filing unit in determining AGI and keeping the remaining amount (the other half of reported business income) as part of EI. Another way of saying the same thing is that we assume that unreported business income is proportional to business income.[7]

Our procedures build on the procedures in Gale et. al (2022a, b) in several ways. We (a) include data from the 2022 SCF, (b) impose a $10,000 cap on state and local tax deductions starting in tax year 2018, (c) separate the alimony and child support received using relevant demographic information from the survey, (d) include non-filers, and (e) incorporate new methods for imputing net operating losses and correcting for gross versus taxable wages and salaries. Specifically, we subtract pension contributions and an estimate of employee-paid health insurance premiums from SCF

respondent-reported wages and salaries to bring those into line with the taxable wages and salaries measures that show up on tax forms.

C. ADDING FORBES 400 DATA

The SCF is prohibited from interviewing members of the Forbes 400 because it would be too easy to identify them in the survey. But Forbes 400 families currently hold an estimated 3% of household net worth, and that share has been growing. As a result, estimates of wealth concentration using the SCF require an adjustment to account for the missing top tail (Bricker et al, 2016; Vermeulen 2018). Adding the estimated Forbes wealth brings adjusted SCF top wealth shares into line with estimates based on capitalizing income taxes (Smith, Zidar, and Zwick, 2023).[8]

To account more fully for aggregate wealth, income, and taxes, we construct a micro-based file for Forbes 400 members. Essentially, we are adding 400 new records—each with a weight of "1"—to each SCF survey year sample.[9]

The same factor that forbids the SCF from interviewing Forbes 400 members—that their information would allow them to be identified in the survey—is also the underlying premise of our construction of a Forbes micro file. Namely, many of the variables needed to address specific tax policy questions for the Forbes families exist in public records and internet repositories, and the other variables can be estimated.

To gather the data for a micro file on each Forbes 400 member, we exploit the fact that the Forbes web site reports estimates of the total net worth for the top 400 families, along with names and other identifying information that makes it possible to link additional data. In various projects using Forbes data, researchers have added key demographics such as age, marital status, number of children, source/origin of wealth, and gender.[10]

We combine this publicly available information on Forbes families with a SCF "near-Forbes" data set to estimate income and taxes.[11] We draw a "near-Forbes" sample that includes the top 100 wealth observations (roughly 1,000 on a weighted basis) in each SCF survey from 2001 to 2019. The near-Forbes sample lives up to its name, with average wealth in 2019 of $933 million, and a top range that approaches $2 billion, right below the bottom of the Forbes 400.

Using TAXSIM, we calculate taxes for the near-Forbes sample and assume that the ratio of taxes to wealth is the same in the Forbes sample. For most types of income, we assume that the income-to-wealth ratio in the near-Forbes sample also holds in the Forbes sample. For other types, such as social security, we assign the average in the near-Forbes sample to the Forbes sample. Tax credits are assumed capped (and most often zero) and thus we use the average within near-Forbes value for assigning values to the Forbes sample. This simple approach gives us a realistic estimate of average taxes paid by the Forbes 400, though the distribution within the Forbes group is of course a topic for future work.[12] The result is a data set with 400 records per year and information on wealth, income, taxes, marital status, dependents, and race.

D. TAX CALCULATIONS

Given the creation of tax units and their income as described above—and SCF data and our imputations for dependents, deductions, and eligibility for credits—to compute federal income tax, we apply the National Bureau of Economic Research TAXSIM microsimulation model (Feenberg and Coutts 1993). TAXSIM replicates U.S. federal and state income tax rules over history, including the period from 1997 to 2021. (Each SCF survey records income earned in the year prior to the survey.) The TAXSIM model has evolved over time, and the methods described here are specifically designed to generate an input file for the most recent TAXSIM. In addition to generating tax liabilities using survey income values under the tax law applicable for that survey year, TAXSIM makes it possible to run simulations with alternative tax rules, or even the tax law that existed in years other than the year in which the income information was collected.

E. VALIDATION

Validation of the SCF-TAXSIM model against published Statistics of Income (SOI) tables is a key part of our modeling strategy. The Survey of Consumer Finances (SCF) is a relatively small sample—roughly 4,000 to 6,000 observations depending on the year—and the incomes reported by respondents are not always conceptually consistent with the incomes that taxpayers report on tax forms. In addition, our modeling exercise requires separating SCF households into tax filing units, assignment of dependents, and imputations for missing tax inputs such as itemized deductions.

Figure A1 shows that, for each SCF wave, our estimate of aggregate AGI (the blue line) is close to, and trends with, SOI's estimate of the same measure (the orange line). In six of the nine survey years, the estimates are within 2% of each other. Figure A2 shows that our estimates of aggregate tax revenues before credits (blue line) track published SOI values (orange line) well. In seven of the nine survey years, our estimate is within 4.5% of the SOI figure.[13]

Table A1 shows information on the distribution of returns in tax year 2018. For groups with AGI between $25,000, and $1,000,000, our estimates closely match the SOI data for both the number of returns and the amount of income. Two differences, however, stand out, in the rest of the table. First, our estimates record about 6 million fewer returns overall, virtually all of which have AGI between $1 and $25,000. This largely reflects the fact that we do not include dependent filers in the SCF. Second, the SCF records more units with AGI above $1 million and fewer with "none." The latter category consists mostly of returns with negative AGI, meaning substantial current-year business or other capital losses, or net operating loss carryforwards (NOLs). Current-year losses and NOLs are captured reasonably well in the SCF but often through respondents reporting "none" when asked about the profits from a business or proceeds from a capital transaction, which explains why counts of returns in AGI equals "None" are closer than total (negative) AGI in that range.

Appendix II: Constructing Components of Expanded Income

This appendix presents details about the construction of EI. Given the construction of AGI, described in Appendix I, constructing EI is a matter of adding incremental (untaxed) income components to AGI. We describe EI components across five broad types of untaxed incomes: labor income, retirement contributions and inside buildup, capital income, government transfers, and private transfers.

A. UNTAXED LABOR INCOMES

For income tax purposes, the relevant measure of labor income (meaning the labor income included in AGI) is taxable wages and salaries. Untaxed labor income comes in three forms. We discuss employer-paid payroll taxes and employer-provided benefits in this section, and cover retirement plan issues in the next section.

1. Employer Payroll and Unemployment Insurance Taxes

Payroll taxes include employer- and employee-paid Social Security contributions, Medicare taxes, and (since 2013) Additional Medicare taxes. Each tax has its own rates and caps, but the tax bases (total wages and self-employment income) is generally the same. TAXSIM returns values for the sum of the three payroll taxes in every call. We set the employer share at half the total returned by TAXSIM.[14] We calculate the employer-paid Unemployment Insurance tax directly using SCF taxable wages. The UI tax is levied on wages at a rate of 6%, up to $7,000.

2. Employer-Provided Health and Other Benefit Plans

The SCF collects information about who is covered by health insurance and who (employer, government, or the household) pays for the insurance coverage but does not collect data on the value of health benefits—presumably because most respondents have little or no basis for estimating those values. We combine the SCF coverage information with health insurance valuation differentials (by age and earnings) from the Kaiser Family Foundation (KFF) and then scale the household-level values to match aggregate employer-provided health benefits in the NIPA and aggregate employee-paid benefits in the National Health Expenditure Accounts.

The Employer Health Benefits Survey (EHBS) is an annual survey conducted since 1999 by the Kaiser Family Foundation. Since 2006, EHBS has measured employer contributions to joint and single coverage plans along with the employee share. The major obstacle to merging these values onto SCF data is that EHBS data uses the employer as the unit of observation, while the SCF is based on households or individuals. In EHBS, we use data for 2012 through 2019, years which have the specific variables we use to predict coverage value. We separate firm-level plan types into nine categories (cells) by earnings and age of workers, with separate matrices for joint and single coverage and for small and large firms (Figures A3 and A4).[15] We then regress the value of average employer-provided health insurance contributions for joint and single coverage on firm size and plan type dummy variables. The results are as expected, with higher average employer-paid health insurance contributions (and lower employee premium shares) for joint coverage relative to single coverage and for workers in large firms with higher-earning and older workers.[16]

Using these regressions, we predict employer-provided health insurance premiums for SCF respondents. We start by using SCF health insurance coverage variables to determine whether a respondent—and their household generally—is covered by employer sponsored insurance. We distinguish between joint and single coverage using the sequence of SCF questions that first determine whether everyone in the household is covered by the same insurance as the respondent and, if not everyone is covered, who is not covered. After determining joint versus single coverage, we split SCF respondents into the same nine plan types

by earnings and age as we did firms in EHBS. There are, again, separate matrices (nine plan types) for joint and single coverage and for large and small firms. For each respondent (or respondent-spouse combination) we use reported coverage (joint versus single) along with firm size, age, and earnings (using the larger firm if both R and SP are working).

The SCF does not collect information about other (non-health) employer-provided benefits, so we rely on the fact that generous firms (in terms of untaxed benefits) tend to be generous in all dimensions. That is, if an individual in the SCF has employer-provided health insurance, they are more likely to get other benefits such as term life insurance. Thus, our imputation for non-health, employer-provided benefits is proportional to the employer-provided health values described above.

The final step is scaling predicted SCF values to match the NIPA and National Health Expenditure Account aggregates in every survey year. The Bureau of Economic Analysis (BEA) estimates that employer contributions to private group health insurance totaled $823 billion and other benefits totaled $73 billion (NIPA Table 7.8) in 2021, while the National Health Accounts show a value of $294 billion for employee paid premiums in 2021.[17]

B. UNTAXED RETIREMENT PLAN CONTRIBUTIONS AND INSIDE BUILDUP

In principle, tax preferences for retirement saving are about when income is taxed, not whether the income is taxed. Flows into tax-preferred accounts (which includes Defined Benefit (DB) pensions, Defined Contribution (DC) pensions, and Individual Retirement Accounts (IRAs)) are excluded from current taxation, as are the interest, dividends, and capital gains (so-called "inside buildup") on those accounts. Benefits paid and withdrawals from those accounts are subject to tax. Said differently, contributions and inside buildup are not part of AGI, while benefits and withdrawals are included in AGI.

As explained by Rosenberg (2013), however, the difference between whether and when retirement saving is taxed matters a great deal for distributional analysis of taxes, at least on an annual basis. There is no ideal income measure when the tax system separates the establishment of rights to future income (contributions and inside buildup) from the realization of that income (benefits and withdrawals). The least bad solution is to follow the standard practice among government and non-profit organizations that generate tax distribution statistics. Contributions to retirement plans and inside build up within those plans (not included in AGI) as well as benefits and withdrawals (included in AGI) should all be counted as components of EI, even though (on a lifetime basis) to some extent that constitutes double counting.

Our approach to constructing the retirement flows for EI follows closely what is done by the TPC, as described in Rosenberg (2013). EI retirement flows include employee and employer contributions to retirement plans, which are measured directly in the SCF, as well as inside buildup within DB and DC/IRA plans, which we estimate using SCF wealth holdings and estimated interest, dividends, and capital gains on the various types of plans. EI also includes pension benefits and retirement account withdrawals, but (following TPC) the EI measure of contributions and inside buildup for an individual in any year is limited by benefits and withdrawals for the same individual in the same year, which eliminates some of the double counting. Thus, for example, an individual with $100 in contributions and $100 in withdrawals will have an EI of $100, not the $200 that would come from directly summing the pieces.

The estimates of inside build-up essentially involve allocating flows from the NIPA and Financial Accounts of the United States (FA) across SCF tax units based on their observed wealth holdings. The underlying principle is that we observe retirement wealth holdings in the SCF and the FA, so we can compute average rates of inside buildup using aggregate flows relative to aggregate holdings and then apply those rates of inside buildup to SCF wealth holdings. That approach generates an aggregate rate of inside buildup that matches the totals so long as aggregated SCF retirement wealth holdings match the corresponding FA aggregates.

The SCF questionnaire includes questions on DC account balances, and previous research has shown the SCF totals benchmark quite well against the FA totals (see Feiveson and Sabelhaus (2019) and Batty et al, (2019)). Although disentangling IRA holdings is not quite as straightforward as DC plans in the FA data, we know that SCF IRA holdings benchmark well against published statistics from the Investment Company Institute (see Feiveson and Sabelhaus (2019)). Finally, the relationship between macro and micro aggregates is formulaic for DB wealth because we use the methodology developed by Sabelhaus and Volz (2022) which essentially involves disaggregating the aggregate DB balances in the FA across SCF households.

The details of the imputation for inside buildup differ across DB, DC, and IRA retirement plans. The inside buildup in DB plans is fully captured by interest and dividends in the NIPA, because the NIPA flow measures reconcile starting and ending DB balances. DB assets in the FA reflect the actuarial obligations of plans to the participants, whether those plans are fully funded or not. The unfunded component is an accounting liability of the sponsoring sector, whether government or a private business. The NIPA interest and dividend measures capture changes in DB balances not accounted for by contributions and benefits, which is the definition of inside buildup. Thus, for DB plans, we simply apply the interest and dividend ratios based on NIPA flows and FA stocks to the household level DB balances from Sabelhaus and Volz (2022).

The NIPA also has interest and dividends received by DC plans, so we can similarly apply those components directly to SCF DC and IRA balances. Imputing capital gains on DC accounts and IRAs also involves first dividing the balances into equity and interest-bearing components. The corresponding capital gains rates (for "debt securities" and "equities and mutual funds") are computed using FA data and applied to the corresponding balances in DC and IRAs. Consistent with the discussion of how EI relates to Haig-Simons principles above, we compute the average nominal gains rates for each of the asset type and apply those to average SCF to balances every year.

Summarizing how tax-preferred retirement flows enter EI: First, contributions to accounts are deductible from taxes when made, so those enter directly into EI—much like employer provided health and other untaxed benefits. Second, we count the inside buildup on tax preferred accounts, so long as the untaxed flows are not realized during the period. Thus, the measure of net inside buildup that enters our EI measure is the imputed measure based on interest, dividends, and capital gains minus the taxable benefits and withdrawals in the same period.

C. CAPITAL INCOME

We group capital income into interest, dividends, closely held business incomes, rents, and capital gains. AGI treats these categories differently, with (for example) adjustments for taxable versus non-taxable interest, qualified versus non-qualified dividends, and short-term versus long-term capital gains. Several additional adjustments and calculations are needed to construct EI. Incomes from closely held businesses are generally greater in the SCF than those reported to the IRS, so we split SCF business incomes into the reported and non-reported components. Other capital incomes counted as part of EI include unrealized capital gains (we omit capital gains on retirement accounts here, to avoid double counting), corporate taxes paid, and imputed rent on owner-occupied housing. Those flows are not measured at the micro level and must be imputed using aggregates and a set of SCF controls including wealth balances and related income and expenditure flows.

1. Nontaxable Interest

The tax exemption for interest on state and local bonds gives subnational government entities a competitive advantage in raising funds relative to corporations and other competitors. Information on nontaxable interest is collected directly by the SCF.

2. Corporate Income Tax Liability

Following CBO, JCT, TPC and other groups that produce distributional statistics for tax analysis, we

allocate corporate income taxes across tax units. Our starting point is NIPA aggregate corporate tax liability, which ranges from about 2.5 to 5.0% of AGI, depending on the year. Corporate income taxes have been declining relative to AGI over the past several SCF waves.

As noted earlier, the allocation of aggregate corporate income taxes is based on the same rule as TPC (Nunns 2012), which is 60% equity, 20% labor, and 20% all capital. The equity share is based on the SCF reported value of directly held stocks plus 50% of DB and DC balances. The labor share is based on total compensation, including taxable wages and salaries, pension contributions, employer taxes paid, and employer-provided benefits. The all-capital share is based on SCF reported total financial assets less directly held stocks and pensions, and we add back in the other 50% of DB and DC balances.

3. Untaxed Closely Held Business Income

Aggregate business income on Schedules C, E, and F in published SOI tables is only about 50% of the corresponding total business income estimated by NIPA. This is sometimes referred to as "underreporting" of business income, and sometimes even mischaracterized as "non-compliance" of business owners. In truth, the gaps between SOI and NIPA business incomes (what we refer to here as "untaxed" closely held business income) result from a combination of factors. Non-compliance is certainly one reason for the gap, but there are also differences in how business incomes are measured for the different purposes. The specific resolution of the SOI/NIPA business income gap matters for our understanding of income distribution and other policy questions.[18]

The starting point for measuring untaxed business incomes using the SCF is a simple observation: the sum of business incomes reported in the SCF is very similar to the NIPA, meaning—like the NIPA—SCF business incomes are roughly double the values in published SOI tax data. Indeed, simply dividing all SCF respondent-reported business incomes by two moves the SCF+TAXSIM simulated AGI and tax liability distributions close to the published SOI values (Gale et al, 2022b). The closer alignment occurs because the unadjusted SCF has much more business income than SOI, and that income is concentrated at the top of the AGI distribution.[19]

Why does the SCF have substantially more business income than SOI? There is some debate about what the SCF is capturing, but the nature of the questions suggests that SCF respondents report what the business truly earned in an economic sense, and not what was reported to the IRS. The SCF does a good job capturing the number of businesses by broad type (i.e., Schedule C sole proprietors versus the various types of Schedule E businesses) and the fraction of those with relatively small profits or losses (generally captured by SCF business owners choosing "none" when asked what the business earned). More generally, business incomes on tax forms are reported by accountants who are motivated to reduce tax liability, whereas the business owners are often motivated by the pride they have in running a successful business.[20] Again, some of this may be true non-compliance, but the consistency between SCF and NIPA totals suggests there is an important conceptual difference as well.[21]

Simply dividing (positive) business income by two for purposes of estimating AGI (and thus taxable income) has a simple implication for the EI untaxed business income component. For every dollar of business income reported by SCF respondents, half is untaxed and therefore would be added to EI. This adjustment could be distributionally biased in either direction: lower- revenue business owners (e.g., home repair or mom and pop retail) may have more opportunity to underreport sales, but higher-revenue business owners (e.g., land developers or property management) may have more opportunity or incentive for taxable income manipulation.

The bottom-line question is whether the adjusted SCF+TAXSIM taxable business income distributions line up well with published SOI tables. Unfortunately, SOI does not publish those distributions, so we rely on SOI microdata Public Use Files (PUFs) available through 2012, and the published counts and total incomes for closely held businesses by AGI class available for the entire sample period. The 50%-taxable and

50% -nontaxable business income adjustment lines up reasonably well using both these criteria, though the distribution of business losses remains an important area for future work.

D. UNREALIZED CAPITAL GAINS

AGI includes realized capital gains, but it does not include accrued (or "unrealized") capital gains. Realized capital gains are measured directly in the SCF, so there is no need to impute those values.[22] EI includes all gains, and therefore we add an estimate of unrealized gains to realized gains.[23] We compute unrealized gains by first estimating total capital gains and then subtracting realized capital gains. The estimates of total gains are based on SCF reported wealth holdings and average capital gains rates in the Financial Accounts (FA) macro data.

We compute capital gains across five asset classes: real estate, debt securities, equities and mutual funds, life insurance, and equity in non-corporate businesses. These categories are chosen based on the FA breakdown for the household sector (see the FA Table R.101 "revaluation" series). The asset classes differ as expected in terms of volatility and overall average gains rates, with equities and mutual funds having both the highest average and most volatile capital gains. The gains levels are converted to gains rates using the corresponding end- of-period FA wealth holdings, and those rates are applied to the SCF survey-based wealth measures.

An important point is that we do not apply the actual year-by-year gains data to individual survey years. Rather, we apply the overall average gains rates between 1994 and 2021 by asset class to SCF wealth holdings in every period. We use the average gains rates to compute total gains, then subtract realized gains (captured in the SCF) to solve for unrealized gains for each observation. This procedure may understate the inequality of capital gains across the income distribution because higher-EI observations likely have higher rates of capital gains than the rest of the population, and thus using the overall average rate understates their share.

E. IMPUTED RENTAL INCOME ON OWNER-OCCUPIED HOUSING

In the most recent year for which SCF data are available, corresponding to tax year 2021, the Bureau of Economic Analysis (BEA) estimates that owner-occupied housing (nonfarm and farm combined) provided a net rental value of roughly $650 billion.[24] This figure represents (a) the flow of rental value from owner occupied housing (roughly $2 trillion) that is counted as part of personal consumption (NIPA Table 2.4.5), minus (b) intermediate inputs (roughly $350 billion) used in the production of owned housing services (NIPA Table 7.4.5), depreciation (roughly $650 billion, also NIPA Table 7.4.5), and mortgage interest (roughly $350 billion) paid by homeowners (NIPA Table 7.11). Thus, the NIPA estimates that $2 trillion of aggregate rental value generates $650 billion of implicit income for homeowners, which is a ratio of about 30%.

Our method for distributing the rental income from owned housing uses the SCF reported values for the value of owned housing, mortgage interest, and property taxes. There is no direct information in the SCF about rental values, for example, so we assume rental values are proportional to reported house values. However, using actual mortgage interest and property taxes is distributionally important because there are differences in indebtedness and the rates of property taxation. A homeowner with no mortgage will receive a larger imputed rent per dollar of housing they own, while a homeowner who is highly indebted will receive much lower imputed rent.

The total value of owner-occupied housing was roughly $40 trillion in 2021, which translates into roughly $5 dollars of rental value per $100 of housing value ($2 trillion/$40 trillion=.05). The specific assignments in each year are based on the ratio of NIPA imputed rental value and SCF aggregate owned housing value. Moving from gross rental value to rental income involves subtracting depreciation, intermediate inputs (which includes property taxes), and mortgage interest. Mortgage interest and property taxes are observed directly in the SCF, so we use those reported values. The remaining costs of homeownership (depreciation and intermediate inputs other than real

estate taxes) are distributed proportionally to the SCF reported home value.

In aggregate, the methodology generates a total imputed rent that matches the NIPA value (again, $650 billion in 2021). However, the ratio of imputed rental income to respondent-reported house value will vary widely, depending on mortgage interest and taxes, and could even be negative for some SCF respondents.

D. GOVERNMENT TRANSFERS

The key adjustments we make to government transfers when constructing EI involve adding the non-taxable share of Social Security and the value of cash (and near-cash) means-tested transfers. (Unemployment insurance benefits are a fully taxable component of AGI and captured in the SCF.)

1. Non-Taxable Social Security

The SCF collects total Social Security received, and TAXSIM splits the gross total between taxable and non-taxable benefits.[25] The tax laws governing taxability of Social Security benefits have a (designed) nominal dollar parameter that leads to an increasing share of taxable benefits over time. In published SOI and NIPA data, the taxable share rises from 12% in 1994 to 37% by 2021. In SCF+TAXSIM, the corresponding values are 11% in 1994 and 36% in 2021. Having solved for taxable Social Security, we compute the non-taxable component as a residual.

2. SSI, TANF, SNAP, and Other Means-Tested Transfers

The SCF collects data on means-tested government transfers, but as with most household surveys, estimated transfers received are well short of known administrative totals. The category of cash and near-cash transfers includes NIPA line items for food stamps (SNAP), Supplemental Security Income (SSI), direct relief, family assistance, general assistance, and energy assistance. The wording of the corresponding SCF question mentions SNAP, SSI, and TANF/AFDC by name but then "other forms of welfare and assistance."

Given the discrepancy between survey-reported and aggregate transfers, we follow the lead of other projects and adjust the SCF reported values. For example, the Tax Policy Center TPC) model takes its values for government transfers from a statistical match with the CPS, but then adjusts the CPS model using the Urban Institute's in-house government transfer microsimulation (TRIM). The TRIM model very carefully adjusts CPS values to line up with known aggregates.

Our approach is similar, though somewhat simplified. We start with SCF reported cash and near cash transfers captured in the SCF income module. We then compare the SCF aggregated transfers to the NIPA categories listed above and find that the SCF aggregates are roughly one-third of the NIPA totals. The SCF underreporting is roughly in line with CPS values and thus consistent with the TPC starting point. We then scale up the reported government transfers reported, and do not attempt to adjust the external margin of receipt.

3. Government Health Transfers

As with employer-sponsored health insurance, the starting point for computing the value of Medicare and Medicaid in EI is the self-reported health insurance coverage variables in the SCF. Respondents are asked to check "all that apply" when presented with a list of insurance types, and that list includes Medicare, Medicaid, and the state programs and SCHIP which operate under the Medicaid umbrella. The SCF also asks who within the household is not covered by insurance, which makes it possible to compute the number of individuals in the household covered by that program. The SCF-based counts of Medicare- and Medicaid-covered individuals tracks published coverage counts over time, and the SCF total numbers covered by Medicare and Medicaid are within 10% of published totals in every year.

Assigning the value of Medicare and Medicaid then involves a simple assumption—all covered individuals receive the same value from having the insurance, and the sum of those values across individuals is equal to total spending under each program. The Bureau of Economic Analysis (BEA) estimates that Medicare

spending—as reflected in their estimate of Personal Income (Table 2.1)—was $926 billion in 2021, while Medicaid was $814 billion. Thus, for example, the per-person value of Medicare in 2021 was about $14,000, and the per-person value of Medicaid was about $9,500.

E. PRIVATE TRANSFERS

Our measure of EI includes net child support received. (Net alimony paid or received is already included in the AGI calculation.) We also include current-year inheritances because the giver (who is deceased) is not included in the sample, so we would otherwise miss those resources. We do not include other (inter vivos) interhousehold transfers because in those cases there is some question as to whose consumption we should be measuring.

1. Net Child Support Income

The SCF asks questions about alimony and child support paid and received. The two flows are lumped together, and we allocate the total flows using ancillary information about own children in the respondent's home and own children living somewhere else. The alimony pieces (paid and received) are used in the SCF+TAXSIM taxable AGI calculation, while the child support pieces (again, paid and received) are used to construct the EI component "net" child support received.

In principle, the aggregate total for net child support received should be zero, because every dollar paid is also received. We nevertheless include the net payments for distributional reasons—adding and subtracting child support affects the total incomes within a given EI group if (e.g.) payments made are generally made by someone higher up in the EI distribution and received by someone with lower EI. In practice, total net child support income received is a small negative number, meaning SCF respondents report more child support paid than received.

2. Inheritance Income

Our measure of inheritances received is taken directly from the SCF. The SCF collects data on inheritances received in several places during the survey. The primary source is the "Inheritances and Gifts Received" module, which comes near the end of the survey. Respondents are asked to report any "substantial" inheritances or gifts received "in addition to" those already reported. The qualifier is important, because about 15% of gifts and inheritances are captured in the owned housing, business, and other real estate modules, where respondents who report owning the asset are asked how they came into possession, with "inherited" as an option.

Our method for reconciling the reporting of inheritances and distinguishing inheritances from other types of gifts received is described in Feiveson and Sabelhaus (2018, 2019). In any given year, 2-3% of respondents report receiving inheritances, and the aggregate amount received is roughly half of 1% of total wealth. We use inheritances reported for the year prior to the survey, so the inheritance income lines up with other respondent-reported incomes.

TABLE A1

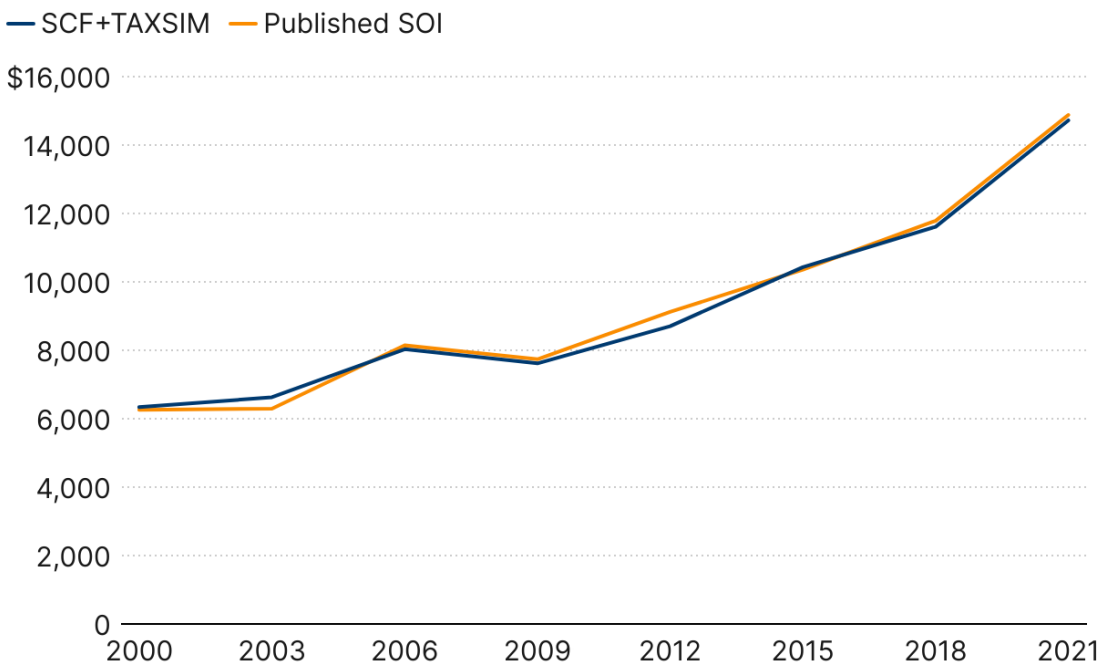
Distribution of Tax Returns and Total Adjusted Gross Income (AGI), Tax Year 2018

Adjusted Gross Income Group	Number of Returns (Millions)			Aggregate Adjusted Gross Income (AGI) (Millions)		
	SCF+TAXSIM	Published SOI	Ratio SCF/ SOI	SCF+TAXSIM	Published SOI	Ratio SCF/ SOI
None	1,406,919	1,962,253	0.72	-56,802	-200,109	0.28
$1 to Under $25,000	44,597,283	50,453,810	0.88	566,878	647,707	0.88
$25,000 to Under $50,000	38,300,033	36,512,304	1.05	1,372,985	1,340,764	1.02
$50,000 to Under $100,000	35,113,560	35,146,085	1.00	2,511,184	2,534,215	0.99
$100,000 to Under $1,000,000	27,903,340	29,160,637	0.96	5,524,095	5,670,128	0.97
$1,000,000 or More	703,160	539,207	1.30	1,692,543	1,792,574	0.94
Total	**148,024,296**	**153,774,296**	**0.96**	**11,610,883**	**11,785,278**	**0.99**

SOURCE: Internal Revenue Service Statistics of income (SOI) and author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM. SCF data estimates are calculated using tax unit weights. Data exclude non-filing tax units and dependent filers but include members of the non-primary economic unit who were deemed to be filers.

FIGURE A1

Aggregate Adjusted Gross Income (AGI), Published SOI and Simulated SCF+TAXSIM



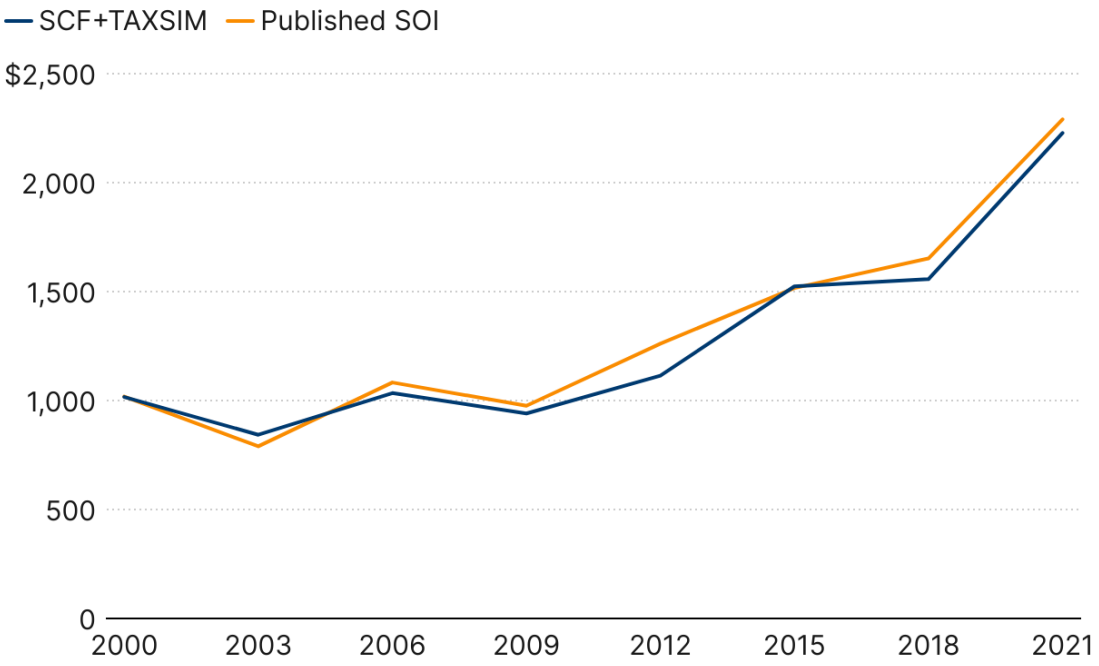
BROOKINGS

Source: Internal Revenue Service Statistics of income (SOI) and author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: SCF data estimates are calculated using tax unit weights. Data exclude non-filing tax units and dependent filers but include members of the non-primary economic unit who were deemed to be filers.

FIGURE A2

Tax Liability Before Credits, Published SOI and Simulated SCF+TAXSIM



BROOKINGS

Source: Internal Revenue Service Statistics of income (SOI) and author's calculations using Survey of Consumer Finances (SCF) and NBER TAXSIM.

Note: SCF data estimates are calculated using tax unit weights. Data exclude non-filing tax units and dependent filers but include members of the non-primary economic unit who were deemed to be filers.

FIGURE A3

Firm Level Plan Types, EHBS (Large and Small Firms, Joint/Single Coverage)

	Age <26	Age 27-49	Age 50+
Earnings <25th percentile	Type 1. Many younger/Few older; Many low/Few high earnings	Type 2. Many older and younger or Few older and younger; Many low/Few high earnings	Type 3. Many older/Few younger; Many low/Few high earnings
Earnings 25th to 75th percentile	Type 4. Many younger/Few older; Many low and high earnings or Few low and high earnings	Type 5. Many older and younger or Few older and younger; Many low and high earnings or Few low and high earnings	Type 6. Many old/Few young; Many low and high earnings Or Few low and high earnings
Earnings >75th percentile	Type 7. Many younger/Few older; Many high/Few low earnings	Type 8. Many older and younger or Few older and younger; Many high/Few low earnings	Type 9. Many older/Fewer young; Many high/Few low earnings

FIGURE A4

Worker Level Plan Types, SCF (Large and Small Firms, Joint/Single Coverage)

	Age <26	Age 27-49	Age 50+
Earnings <25th percentile	Type 1. Younger, low-earner	Type 2. Middle age, low-earner	Type 3. Older, low-earner
Earnings 25th to 75th percentile	Type 4. Younger, middle-earner	Type 5. Middle age, middle-earner	Type 6. Older, middle-earner
Earnings >75th percentile	Type 7. Younger, high-earner	Type 8. Middle age, high-earner	Type 9. Older, high-earner

Endnotes

1 The estimated ratio of EI to AGI would be more volatile (and EI could in principle be negative) if we calibrated the EI estimate to match actual total capital gains (as measured in the Financial Accounts of the United States) in each survey year. Instead, the values reported here use an estimate of capital gains derived by smoothing average capital gains rates (one for each asset class) across the entire sample period, then applying those rates to each year's asset values. TPC uses similar smoothing in their estimates of inside build up on DC retirement plans. See also, for example, Sabelhaus and Park (2020).

2 Retirees generally have higher wealth-to-income ratios than younger individuals, and the higher wealth leads to higher EI through unrealized gains and owner-occupied housing, even if their AGI (and thus taxable Social Security) is low.

3 In each of these figures, the mean variables represent the ratio of the sum of ECI among all relevant tax units divided by the sum of AGI over those same tax units. The median ratio is based on calculating the ratio of EI to AGI for each individual taxpayer.

4 Beginning with the 1998 survey, the SCF has provided consistent questions about race, asking respondents to describe themselves either as white, Black or African American, Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, or other. Each tax filing unit—single or married—has only one respondent. Respondents can report more than one race but are asked which race they identify with most strongly, which we use as the race classifier. We assume that, if the respondent is married, the spouse and respondent are the same race, thus allowing us to define tax units as Black or white (or neither).

5 The estimated reduction in effective tax rates for the very affluent is consistent with a recent Leiserson and Yagan (2021) blog post that estimates an 8.2% average effective tax rate for the Forbes 400 between 2010 and 2018. See also Yagan (2023). Using EI as the denominator, we find an average ETR of 6.8% for the Forbes 400 over the same period.

6 Although the interviewer instructions mention Form 1040 line1—which is the taxable component—the question wording leads respondents to report the gross. The question reads, "In total, what was your (family's) annual income from wages and salaries in {insert year}, before deductions for taxes and anything else?" Empirically, subtracting employee retirement contributions and employee health premiums paid brings wages into much better alignment with published SOI values.

7 Note also that we do not scale or otherwise adjust SCF AGI components to align perfectly with either NIPA or SOI aggregates. As discussed in Gale et al, (2022b), our focus is on broadly capturing the incomes reported on tax forms, not an exhaustive accounting and reconciliation of income flows estimated by either BEA or the IRS.

8 The role of the Forbes 400 in wealth concentration estimates such as Saez and Zucman (2016) and Smith, Zidar, and Zwick (2023) based on "capitalization" is more nuanced. Capitalization uses aggregate wealth estimates and incomes reported for tax purposes to reverse engineer the wealth distribution. Forbes wealth is included in the aggregates, but the wealth inequality measures still depend on the (heterogeneous) relationship between wealth and taxable income at the family level, and it is not possible to identify Forbes families in the income files used for capitalization.

9 This approach is consistent with limitations on SCF sampling, and confirmed by analysis that shows so-called "rich list" observations (such as the Forbes 400) are consistent with a Pareto "power law" (Vermeulen, 2018) approximation of the missing top tail.

10 See especially Kaplan and Rauh (2013a,2013b), Korom, et al. (2017), and Fernholz and Hagler (2023).

11 Leiserson and Yagan (2021) and Yagan (2023) follow a similar approach but stop short of creating a micro-level Forbes file, however, because their goals require knowing only total wealth, total income, and total taxes paid for the Forbes group.

12 For example, we produce estimates consistent with to the 8% average effective tax rate found by Leiserson and Yagan (2021) and Yagan (2023) when we use our Expanded Income measure.

13 Although not shown in the Figure, comparisons of tax liability after credits are similarly close—in 7 of the 8 waves before the 2022 SCF, our estimate is within 5% of the corresponding SOI figure. As of this writing, however, we do not have aggregate benchmark data for tax liability after credits in 2021 (which would correspond to the income data collected in the 2022 SCF).

14 This is technically a slight underestimate because an individual with multiple jobs that are each below the taxable maximum but together exceed the Social Security taxable maximum will pay employee taxes up to the taxable maximum, but the individual employers will each pay taxes up to the taxable maximum on each job.

15 Earnings categories are high earnings (above the 75th percentile of earnings, as calculated by the Kaiser Family Foundation) and low earnings (below the 25th percentile of earnings, as calculated by KFF). Respondents in 25th-75th percentile are put into the middle category. Age categories are 26 and younger, and 50 or older. Respondents between 27 and 49 are put into the middle category. An employer plan is labeled as "high earning" if 35% or more of its employees earn above the 75th percentile of earnings (KFF uses dollar cutoffs that vary by year). Similarly, the plan is "low earning" if 35% or more of its employees earn less than the 25th percentile of earnings. Employers with more than 35% of both high-earning and low-earning employees, or with less than 35% of high-earning and low-earning employees, are put into a middle category. An employer plan is put into the low age category if 35% or more of its employees are age 26 or younger. It is put into the high age category if 35% or more of its employees are age 50 or older. Employers with more than 35% of both young and old workers, or with less than 35% of both young and old workers, are put into a middle category. From 2012-2014, small firms are defined as having 199 or fewer workers, and large firms are defined as having 200 or more workers. From 2015 to 2019, small firms are defined as having 99 or fewer workers, and large firms are defined as having 100 or more workers. For more methodological information on the EHBS, see the survey methodology at https://www.kff.org/health-costs/report/2022-employer-health-benefits-survey/.

16 Results available upon request; average contributions for plan type 9 (older, higher income workers) are some 50 to 75% higher than plan type 1 (younger, lower income workers). For joint plans, larger firm plans are 10-30% more generous, depending on plan type. Differences by firm size for single coverage are negligible.

17 BEA uses estimates for private employer contributions from Health and Human Service's Agency for Health Care Research and Quality's Medical Expenditure Panel Survey data on insurance purchased by employers for employees and on health insurance provided by employers who insure themselves. State and local government contributions for state/local government employees are pulled from the same survey but use a judgmental trend for the most recent year. For federal employees, BEA uses an OPM internal accounting report for the Federal Employee Health Benefits Program. The BEA methodology is described in Chapter 10, "Compensation of Employees," in the online NIPA methodology handbook (https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapter-10.pdf).

18 There is an extensive literature on closely held business income reporting, including Cooper et al, (2016), Kopczuk and Zwick (2020), and Smith et al, (2019, 2023).

19 Aligning SCF and SOI AGI distributions also requires imputing SCF net operating losses (NOLs), which are not well captured in the SCF questionnaire (NOLs are a subcategory of "other" income, and thus the existence of an NOL must be proactively offered by the respondent). We use microdata from SOI Public Use Files (PUFs) to better understand the relationship between NOLs, current business incomes, and other types of income.

20 Indeed, researchers such as Bhandari et al, (2020) have looked at the difference between SCF and IRS business income reporting and concluded the SCF lacks useful information. See Bricker, Moore, and Volz (2022) for a more nuanced view of how SCF reported business incomes compare to estimated taxable business incomes.

21 Business income is by far the largest component of the "tax gap" between NIPA and IRS incomes, but other

types of income such as tips are generally thought to be underreported as well. Our approach is consistent in using the SCF reported values for all types of income.

22 To determine tax liability using TAXSIM, we allocate total capital gains into short- and long-term gains using SOI reported differences in short versus long term by AGI class.

23 See Larrimore et al, (2021) for an alternative approach to allocating total capital gains across the income distribution. The approach in that paper is similar to ours in terms of allocating total capital gains but differs because we use SCF wealth levels to allocate gains.

24 The discussion here is largely based on Chapter 12, "Rental Income of Persons," in the online NIPA methodology handbook (https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapter-12.pdf).

25 The SCF tracks published NIPA Social Security benefits paid well, especially in recent waves. The SCF is a few percentage points low in every year, but that is to be expected because the SCF sample frame excludes institutions such as nursing homes.

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