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Introducing the THIAs: Total Haig-Simons U.S. Household Income Accounts, 1960–2021

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This paper introduces the U.S. total (Haig-Simons) household-sector income accounting series, or THIAs. The THIA measures of total income, spending, and saving for the U.S.,1960-2021, respond to the needs of scholars and researchers expressed over many decades, as well as U.N. and OECD statisticians and national-accounts specialists. A prototype distributional breakout of all measures by income quintiles is also included for 2000-2021. The series provide novel insights into trends in income, spending, saving, wealth, wealth accumulation, and wealth concentration. These insights may have important implications for economic modeling, and for tax and transfer policies.

Table of Contents

Abbreviations used: CEX: Consumer Expenditure Survey. DFA: Distributional Financial Accounts. DINA: Distributional National Accounts. DPCEA: Distribution of Personal Consumption Expenditure Accounts. DPIA: Distribution of Personal Income accounts. FA:
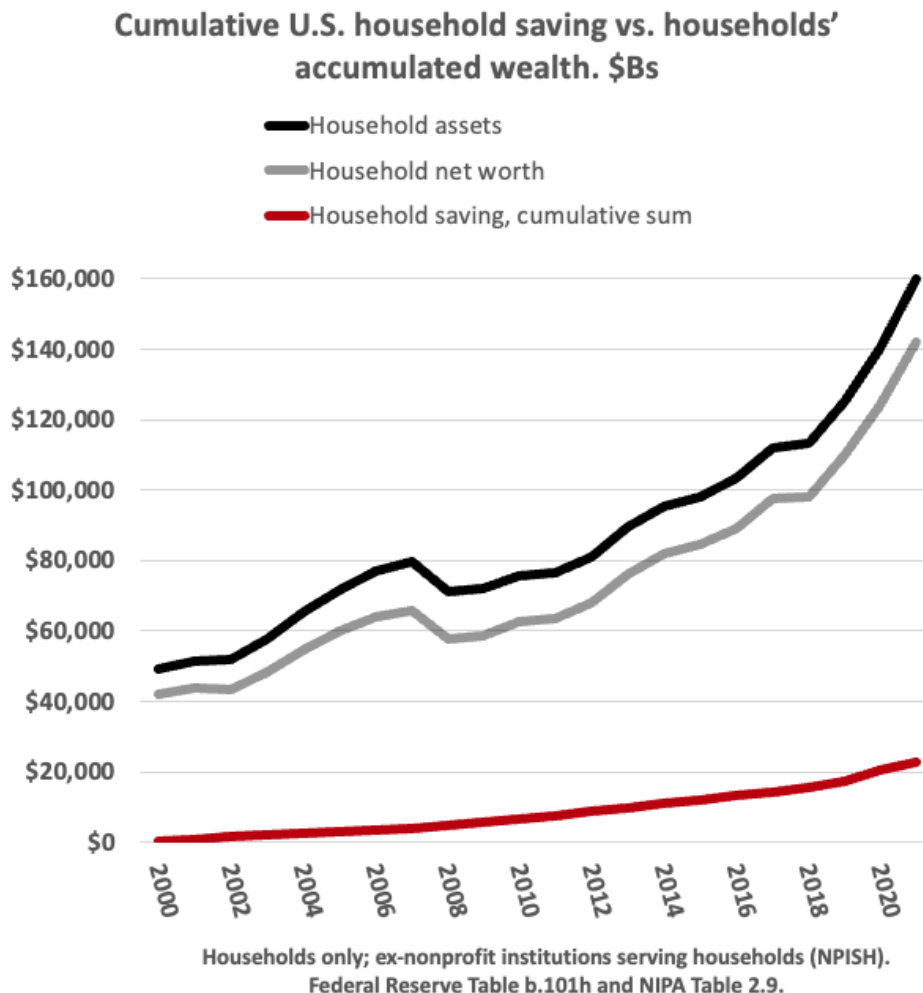
Federal Reserve Financial Accounts (F, L, and B tables). [IMA](#): Integrated Macroeconomic Accounts. [NIPA](#): National Income and Product Accounts. [SCF](#): Survey of Consumer Finances. [SNA](#): System of National Accounts. [WID](#): World Inequality Database.

Section One. Total Haig-Simons Income: The "Preferred" Measure

There is a persistent stylized economic fact that is not widely understood by economic modelers, theorists, and commentators: U.S. saving doesn't explain U.S. wealth accumulation (Figure 1). More precisely, cumulative Personal and Household Saving in the U.S. BEA's NIPAs don't even come close to explaining changes in households' balance-sheet assets and net worth. The same is true of National Saving; it doesn't nearly explain the accumulated "wealth of the nation" as presented on Federal Reserve household balance-sheet tables and Table B.1, Derivation of U.S. Net Wealth.[1]

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[1] Other measures of U.S. saving and its accounting-identity partner, investment/"capital formation," are displayed in the FRED graph here: fred.stlouisfed.org/graph/?g=1kklr, along with annual changes in alternate measures of U.S. wealth. The B.1 "net wealth" derivation is unusual; it attempts to tally "real," nonfinancial assets, but (necessarily) resorts to equity at current market prices for the value of firms, and rest-of-world (net international investment position, NIIP).

Figure 1. Cumulative sum of annual household saving vs. accumulated household wealth.

Cumulative U.S. household saving vs. households' accumulated wealth. $Bs

━━ Household assets
━━ Household net worth
━━ Household saving, cumulative sum

Households only; ex-nonprofit institutions serving households (NPISH).
Federal Reserve Table b.101h and NIPA Table 2.9.

This disparity exists because Personal, Household, and National income measures (from which saving remainders are derived) don't include holding gains accrued and accumulated by households across years, decades, lifetimes, generations, and dynasties (Figure 4). The disparity is significant for economists because "capital accumulation" models, theories, and understandings of economic growth are confronted with two very different measures: the cumulative sum of net investment (which equals personal/national saving by national-accounting identity), versus observed growth in assets/net worth. Despite the very large disparity between the two measures, "wealth" and "capital" in many models and understandings are treated (somewhat inconsistently) as synonymous or "interchangeable" (Piketty 2014, p. 47).

Economists have had a solution to this issue for more than a century: a "preferred" measure of income called Haig-Simons income, which is just personal or household income plus accrued holding gains (this is only slightly simplified).[2] Many U.S. income, wealth, and inequality

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[2] Robbins' footnote 7 nicely encapsulates Haig and Simons' definitions: "Haig (1921) wrote that income is 'the money value of the net accretion to one's economic power between two points of time', and Simons (1938) wrote that income is 'the algebraic sum of (1) the market value of the rights exercised in consumption and (2) the change in the value of the store of property rights between the beginning and end of the period in question.'"

researchers and economic modelers over decades have expressed wishes for a published Haig-Simons data series. Comments from two recent papers serve as good examples:

> "The most comprehensive concept of income and consumption is drawn from the suggestions of Haig and Simons, where income represents the capacity to consume without drawing down net worth. Economists have used the following equation as the working definition of Haig-Simons: Income (Y) equals consumption (C) plus the change in net worth (ΔNW). No studies use this definition to the fullest extent, because no household survey has the necessary variables to create a full measure of Haig-Simons income. (Fisher et. al. 2020)

> A long-standing preferred measure of economists is the Haig-Simons concept of economic income, sometimes described as equaling consumption plus the change in net worth and including these income sources. A key feature of this definition of income is the inclusion of annual accrued capital gains or losses. ... While the Haig-Simons approach is often considered the preferred measure by economists, actually estimating the distribution of accrued gains is necessarily imprecise because micro data rarely have all the information needed. (Auten 2022)

Atkinson, Piketty, and Saez 2011 likewise refer to "a 'preferred' definition of income, such as the Haig-Simons comprehensive definition, which includes such items as…accruing capital gains and losses." Saez and Zucman 2019 focuses on this measure as well, though not by that name; they call it "true economic income."[3] Eisner 1989, Robbins 2018, Bricker et. al. 2020 and Larrimore et. al. 2021 all assemble H-S series from multiple sources, but none of these series is published or downloadable.

Prior research on the topic is extensive and longstanding. Hicks 1946 is an important touchstone; some researchers refer to the measure as Haig-Simons-Hicks income. Hicks' book devotes a chapter to H-S income, though not by that name (Chapter 14, "Income"). H-S income is necessary and inherent to his sustainable-consumption constraint (and Hyman Minsky's "survival constraint"): "the amount which [households] can consume without impoverishing themselves."[4] (Without running out of assets to spend, that is.) The 2008 SNA guide (p. 160) echoes Hicks' words almost verbatim. The OECD (a) handbook (p. 29) discusses H-S income and concludes, "Although it is not part of the income definition as defined by the SNA, it would provide more insight into the economic situation of various household groups."

The main contribution of this paper and the accompanying Excel workbook[5] is to provide such a "preferred" and open-access data set based on total H-S income, covering 62 years 1960-2021, for use by researchers. The data set is here dubbed the THIAs, or Total Household Income Accounts. All THIA measures are for the households-only sector, excluding nonprofit institutions

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[3] Eight usages in the paper. One example, emphasis added: "As long as Bezos, Buffett, and Zuckerberg do not sell their stock, their realized income is going to be minuscule relative to their wealth and *true economic income*."

[4] Minsky/Simons: See Mehrling 1999, p. 139: "the most basic constraint on the behavior of every economic agent is the 'survival constraint' (Minsky, 1954, p.157) which requires that cash outflow not exceed cash inflow." The THIAs consider all assets, not just households' quite small (~10%) proportion of "cash" assets. See also Bezemer, 2021, p 391 ff, and Neilson, 2019, pp 45–49.

[5] icloud.com/iclouddrive/0f6fDVQ1pwdx3yckeXzrbAgkg#THIAs-MPRA-6-19-24.xlsx

serving households (NPISHes).[6] Households-only Haig-Simons income is referred to here as "total income," a superset of the NIPAs' "household income" (which is the households-only portion of personal income). All measures are in nominal dollars ($Bs); inflation-adjusted series are easily derived from these.

Figure 2 illustrates how the "Additional Property/Ownership Income" category (holding gains plus other changes in volume) is the THIAs' key addition to NIPA income, and therefore to measures of total saving and wealth accumulation.[7] All other income is NIPA household income (79% of total income over the 22 years 2000-2021). Most significantly, total income incorporates households' *total* returns on assets: asset-holders' total "property" income including holding gains — not just the "yield" from interest, dividends, etc. that's tallied within NIPA income. (Yield comprises 51% of the household sector's total return on assets over 22 years, versus holding gains' 49%.) With the inclusion of outlays (consumption spending and consumer-interest payments), taxes, and borrowing, the THIAs are balance-sheet-complete.

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[6]   In 2019, national accountants "de-consolidated" the consolidated personal sector (often referred to in shorthand as the household sector) into its component sectors, households and NPISHes. See NIPA Table 2.9's separate measures: personal, household, and NPISH (coverage back to 1992), the DPIAs (coverage from 2000), plus the FA balance-sheet tables B.101h and B.101.n and the households-only DFAs (coverage from 1989). Measures for earlier years are adjusted in the THIAs from personal to households-only estimates as necessary, as explained in Appendix A.

[7]   To avoid confusion, "accumulation" is used in this paper in preference to Haig's "accretion," or "acquisition" and "net lending/borrowing" as used, for instance, in the Financial Account section of IMA tables. See "Author" 2021c; note 28 therein explains Godley and Lavoie's usage and preference for this term.

Figure 2. The THIAs, detail displaying 2019-2021

Household Total Income and Wealth, Sources and Uses	2019	2020	2021	Sum 2000–21	% of Total income
Billions, nominal dollars. Household-only measures, ex-NPISH					
Start-of-period net worth	99,506	110,956	124,630		
Start-of-period assets	114,577	126,485	140,685		
Start-of-period liabilities	15,070	15,529	16,055		
Sources: Total income. Labor + Total return on assets + transfers	**28,198**	**30,193**	**37,288**	**376,296**	**100%**
Labor Compensation (earned income)	**11,448**	**11,595**	**12,546**	**188,771**	**50%**
Plus: Primary property income, return on assets ("yield")	**5,120**	**5,188**	**5,707**	**80,707**	**21%**
Proprietors' net income (profits)	1,554	1,584	1,749	26,105	7%
Rental net income (profits) including imputed owner-occupier rental profits	675	747	804	9,578	3%
Interest	1,579	1,488	1,493	27,389	7%
Dividends	1,312	1,369	1,660	17,634	5%
Equals: Primary market income	**16,568**	**16,783**	**18,253**	**269,478**	**72%**
Plus: Additional property/ownership Income, return on assets	**9,846**	**10,658**	**15,927**	**78,485**	**21%**
Other Changes in Volume	**898**	**452**	**7**	**9,479**	**2.5%**
Accumulation of durable goods (net of depreciation)	235	291	479	4,600	1.2%
Disaster losses	0	0	-20	-198	-0.1%
Other (other) volume changes	663	161	-452	5,077	1.3%
Accrued holding gains/asset (re)valuation	**8,948**	**10,206**	**15,920**	**69,006**	**18%**
On financial assets	7,547	7,294	9,606	45,007	12%
On nonfinancial assets	1,400	2,912	6,314	23,999	6%
Memo: Total property income, return on assets	14,966	15,846	21,634	159,192	42%
Equals: Total market income	**26,414**	**27,441**	**34,180**	**347,963**	**92%**
Plus: Net Transfer income	**1,784**	**2,752**	**3,108**	**28,334**	**8%**
Gross social benefits and other transfers received	3,209	4,201	4,666	51,488	14%
Government social benefits	3,062	4,062	4,483	49,093	13%
From business (net)	32	17	55	561	0.1%
From nonprofits	115	122	128	1,834	0.5%
(Less) Household contributions for gov. social insurance	1,425	1,449	1,558	23,154	6%
Memo: Household income (labor + primary property + net transfers)	18,352	19,535	21,361	297,812	79%
Less: Uses	**16,749**	**16,519**	**18,842**	**274,861**	**73%**
Household Taxes	2,199	2,257	2,743	35,187	9%
Household Outlays	14,549	14,262	16,099	239,673	64%
Consumption expenditures	14,000	13,722	15,585	230,282	61%
Consumer (non-mortgage) Interest paid	341	286	274	5,591	1.5%
Adjustment for personal vs HH: net HH transfers to nonprofits	209	255	240	3,800	1.0%
Equals Total saving. Sources - uses, change in net worth	**11,450**	**13,674**	**18,445**	**101,436**	**27%**
Plus: Assets accumulated from net new borrowing	459	526	1,576	11,203	3%
Equals: Change in assets	**11,908**	**14,200**	**20,021**	**112,638**	**30%**
Minus: Liabilities accumulated from net new borrowing	459	526	1,576	11,203	3%
Equals: Change in net worth	**11,450**	**13,674**	**18,445**	**101,436**	**27%**
End-of-period net worth	110,956	124,630	143,075		
End-of-period assets	126,485	140,685	160,706		
End-of-period liabilities	15,529	16,055	17,631		

In addition to aggregate measures for 1960-2021, the THIAs also provide distributional breakouts by income quintile for 2000-2021, covering all income and outlay categories and subcategories (Figure 3).[8] These measures for the lower quintiles are more problematic (see Section 3), and can thus be considered as a prototype. But the top-20% and bottom-80% measures are quite solid, so they are the primary distributional measures discussed in this

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[8] Income quintiles are used because they are directly provided by, or can be reasonably assembled for, all the source data sets. They provide both a broader and more granular bottom-to-top view than in the DINAs, where both income- and wealth-percentile breakouts are given for the bottom 50%, next 40%, and above. The DFAs' wealth-percentile breakouts also use that form, but their income-percentile breakouts are by quintiles (plus top 1%). Both the DPIAs and CEX provide income-decile/quintile breakouts. See Appendix C for discussion of income quintiles' comparability across sources.

paper. The 22-year period 2000-2021 is also used frequently in this paper as a convenient sample of recent decades' aggregate measures.

Figure 3. THIAs distributional breakouts by income quintiles ($Bs). Detail.

Proprietors' net income (profits)	1,749
All HHs (cross check)	1,749
Top 20%	1,582
60-80%	113
40-60%	43
20-40%	13
Bottom 20%	-2
Bottom 80%	167

The THIAs' data series are novel because the U.S. national-accounting series necessary to assemble them did not start to become available until 2006. Households-only (excluding NPISH) and distributional measures have only been published since 2019.[9] All the series are publicly available and maintained by national-accounting agencies. The THIA workbook assembling those series comprises a full replication file including transparent derivations and the complete publicly-downloadable source data sets (with download links for incorporating new data releases), in a form that is relatively easy for researchers to vett, alter, adapt, and improve, and expand with new years' and/or alternate data.

The THIAs comprise a complete and coherent web of accounting identities explaining balance-sheet changes (see Section Two). NIPA identities, by contrast, terminate with the personal/household saving remainder, or residual, whose identity relationship to change in assets, liabilities, and net worth is undefined in the NIPAs. (The NIPAs don't have balance sheets.) Each period's ending balance-sheet measures in the THIAs, beginning 1959, provide the starting measures for the next period, in a repeating loop culminating in the end-of-2021 household balance sheet. This construction allows us to cross-check the validity of the THIAs' results against observed balance-sheet measures (Section 3).

The THIAs' full accounting of the relationship between income, spending, and wealth may be valuable given the recent focus among inequality researchers on "joint distributions" of those measures. The title of Fisher 2021 nicely encapsulates this approach: "Inequality in 3D."[10] It may also relieve researchers and modelers of the need to assemble bespoke Haig-Simons series from household surveys and administrative data. Examples of these efforts include Eisner 1989,

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[9] The SNA-based Integrated Macroeconomic Accounts (IMAs), with their Revaluation and Balance Sheet accounts for all sectors, were released in 2006 (2012 for quarterly series). The Distributional Financial Accounts' (DFAs') quarterly wealth-distribution tables and the accompanying households-only sectoral balance sheet B.101.h were released in 2019. The DPIA's annual income-decile breakouts of household income, its submeasures, and taxes were first released in December 2020; their fourth (still-prototype) version was released in December 2023. These new data series have brought the staffing, resources, and expertise of national accounting agencies to bear on these measurement challenges — assembling data series from multiple microdata sources that comport with macro-level national-accounts measures. (With ongoing revisions of methodology and improved accuracy over many years.) The THIAs assemble their results within a complete and coherent accounting framework.

[10] Garner et al (August 2023) Appendix B provides an excellent historical and international overview of that emerging "3D" approach, and the literature and research institutions engaging it.

Robbins 2018, Bricker et. al. 2020, and Larrimore et. al, 2021. The results of such efforts are somewhat idiosyncratic so difficult to compare or re-create, especially absent replication files.

Section Two. Haig-Simons Income Accounting

The derivation of Haig-Simons income is quite straightforward:

> H-S income = Consumption expenditures + change in net worth
> = Household income + accrued holding gains from asset-price (re)valuation changes

In practice, based on national accounts' methods and derivations, it's also necessary to add small "other changes in volume" measures along with holding gains, as the IMAs do (see Appendix A, Figure 12), to match observed changes in balance-sheet assets and net worth. Subtracting taxes and outlays then yields "H-S saving," here called "total" saving, which is equal to change in net worth. Table 1 explains the construction of H-S income starting from household income, with two different approaches to ordering and labeling.

Table 1: Two ways of presenting and labeling the Haig-Simons accounting construction

Household income + Accrued holding gains and other changes in volume = Total income, H-S income - Taxes and outlays = Δ Net worth (total saving) + Assets accumulated from net new borrowing = Δ Assets - Liabilities accumulated from net new borrowing = Δ Net worth, total saving	Household income + Accrued holding gains and other changes in volume + Assets accumulated from net new borrowing = Gross asset accumulation, H-S income plus net new borrowing - Taxes and outlays = Net asset accumulation, Δ Assets - Liabilities accumulated from net new borrowing = Δ Net worth, total saving

Note: Outlays = Consumption expenditures plus consumer-interest payments

It's important to understand that holding gains don't "flow" from anywhere. Neither the household sector nor any other sector posts offsetting liabilities to their balance sheets when asset-market prices go up. New assets just appear on accounts/balance sheets due to mark-to-market accounting-markup events, when brokerages and (national) accountants see changes in market prices. Absent new liabilities, gains increase both aggregate household assets, and net worth. (Unlike borrowing, for instance, which increases borrowers' assets *and* liabilities, for zero change in net worth.) This is why holding gains (valuation changes) are absent from the Flow/Transaction tables (which only tally volume changes) in the Fed's Flow of Funds accounts, and why gains are tallied in a separate Revaluation account in the SNAs/IMAs (Figure 12).[11]

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[11] The Federal Reserve Flow of Funds/Z.1 report explicitly adopted the volume vs valuation distinction with a terminology change and explanatory note in the June, 2018 Z.1 release. (federalreserve.gov/releases/z1/20180607/html/introductory_text.htm). Emphasis added: "As of this publication, the term 'flow' is being replaced by the term 'transactions.' The concept being referred to, which is the acquisition of assets or incurrence of liabilities, is not being changed. The change

Whether some holding gains are "realized" by individual asset holders through sale is not material to the accrued Haig-Simons series. Those sales are just dollar-for-dollar asset swaps between asset-holders at current market prices — non-cash assets for cash assets. Those sales/swaps are "portfolio churn," with no effect on the individuals' or the aggregate current stock of assets.

Subtracting taxes and outlays from total H-S income yields total, comprehensive, or Haig-Simons saving, which equals change in balance-sheet net worth[12] (Table 1).This total-income accounting offers a comprehensive post-facto, backward-looking *descriptive* accounting model of wealth accumulation, through the lens of the household-sector balance sheet that sits at the top of the national accounting-ownership pyramid.[13]

Like household income, national income — the core measure for the Distributional National Accounts and the World Inequality Database — does not include holding gains, realized or accrued. (The DINA tables do provide valuable series of realized holding gains, as employed in Figure 4, but only for the purpose of allocating, as opposed to measuring, national income.) National-income series are more internationally comparable, however, given the availability of national accounting measures across countries.

The THIAs are particular to the U.S., and are thus only a potential exemplar for other countries. But the SNA-based structure should be adaptable for details and particularities of other countries as SNA conventions and practices are more widely adopted — especially the clear distinction between volume and (re)valuation measures. To the extent that asset revaluation is measured, valuation and "other changes" measures can be added to existing

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in terminology is intended to prevent confusion with the broader concept sometimes called 'economic flow,' which is the *change in level* from one period to the next and is composed of *transactions*, *revaluations*, and *other changes in volume*. The new terminology brings the Financial Accounts of the United States into better alignment with international guidelines in the System of National Accounts 2008 (SNA2008)." (And thus the IMAs.) The Transactions tables are still labeled as the "F" tables, however: F.101 and etc.

[12]   This accounting treatment comports with standard public-corporation financial statements, which include a Consolidated Statement of *Comprehensive* Income. These statements include net income (profits), equivalent to household or national income, and add additional income sources, notably holding gains. An example statement from Berkshire Hathaway is available at wealth-economics.com/BHCompInc.png.

[13]   Household wealth is the operative measure of "national" wealth. In the words of the OECD DNA expert working group handbook (p. 29), "all forms of income in the economy eventually accrue to resident individuals." (In sectoral terms, households). Likewise, domestic firms' equity-share values at current asset-market prices are assets on the household-sector balance sheet. The household sector largely "owns" the firms sector in this accounting sense; the firms sector is like a wholly-owned subsidiary. Firms can own shares in firms, but the household sector ultimately owns the whole firms sector; the ownership buck stops at households. This is an asymmetric, one-way ownership relationship. Since 1865, no other sector owns or can own (equity shares in) households. Likewise NPISHes, for different reasons. Neither sector issues equity shares, or has owners. Similarly, the unmeasurable asset value of household-"owned" government assets (the judiciary system, public schools, roads and highways, et. al.) is at least partially *revealed* in the market value of household balance-sheet assets. That market value would presumably be somewhat smaller if those government institutions didn't exist.
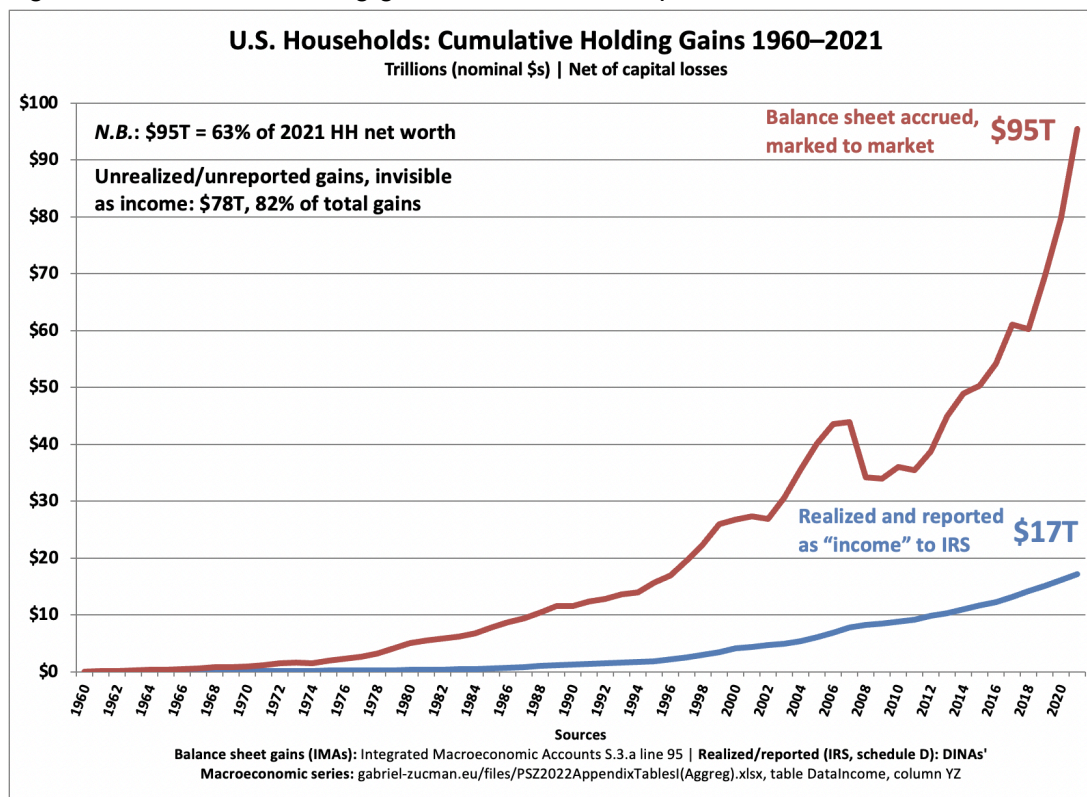
personal/household income to assemble Haig-Simons total income.[14] Subject to available distributional breakdowns of household income and assets/liabilities, those measures can also be allocated to percentiles as in the THIAs, to assemble distributional total income series.

The implications of holding gains for household-sector wealth accumulation are quite large (Figure 4). Even in accounting treatments that include realized gains, 82% of holding gains never appear as income (or hence, saving or wealth accumulation). Those accrued gains nevertheless redound to household balance sheets as asset accumulation. Significantly, given holding gains' reputation for volatility (and thus their frequent dismissal as "not real wealth" or "windfall" gains), over 62 years there has been only one significant drawdown in Figure 4's cumulative accrued series, in 2008: down $9.7T, a 13.7% decline.[15] Accrued holding gains are not just temporary fluctuations.

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[14]   The OECD DNA-EG handbook (OECD a, p. 29) envisions an accounting construction that fully integrates valuation changes, but only in the conditional or subjunctive mood: "[Holding gains are] included in the accumulation accounts in the framework of national accounts (see Figure 2.1) and could be taken into account once distributional information becomes available for the accumulation accounts. Although it is not part of the income definition as defined by the SNA, it would provide more insight into the economic situation of various household groups." The experimental "Distributional results on household income, consumption and savings" provided at OECD b do not include valuation measures. As this paper seeks to demonstrate, these valuation measures are extremely valuable even if distributional breakouts are not available. Lane 2015 also brings H-S thinking to bear on the U.K. and other countries' current account balances (emphasis added): "*In principle*, the stock-flow adjustment term *should* reflect 'valuation effects' (net capital gains on holdings of foreign assets and foreign liabilities due to movements in the market values of assets and liabilities…)." Note that Net International Investment Positions (NIIP) *are* tallied using assets' current market prices.

[15]   Given this rather large reality, it is worth revisiting the BEA FAQ, "Why do the NIPAs exclude capital gains from income and saving?" bea.gov/help/faq/67 The THIAs' total-income measures are not a useful measure of "current production." But they're arguably a valid market *correction* of firms' past production measures. Current asset markets think unconsumed long-lived goods produced in the past (tangible and non-) are worth more, relative to their sales prices when they were produced, purchased, and posted as assets to balance sheets. (Some but not nearly all of that greater nominal value is attributable to general inflation.)

Figure 4. Household holding gains: realized and reported, versus accrued.

U.S. Households: Cumulative Holding Gains 1960–2021
Trillions (nominal $s) | Net of capital losses

N.B.: $95T = 63% of 2021 HH net worth

Unrealized/unreported gains, invisible as income: $78T, 82% of total gains

Balance sheet accrued, marked to market   **$95T**

Realized and reported as "income" to IRS   **$17T**

Sources
Balance sheet gains (IMAs): Integrated Macroeconomic Accounts S.3.a line 95 | **Realized/reported (IRS, schedule D): DINAs'**
Macroeconomic series: gabriel-zucman.eu/files/PSZ2022AppendixTablesI(Aggreg).xlsx, table DataIncome, column YZ

Section Three. Checking the THIAs

The THIA's balance-sheet-complete accounting offers an important advantage: the summed economic flows over years and decades can be cross-checked and validated against observed ending balance-sheet measures (Figure 5). The aggregate derived measures match quite closely. The THIAs' end-of-2021 household assets, calculated over 62 years, show only a 0.3% discrepancy versus observed DFA end-of-2021 assets. Comparing *change* in assets, 2000-2021, the THIA/DFA discrepancy is 0.2%.

Figure 5. THIAs' calculated annual changes in assets versus observed balance-sheet asset changes, 1960–2021.
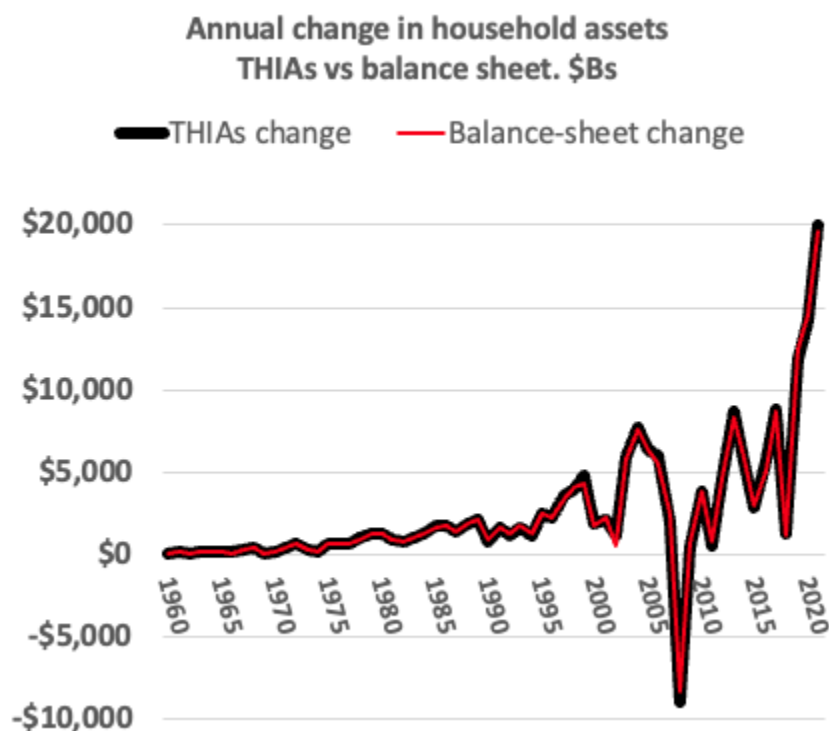
The 2000-2021 distributional income-quintile breakouts show greater discrepancies and annual variation (Figure 6). The bottom-80% and top-20% series are quite solid (though with greater discrepancies in 2008 and 2018[16]), and thus are the main distributional measures examined in this paper. Discrepancies are greater for the lower quintiles. The bottom-quintile series, especially, shows large *qualitative* discrepancies, including persistent differences in sign. It's worth noting, however, that the bottom quintile's discrepancies are quite small in dollar terms, relative to aggregates.

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[16]   Given the large equity drawdown in December 2018, this suggests inaccurate allocation of holding losses from that event to income quintiles. End-of-year measurement timing and thus the DFAs' interpolation between SCF survey years may be a factor. Late-2008 drawdowns were also largely in equity markets; real-estate declines spanned the period 2007 to 2011.

Figure 6. The THIAs' calculated changes in quintiles' assets versus observed balance-sheet asset changes. Note Y-axis changes. 2000–2021.
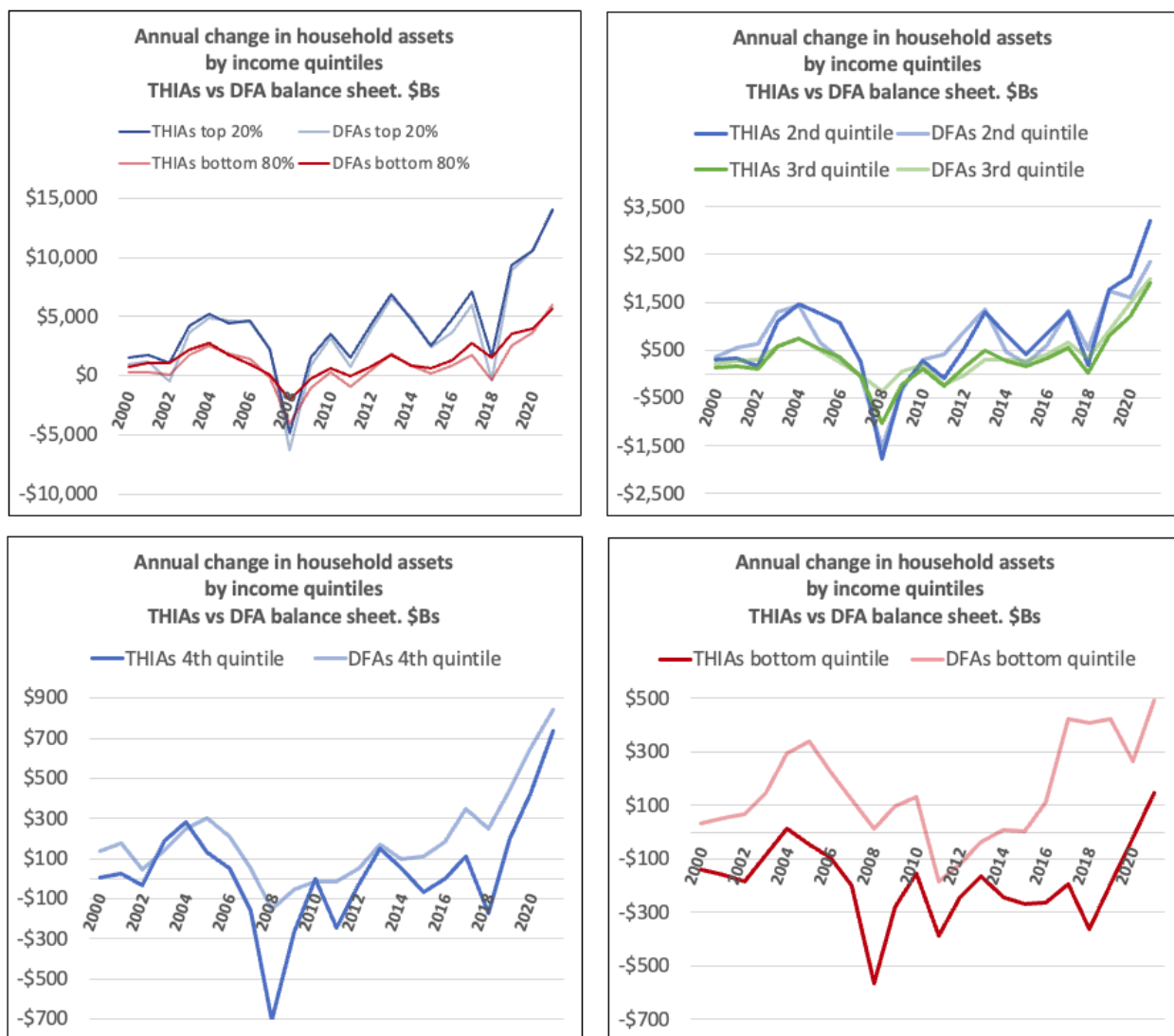
The THIAs' construction makes it possible for researchers to improve this prototype distributional effort by adding to or replacing any of the component data series with alternative series constructed from other data sources, or the same sources with alternative adjustments and/or quintile allocations. Some suggestions are discussed in Appendixes B and C.

Note that even for the aggregate series, some individual years show notable *percentage* discrepancies between the THIAs' calculated asset changes, and observed balance-sheet changes. These seem to result from disparate timing of the data sources' surveys, and their statistical methodologies. The DFAs are a particular example: they interpolate measures for years (and even quarters) between the triennial SCF surveys — the primary DFA data source — and extrapolate since the latest survey. Years with large asset-market changes, and adjacent years (e.g. 2002, 2007, 2009, 2011), seem especially susceptible. End-of-year equity-market drawdowns also stand out: 2008/2009 and 2018/2019. Whatever the causes, the THIA (and DFA) series require careful use when examining periods shorter than a decade.

Section Four. Key Insights from the THIAs

As displayed in this section, the THIAs' assembled "3D" data provides measures and comparisons that paint a more integrated, complete, and sometimes quite surprising picture of U.S. inequality and wealth/income concentration, and the economy overall. The focus in this section is on household asset accumulation. Liabilities only equal about 15% of household assets, and they change very slowly with net new borrowing. Over the period 2000 through 2021, borrowing has explained only 3% of gross asset accumulation (vs. 18% for holding gains).
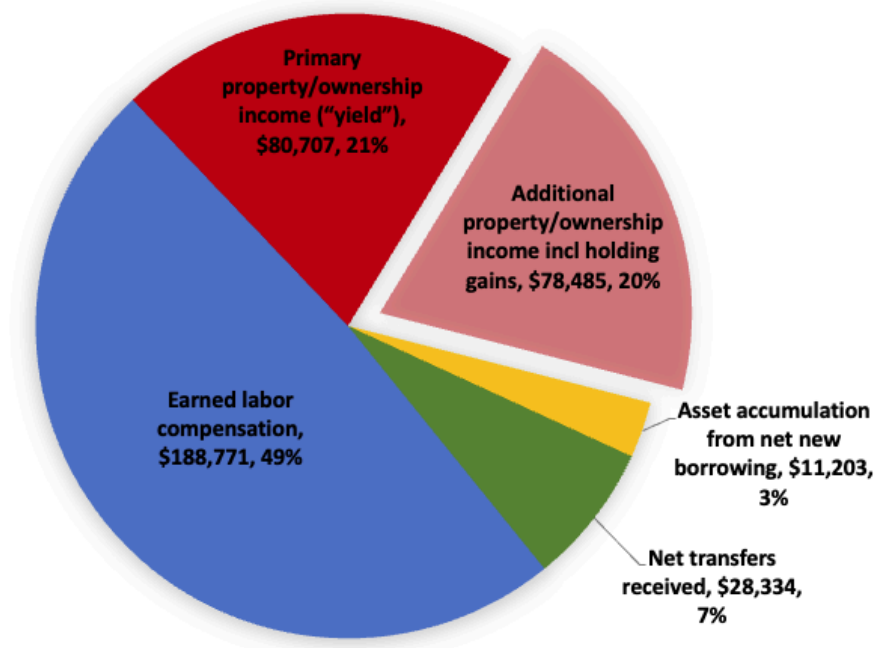
Five key insights are highlighted here. First, total income is much greater than household income, even for the lowest quintiles. Second, total income *growth* is much faster for the top 20% than for the bottom 80%. Third, the labor share of total income is lower and has declined faster than the labor share of household income, with an especially marked decline starting 2019. Fourth, the bottom-80's household saving is persistently negative, but its total saving is positive due to additional asset accumulation from holding gains (plus borrowing, to a much lesser extent). Fifth, most of the total saving since 2000 redounded to the top 20%, and that quintile's share of total assets — wealth concentration — increased accordingly.

Income sources. We start with the big picture of sources, from both income and borrowing, for gross household-sector asset accumulation (before netting out taxes and outlays). The 22-year accumulation is $387T using total Income, versus $309T for household income, 20% less (Figure 7).[17] The difference is largely due to holding gains' inclusion in total property income. Over this period, 49% of households' total property income (total return on assets) came from holding gains, versus 51% from yield (dividends, interest, etc.).

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[17]   Various accounting treatments quite reasonably try to re-allocate a portion of "mixed income" of "active" property owners and "proprietors" (variously defined) from property to labor income. See e.g. Saez and Zucman 2020: "We allocate 50% of partnership mixed income to capital (vs. 50% to labor) and 20% of sole proprietorship income to capital." These re-allocations to the labor income of owners *qua* working "entrepreneurs" only shift the aggregate labor share by one or two percentage points (Figure 7). The THIAs don't essay such adjustments, leaving them to the discretion of individual researchers.

Figure 7. Sources of household-sector income, plus borrowing: gross asset accumulation.
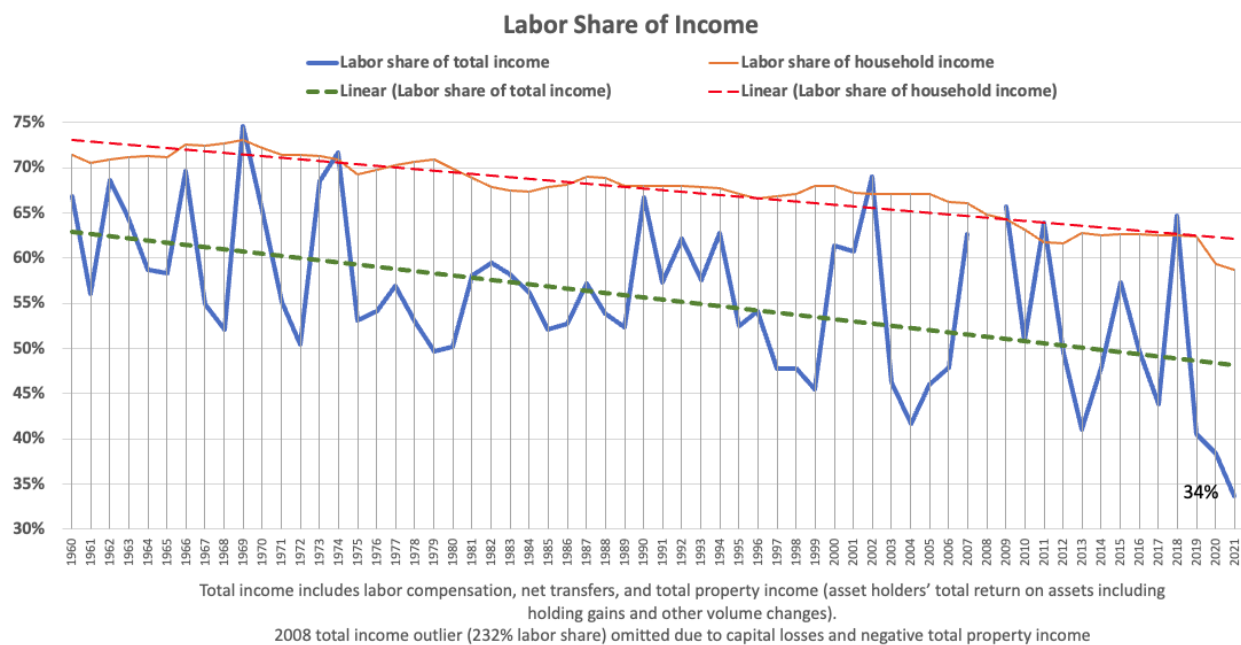

Total contributions to household asset accumulation, 2000–2021.
Total income + net borrowing. $387T total.
Nominal $s in Bs.

Primary property/ownership income ("yield"), $80,707, 21%

Additional property/ownership income incl holding gains, $78,485, 20%

Earned labor compensation, $188,771, 49%

Asset accumulation from net new borrowing, $11,203, 3%

Net transfers received, $28,334, 7%

Labor and unearned-income shares. Over 62 years, 62% of household income went to labor as earned income, while only 52% of total income went to workers (Figure 8).[18] The labor share of total income shows greater and faster decline, from ~63% to ~48%, with especially sudden and large declines from trend starting in 2019.

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[18]   For comparison, The BLS "labor share of nonfarm business output" measure averages 59% over the period. The Penn World Tables' U.S. labor share of GDP averages 60%. These both reflect national-income-based accounting, ex-holding gains.

Figure 8. Labor compensation as a percent of total and household income.

Labor Share of Income

Total income includes labor compensation, net transfers, and total property income (asset holders' total return on assets including holding gains and other volume changes).
2008 total income outlier (232% labor share) omitted due to capital losses and negative total property income

Workers are capturing an ever-smaller share of the total household-sector wealth-accumulation "pie" over time, while asset holders are capturing bigger slices. The total income approach provides a much more complete and comprehensive answer to the question posed, for instance, in Fixler 2019: "How households share in an economy's growth" — which only addresses personal income.

The obverse of labor income is unearned income, from property/ownership plus transfers. Unearned household income is split 74%/26% between asset holders and transfer recipients. For unearned total income, the split is 85%/15%.

Income distribution and growth. Turning to distributional measures, total income is much greater than household income for all quintiles (Figure 9).[19] Household income *growth* was about the same for the top 20% and bottom 80% (Table 2). Total income growth has been faster for both groups, but much more so for the top 20%. The holding-gains share of total income has redounded to all quintiles, but especially to the top quintile that (in 2021) owns 85% of equity shares, 75% of financial assets, 54% of nonfinancial assets, and 68% of total assets.

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[19]   Even the bottom quintile's total income is significantly higher than its household income. The DFAs show even greater bottom-quintile net asset accumulation than the THIAs (Figure 6), so this result does not appear to be just an artifact of the THIAs' calculations.

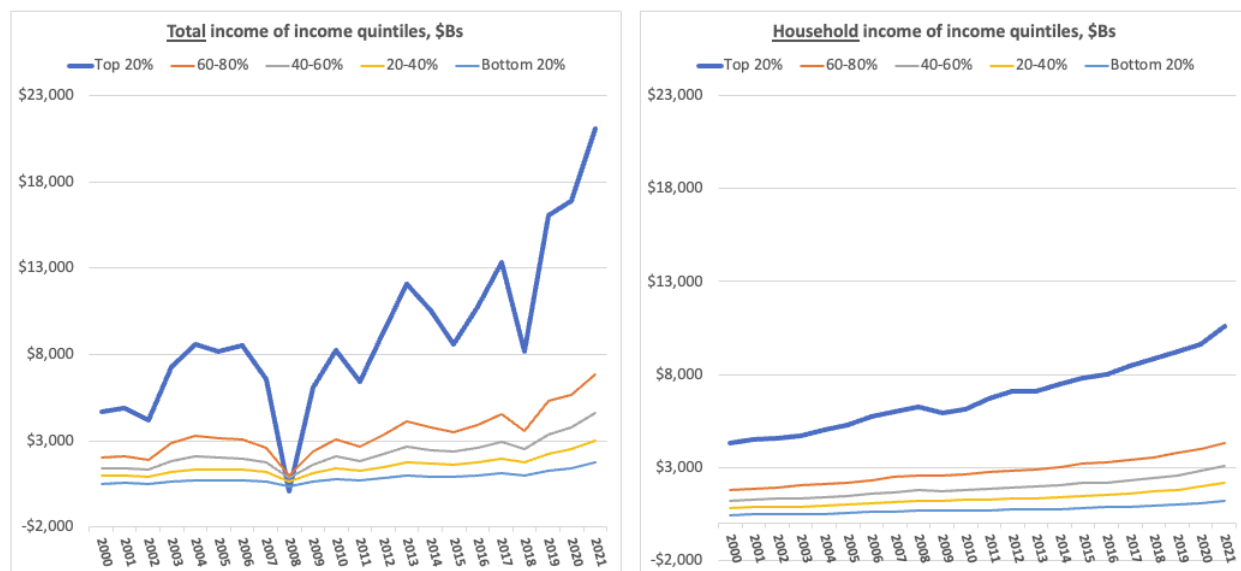Figure 9. Income quintiles' total and household income.

Table 2. 2021 income increase from 2000.

	Top 20%	Bottom 80%
Household income growth	+146%	+152%
Total income growth	+350%	+230%

Spending propensities and saving rates. The THIAs' distributional spending breakouts also provide novel pictures of annual propensity-to-spend ratios (the inverse of propensity to save) out of household income, total income, and total assets (Figure 10). While *marginal*-propensity equations and curves have been widely studied, these annual distributional propensity-to-spend ratio series have previously required bespoke construction by researchers.[20]

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[20]   Fisher et. al. 2020 Table 1, for instance, constructed from the Panel Study of Income Dynamics (PSID) *en route* to calculating marginal propensities, finds an annual propensity to consume/spend out of income of less than one (<100%) in 1999 and 2013, for all income and wealth quintiles.

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Figure 10. Income quintiles' annual spending relative to income and wealth.
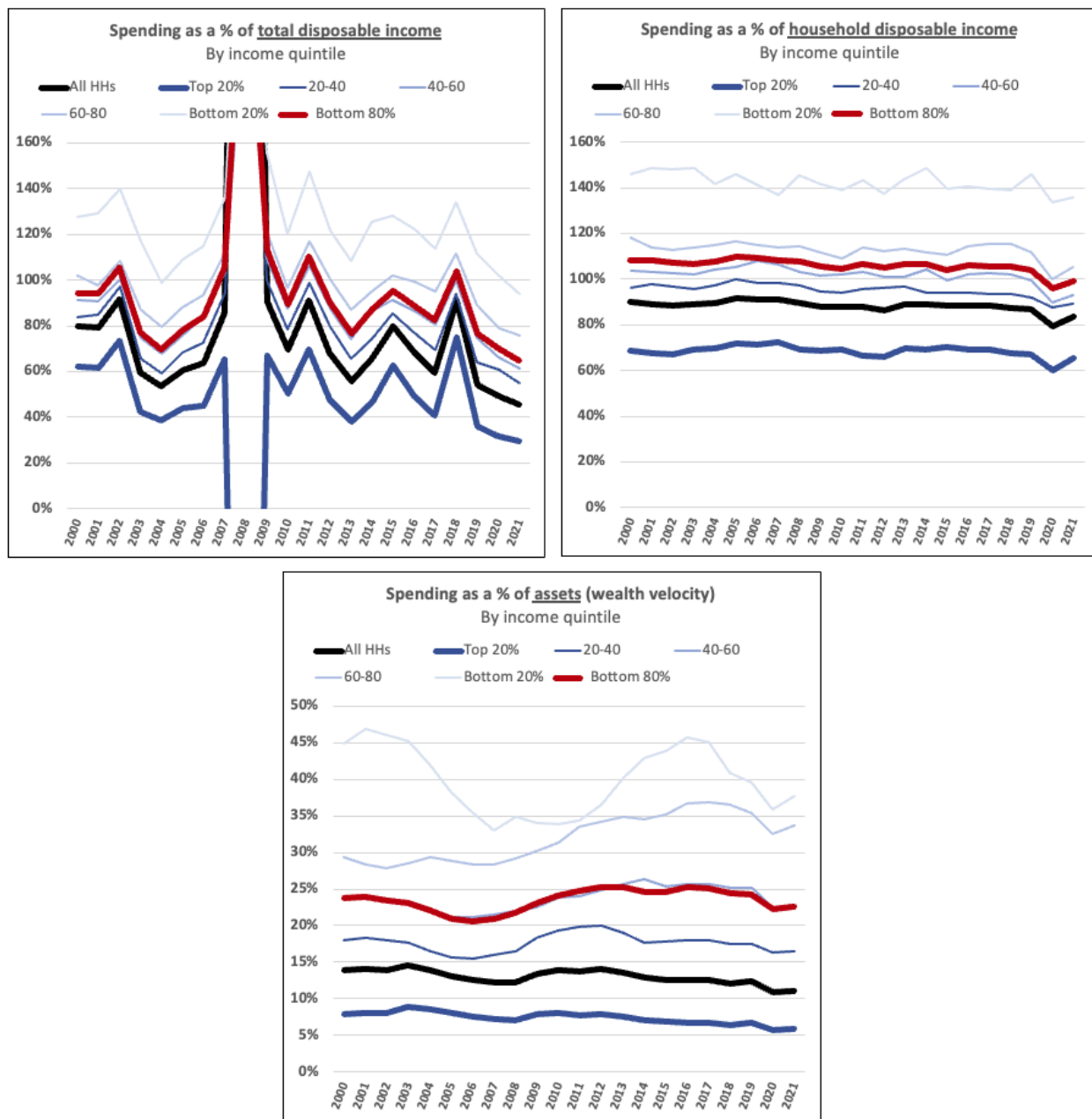
Households show declining propensities to spend over the period in all three ratios, especially relative to total income. The top 20% stands out; it only depleted 6% of its assets in spending in 2021, down from a series high of 9% in 2003/2004 — a 33% decline in that ratio. By contrast, the bottom-80% "wealth velocity" was basically unchanged: about 23% for the period (36% for

the bottom 40%), 4–6 times greater than the top 20% ratio.[21] Even as the top-20% total income share increased, it has been depleting its assets more slowly via spending.[22]

Saving and wealth accumulation. The increased total-income concentration detailed above, into more-concentrated property vs. labor income and into the top quintile, combined with declining top-20% spending propensity, explains a dominant stylized economic fact in the U.S. over recent decades: extreme and increasing concentration of wealth into the top income (and wealth) percentiles (Figure 11).[23]

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[21]   Wealth velocity is the conceptual inverse of Piketty's wealth:national-income ratio. The fairly consistent ratios across the period, with some trending, suggest that predictive growth models might benefit from including a wealth term in their consumption functions, combined with the traditional Keynesian income term. "Author" 2021b presents a long-term economic growth model based on income quintiles' historical wealth-velocity measures. (Wealth velocity is distinct from the "velocity of 'money,'" which only encompasses currency and deposit assets that comprise about 10% of household assets, 13% of financial assets.)

[22]   Perhaps the most surprising result in dollar terms: the bottom 80% persistently spends more than its household disposable income, with a -8% average household saving rate. By that standard measure, the bottom 80% perennially dissaves; the top 20% does all the saving (see Figure 9). It seems these spending deficits should very quickly encounter a straightforward version of Minsky's survival constraint or Hicks' sustainable-consumption constraint: If a household spends down all its assets (so it has none), it can't spend (see footnote 5). By contrast, the bottom 80% does *not* spend all of its total income; the household-saving deficit is "funded" primarily by lower quintiles' own holding gains. Borrowing provides additional funding, but the funding from gains is an order of magnitude larger ("Author" 2023; see also Appendix B).

[23]   There has been much discussion and debate about "upper tail" income concentration, into the top 1% and above, notably of late between Auten/Splinter and Piketty/Saez/Zucman. Auten/Splinter incorporates realized gains (only), and concludes that their series demonstrates slower/smaller increases in wealth concentration vs PSZ. Larrimore et al. 2021 uses accrued gains, and finds that the top 1% share is several percentage points higher than Auten/Splinter. These top-tail share measures are quite extreme and so the discussions are important, but they are narrow and extremely technical versus the THIAs' much better-sampled top-20% measures.

Figure 11. Saving, asset accumulation, and the top-20% asset share.
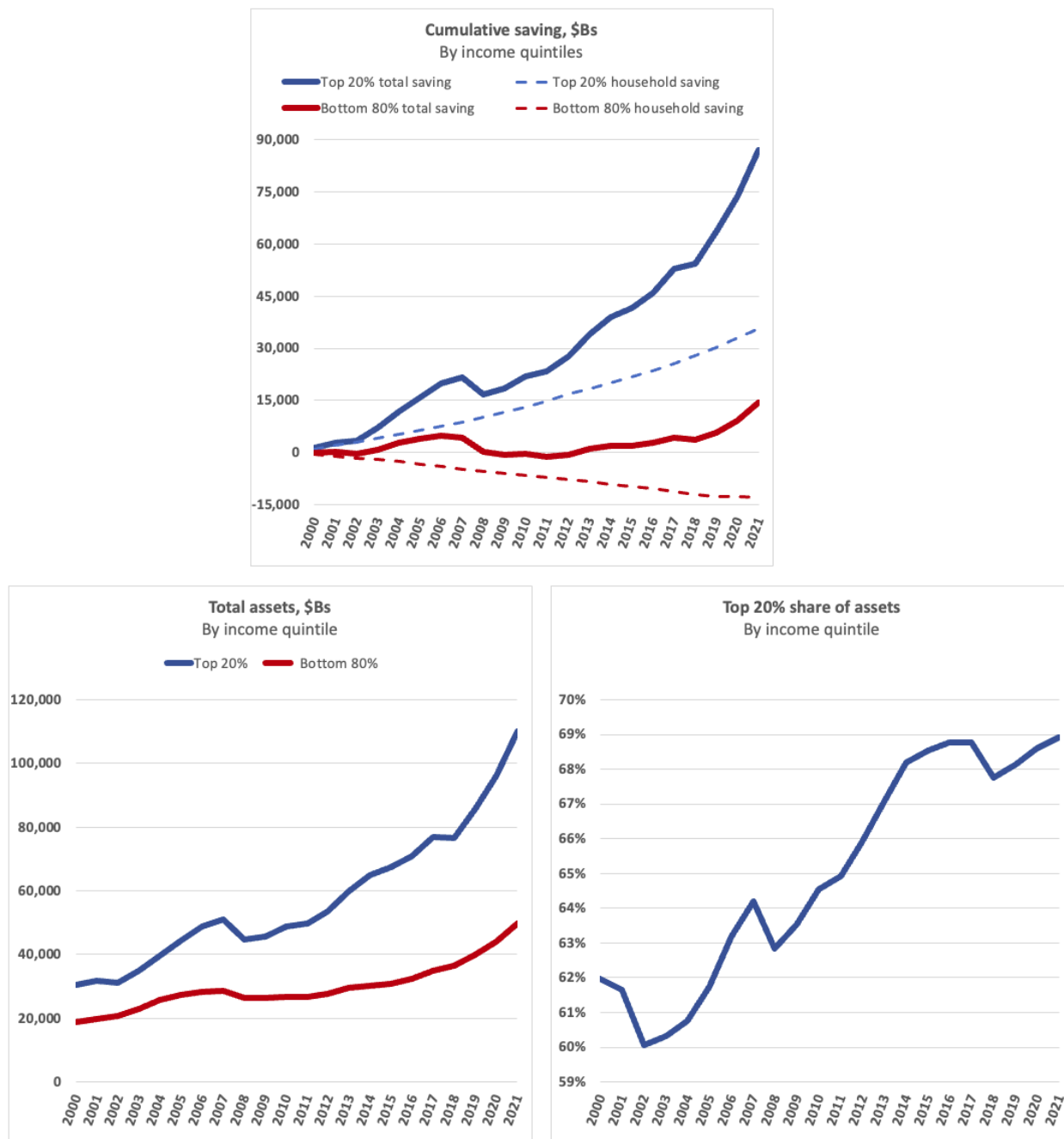
Over 22 years, 86% of total saving has redounded to the top quintile (which has more asset holders), so it has accumulated assets at a much higher rate than the bottom 80% (more workers). Measures based on household income or GNI, and their household- or national-saving remainders/residuals, cannot account for this observed rise in wealth and wealth concentration.

The magnitude of the total-income-based measures and changes detailed in the THIAs, extending to trillions of dollars in single years and even in single quarters, dwarfs widely employed "headline" measures that are based on household, or even just labor, income. The

total-income measures tell a multi-decadal story of wealth accumulation and concentration that's not visible through the incomplete lens of household income and saving measures.

Conclusion

The THIAs are at least a first effort at offering the public-access, balance-sheet-complete Haig-Simons data series that economists have been expressing a desire for (and in some cases producing for themselves), over many years. The THIAs' clear accounting framework, transparent construction, and detailed documentation (here, and in the workbook itself) may enable revisions, improvements, and iterations by other researchers. And the widely-available data set may provide important new insights and measures of inequality, income, consumption, and saving, wealth and income concentration, and the changes in those conditions over decades.

Appendix A. Constructing the THIAs

The THIAs' precise methodology is revealed in the accompanying Excel workbook, which serves as a complete replication file. While it attempts to make the derivations as transparent and well-explained as possible, it remains somewhat complex. This appendix seeks to explain the derivations.

The basic THIA *structure* (Figure 2) is based on the IMA/SNAs' balance-sheet-complete presentation (Table S.3.a), and its derivation of change in net worth (line 96). Figure 12 diagrams its account structure, with alternate pathways through the Capital or Financial account. The THIAs do not engage with the Capital account, only the Financial account. That account comports with balance-sheet changes; the Capital account doesn't (hence the Statistical Discrepancy; see below). There is no engagement with value-added or investment spending (called "capital formation" in the IMAs). All of that is replaced with households-only income (and outlay) measures from NIPA Table 2.9 (since 1992), which matches the DPIAs (since 2000), and pre-1992 from NIPA Table 2.1 (personal sector), adjusted for households-only as detailed below. These household income measures comprise 79% of the THIAs' total income measures.

Figure 12. The IMAs' account structure, with alternative Capital and Financial accounts.
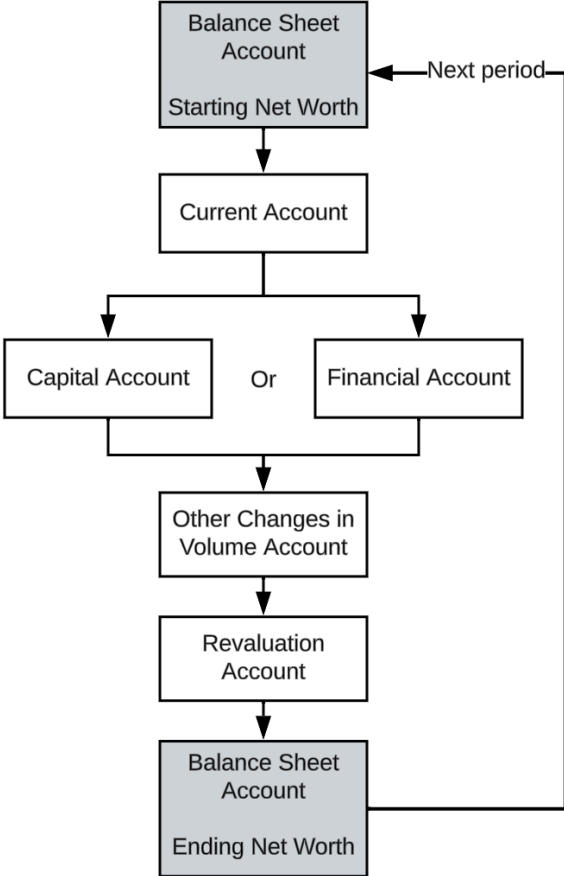
Zooming (*way*) out on the THIAs (Figure 13) gives an overall sense of the coverage: all-households aggregates only in earlier years, to full (prototype) distributional coverage for all measures, 2000-2021. (Some earlier distributional coverage is possible for Additional property income, and for outlays.)

Figure 13. The THIAs' scope of coverage, full table for 1960-2021. Aggregate-only on the left, with available distributional measures increasing to the right.

The reference balance sheet since 1989 is households-only Table b.101.h, which is mirrored in the DFAs.[24] The THIAs' pre-1989 asset and liability measures adjust available personal-sector balance-sheet measures from B.101 down to households-only based on the average post-1989 household:personal ratio — 94.1%. (These ratios are very consistent over the years since 1989.) Net worth is of course assets minus liabilities.

Detailed Measures
Several of the detailed measures in the THIAs (which sum to the aggregate measures) require individual treatment, and/or adjustment to households-only in earlier years.

Labor compensation and proprietors' income are both inherently households-only. The NIPA 2.1 personal and 2.9/DPIA households-only measures are equal. So pre-1992 measures from Table 2.1 require no correction.

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[24] The de-consolidation of the B.101 personal-sector balance-sheet table into B.101.h and B.101.n (since 1989) shows some anomalies. B.101.h assets + b.101.n assets, for instance, ≠ B.101 personal-sector assets. Part of this may just be because consolidation does not equal simple summing. But in any case deconsolidated NPISHes end up with some unexplained extra assets. See details and notes at the bottom of those B tables. The THIAs do not attempt to resolve those anomalies, which are quite small relative to household assets; they simply employ the DFA/B.101.h measures.

Rental, interest, and dividend income. Post-1992 Table 2.9 household measures are 2.2% lower than Table 2.1 personal measures. Pre-1992 personal-sector measures are adjusted down accordingly to estimate households-only measures.

Other changes in volume. All of the Other changes measures come directly from the IMAs' Other Changes in Volume account, personal-sector Table S.3.a. These quite small measures (2.5% of total income, combined) are all inherently households-only, requiring no adjustment. They are allocated to quintiles starting in 1989 as detailed below.

Net Accumulation of Consumer Durables. This measure — purchases of new durables less depreciation of existing durables — must be added to balance sheets because durables are an asset category thereon, so the period-to-period holdings changes must be accounted for. Consumption expenditures includes spending on durables (reducing household assets), but in the NIPAs the accumulated assets aren't added back to balance sheets. The IMAs do so via the "Net investment in consumer durable goods" line in the Other Changes account, and the THIAs follow that practice. Durables accumulation is allocated to quintiles based on their shares of durable holdings, from the DFAs..

Disaster losses. A small measure, zero in many years, this is allocated to quintiles based on their shares of real-estate assets.

Other (other) changes in volume. This measure includes "bad debts, accounting changes, data discontinuities," etc. (Teplin et. al. p. 6). The difficulties of pension accounting figure significantly in this measure. It's allocated to quintiles based on their percent holding shares of total assets.

Statistical discrepancy. This measure is *not* included in the THIAs, even though it is included in the IMAs' Other volume measures. This is because it's the discrepancy between the Capital account and Financial account bottom lines, and the THIAs don't engage with the Capital account. Derivations all effectively pass through the Financial account (Figure 12).[25]

Holding gains/asset (re)valuation. Holding gains total $69T over 22 years, 18% of total income for the period. The measures come from the IMAs' (personal-sector) Revaluation account, adjusted down to households-only based on the household sector's average share of personal-sector assets,1989-2021 (94.1%).

Since holding gains are the result of holdings, they're allocated to quintiles based on quintiles' shares of asset holdings. Different quintiles have quite different asset-portfolio mixes, however (most significantly, equity shares vs real-estate titles), so gains on financial and nonfinancial

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[25]   The net-worth derivation in S.3.a line 96 includes the bottom-line Capital-account net lending/borrowing measure. If it used the Financial-account bottom-line measure instead, it would not be necessary to include the statistical discrepancy in the Other changes account. The Capital account and its statistical discrepancy would effectively just be an addendum note in Table S.3.

assets are allocated separately based on quintiles' holding shares of each asset category.[26] Some non-systematic testing suggests that the simple financial/nonfinancial split captures the large bulk of variance in percentage gains on assets across asset categories, but since holding gains comprise such a big share of total income, this topic merits further investigation.[27]

Transfers. There are numerous quite small discrepancies for transfer submeasures between NIPA 2.1 and 2.9/DPIAs; no attempt is made to adjust for those. The THIAs use the Table 2.9/DPIA measures from 1992, and 2.1 measures in previous years. See also below, "Adjustment for personal vs HH: net HH transfers to nonprofits."

Taxes. This measure from the DPIAs/NIPAs is mostly household income taxes. (National accounts' treatments of property and sales taxes, and "taxes on production and imports," are too complex to detail here.) It is inherently households-only; there is no difference between NIPA 2.1 and 2.9/DPIA measures. The THIAs nevertheless use 2.9 household measures starting in 1992, and 2.1 personal measures pre-1992, for consistent treatment.

Consumption expenditures. These outlays comprise 61% of total income over 21 years, so they're quite significant to saving "remainder" measures, and net asset accumulation. NIPA 2.9 household consumption expenditures (HCE) is used starting 1992. In prior years, available PCE measures are adjusted down to households-only, based on the (quite consistent) average HCE/PCE ratio 1992-2021 (97.4%), from NIPA 2.9.

HCE is allocated to income quintiles starting in 1984, based on CEX quintiles' percent shares of spending.[28] But an adjustment is needed first. The CEX aggregate expenditure measures include households' social security and pension contributions, which are not consumption expenditures in any national-accounting treatment. The magnitude is significant, a quite consistent 10% of total CEX expenditures across the period. Those measures are subtracted

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[26]   It's tempting to break out gains on assets with more granularity than just financial/nonfinancial. But that immediately engages with the third-largest asset category in the DFAs: pension entitlements (a financial-asset subcategory), for which quintile allocation would be difficult. These measures can be and are variously estimated in national accounts based on pensioners' tallied entitlements, on pension funds' funding/endowment changes, or even on projections of funds' future inflows. Discussions of those accounting choices continue among national accountants. (The DFAs recently changed its detailed asset categories for these assets. See the more-detailed asset and liability category breakouts in the dfa-income-levels-detail.csv and dfa-income-shares-detail.csv files, available in the "Full CSV" zip file download at federalreserve.gov/releases/z1/dataviz/dfa/.)

[27]   There is some evidence that wealthier households garner higher total returns (which include holding gains) on their asset holdings than lower quintiles, even from the same asset types (Balloch, Kartashova, Xavier).

[28]   CEX undercounts consumption spending relative to HCE by roughly 40% (so only its quintile percent-shares are used in the THIAs, to allocate total HCE to income quintiles), and arguably undercounts top-percentiles' spending by even more. But it's "the only dataset with comprehensive and detailed information on household expenditure and its components." (Attanasio 2016). See BEA, 2019. "Comparing expenditures from the Consumer Expenditure Survey with the Personal Consumer Expenditures: Results of the CE/PCE Concordance." bls.gov/cex/cepceconcordance.htm Spreadsheet: "Summary comparison of aggregate Consumer Expenditures (CE) and Personal Consumption Expenditures (PCE)" bls.gov/cex/pce-compare-200916.xlsx. Sabelhaus, John et al., 2013. "Is the Consumer Expenditure Survey Representative by Income?" nber.org/papers/w19589 Bee, Adam, Bruce D. Meyer, and James X. Sullivan. "Micro and Macro Validation of the Consumer Expenditure Survey." 2012 conference.nber.org/confer/2011/CRIWf11/Bee_Meyer_Sullivan_March2012.pdf See also discussion of the new DPCEAs in Appendix C.

from each quintile's expenditures before calculating CEX quintiles' percent shares of spending. Those adjusted CEX percent shares are then used to allocate NIPA HCE by quintile. See Appendix C for details of income-quintile construction/composition in CEX versus other data sources.

Consumer interest paid. This measure is inherently households-only; NIPA 2.1 personal measures match Table 2.9/DPIA household measures. The NIPA 2.9 data is nevertheless used starting 1992 for consistency; previous years are from 2.1. This measure is allocated to quintiles from 1989, based on quintiles' shares of non-mortgage debt outstanding, from the DFAs. (*N.B.* Mortgage interest is "pre-deducted" from income within the derivation of rental profits, for both actual household-sector landlords and imputed owner-occupied landlords "renting to themselves.")

Adjustment for personal vs HH: net HH transfers to nonprofits. This measure corrects for an accounting quirk in the deconsolidation of the personal sector into households and NPISH. In NIPA 2.9, NPISH-to-household transfers are included in household *income*, while household-to-NPISH transfers are tallied in household *outlays*. But the DPIAs don't tally outlays, and unlike household<->business transfers, these two gross flows are not netted out in the income section. The adjustment here adds households' *net* household transfers to NPISHes (after deducting NPISH transfers to households) to household outlays. This additional outlay equals ~1.0% of total income; it reduces saving, asset accumulation, and ending assets accordingly. The households-to-NPISH measure is only available from NIPA 2.9, so the adjustment is only made starting 1992. It is allocated to quintiles based on their shares of household income.

Assets/liabilities accumulated from net new borrowing. This is simply the annual change in households-only liabilities, taken directly (with quintile breakouts) from the DFAs.[29]

Appendix B: Improving the THIAs' Distributional Measures

The THIA workbook is assembled so it's relatively straightforward to replace, adjust, or add to the currently employed data sources and series. This section addresses potentially large additions that seem likely to help explain the THIA's remaining distributional quintile discrepancies, especially for bottom quintiles. (See also the methodological income-quintile issues addressed in Appendix C).

Intrasectoral flows across income quintiles. The measures compiled in the THIAs all involve changes in total household-sector assets and liabilities. Transfers and shifts in assets across quintiles *within* the household sector are not considered. (The all-households sector aggregates for such asset shifts should sum to zero; all the changes are between quintiles within the sector.)

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[29]   Borrowing adds assets and liabilities to borrowers' balance sheets in equal measure, for net-zero effect on net worth; loan payoffs, the reverse. National-accounts measures of net household borrowing derive from changes in financial-account liabilities, not from transaction flows; the THIAs use the same method. There are no available measures of households' gross borrowing or loan payoffs. (Which would in any case face the difficulty of loan rollovers and refis; how much of a year's gross borrowing is actually "new" borrowing?)

Gifts, bequests, and inheritances in particular may be considerable; administrative (tax-return) data on these transfers is quite limited and incomplete. A rough estimate based on census deaths by age and DFA wealth by age suggests the magnitudes are quite large, in the ballpark of $1.7T in 2018, for instance — circa 10% of personal income, annually.[30] (Transfers "down the quintiles" from these bequests may be limited, with quite high estimated ginis for transferred wealth. Nolan, Salas-Rojo, Morelli. See also Sabelhaus.)

Compositional changes. Households constantly shift between income quintiles, and their assets move with them. To the extent that these compositional moves are large and systematic in direction, they could appear as significant asset changes for income quintiles. (Again, the full-sector aggregates should sum to zero.) Retirees, for instance, generally move into lower income quintiles, and bring their often-considerable assets along. Temporary unemployment moves households into lower income quintiles, again with their assets; re-employment moves them back up. As with inheritance, there is limited data available on these effects.

Since many of these intrasectoral, cross-quintile asset movements are systematically age-related (and thus especially pertinent in the context of a lifetime income hypothesis), that adds an important fourth dimension to the three dimensions of income, spending, and wealth.[31]

Holding gains by asset class. Because different quintiles have quite different asset-portfolio mixes, the THIAs quintile-allocate holding gains separately for gains on financial and nonfinancial assets. A more granular breakdown of asset classes could potentially allocate gains to quintiles more accurately. Since holding gains comprise 18% of total income, the effects could be significant.

If time series of these additional and different measures could be assembled, they could be straightforwardly "bolted on" to the THIAs' accounting construct (perhaps with some adjustments or additions to the category and subcategory presentation employed in Figure 2). They could potentially explain some portion of the remaining quintile discrepancies displayed in Figure 6.

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[30]   Zucman p. 21 (citing Alvaredo et. al.) estimates that 55–65% of U.S. household wealth is inherited. Alvaredo et. al.: "There exists substantial uncertainty regarding the relative magnitude of inherited wealth and self-made wealth in aggregate wealth accumulation… The 1980s saw a famous controversy between Modigliani (a strong lifecycle advocate, who argued that the share of inherited wealth was as little as 20–30% of US aggregate wealth) and Kotlikoff–Summers (who instead argued that the inheritance share was as large as 80%, if not larger)." Alvaredo does not estimate annual inheritance flows for the U.S. because there's so little estate-tax data to work with. But its estimates of what it calls "moderate inheritance flows (between 5% and 10% of national income)" put a current estimate of $1.7T near the middle of the likely range.

[31]   Notable recent research efforts in this area include Morelli, Mian, Horioka,and Gindelsky. Available age/income/wealth data series (the DFAs for instance) are broken out by somewhat arbitrary age groups roughly related to life "stages," as opposed to equal-sized age-percentile groups. Because of different age distributions in different populations, this can make comparisons difficult to interpret in relation to income and wealth percentiles.

Appendix C: Comparing the Sources' Distributional Quintiles

Note: To avoid confusing the THIA workbook, the figures in this appendix are assembled using a separate special-purpose [workbook](#)[32] that employs the THIAs data, plus other data, but is arranged differently.

The THIAs' distributional breakouts by income quintile for 2000-2021 rely on income-quintile measures from multiple sources. This raises an important question: is the composition of those sources' income quintiles (roughly) equivalent? Do the income quintiles consist of households with the same range and distribution of incomes, etc.? Is it valid, for instance, to combine quintiles' household income shares based on the DPIAs' income quintiles, to consumption-spending shares based on CEX income quintiles?

In particular, might quintile mismatches help explain the THIA discrepancies for lower quintiles displayed in Figure 6? (There are no significant discrepancies to explain for aggregate, all-households measures; they match quite precisely over decades; Figure 5.)

This appendix does not attempt to answer this question comprehensively, which would require original analysis of all the sources' microdata composition, compared across multiple dimensions. Rather, it examines indicative evidence: if two sources' income quintiles show equal quintile shares of income or consumption spending, for instance, that indicates that the two sources' quintiles are at least functionally commensurate for those measures, and fit for the purposes served in the THIAs — allocating sources' measures across income quintiles. This section examines quintiles as constructed in four sources: the DPIAS, the SCF (and hence DFAS), CEX, and the nascent [Distribution of Personal Consumption Expenditures Accounts](#) or DPCEAs, data released November 2022/January 2023, and November 2023. DPCEA data is not used in the THIAs; it is just a comparator here.

The THIAs take all their distributional household-income (and taxes) measures — 79% of total income — directly from the DPIAs. Notably, the DPIAs sort/rank households by their *household-size-equivalized* personal income (dividing each household's personal income by the square root of household members, for sorting purposes) before dividing the ranked households into equal-sized quintile groups. They then calculate (shares of) unequivalized NIPA personal/household income (and subcategory measures) for those constructed quintile groups. The THIA household-income distributional measures come from, so necessarily match, the DPIAs'.
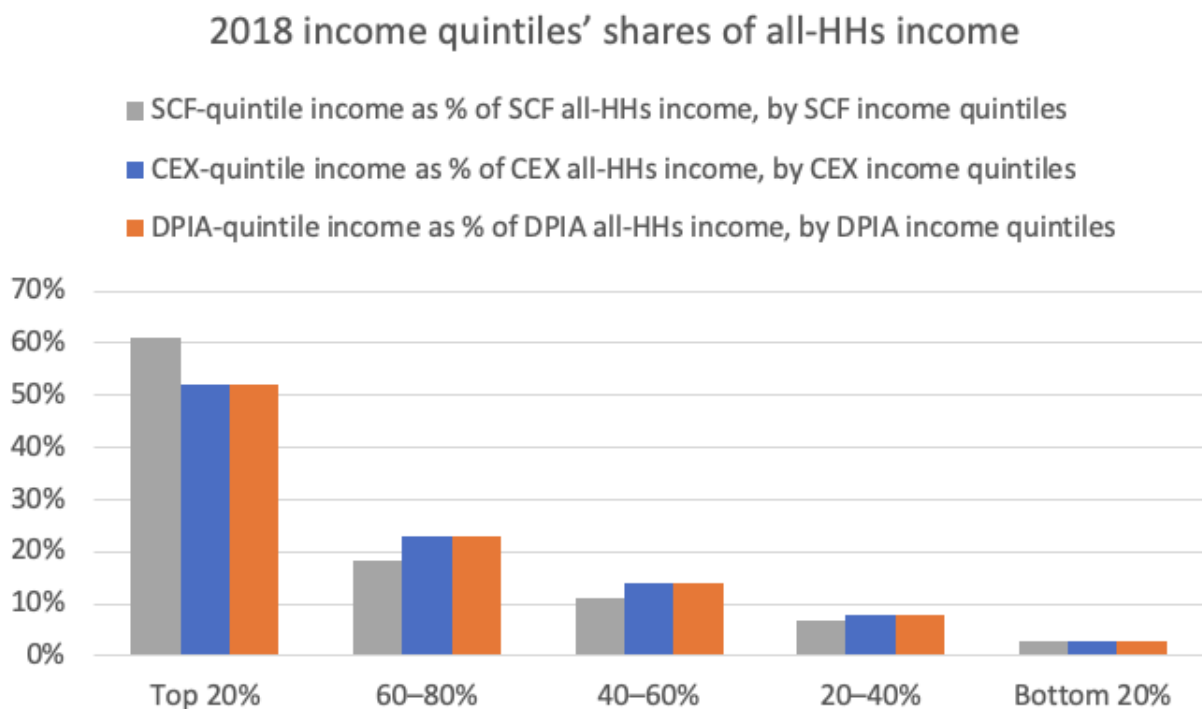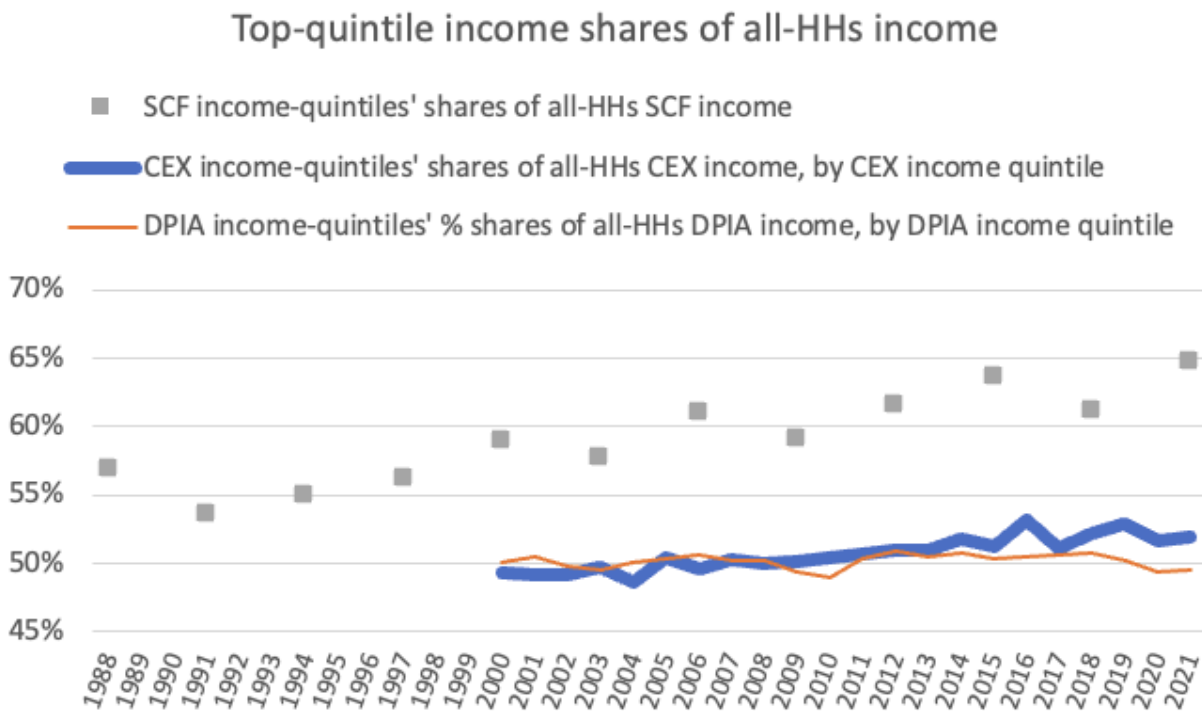
Household consumption expenditures (HCE) is another large measure in the THIAs — 61% of total income — and the THIAs rely on CEX-constructed income quintiles to allocate NIPA HCE to quintiles. To construct its quintiles, CEX ranks households by its own surveyed income measure (not equivalized), which is quite different from NIPA personal or household income.

Despite the differences between DPIA and CEX quintile treatments, their income-share results for quintiles are almost the same (Figure 14). The second graph displays (pre-covid) 2018 shares for all quintiles. (SCF is the anomalous series in this figure, and is discussed below.)

[32]   wealth-economics.com/THIAsIncomeQuintiles-4-17-24.xlsx

Figure 14. Comparing quintile's income shares from multiple income-quintile treatments.

Top-quintile income shares of all-HHs income

- SCF income-quintiles' shares of all-HHs SCF income
- CEX income-quintiles' shares of all-HHs CEX income, by CEX income quintile
- DPIA income-quintiles' % shares of all-HHs DPIA income, by DPIA income quintile

2018 income quintiles' shares of all-HHs income

- SCF-quintile income as % of SCF all-HHs income, by SCF income quintiles
- CEX-quintile income as % of CEX all-HHs income, by CEX income quintiles
- DPIA-quintile income as % of DPIA all-HHs income, by DPIA income quintiles

The THIAs allocate HCE based on those CEX income-quintiles' shares of CEX *spending*. (After correcting for the CEX mistreatment of Social Security/pension contributions as "spending," detailed in Technical Appendix A.) CEX calculates its quintile spending shares quite simply: total spending for a quintile, divided by all-households spending. (The THIAs correct the SS/pension

problem prior to this step.) The resulting consumption (spending) shares can be compared to the new DPCEAs' consumption shares. (Figure 15; top quintile only. Other quintiles' series are in the workbook).

Figure 15. Top-quintile shares of consumption (spending) compared.
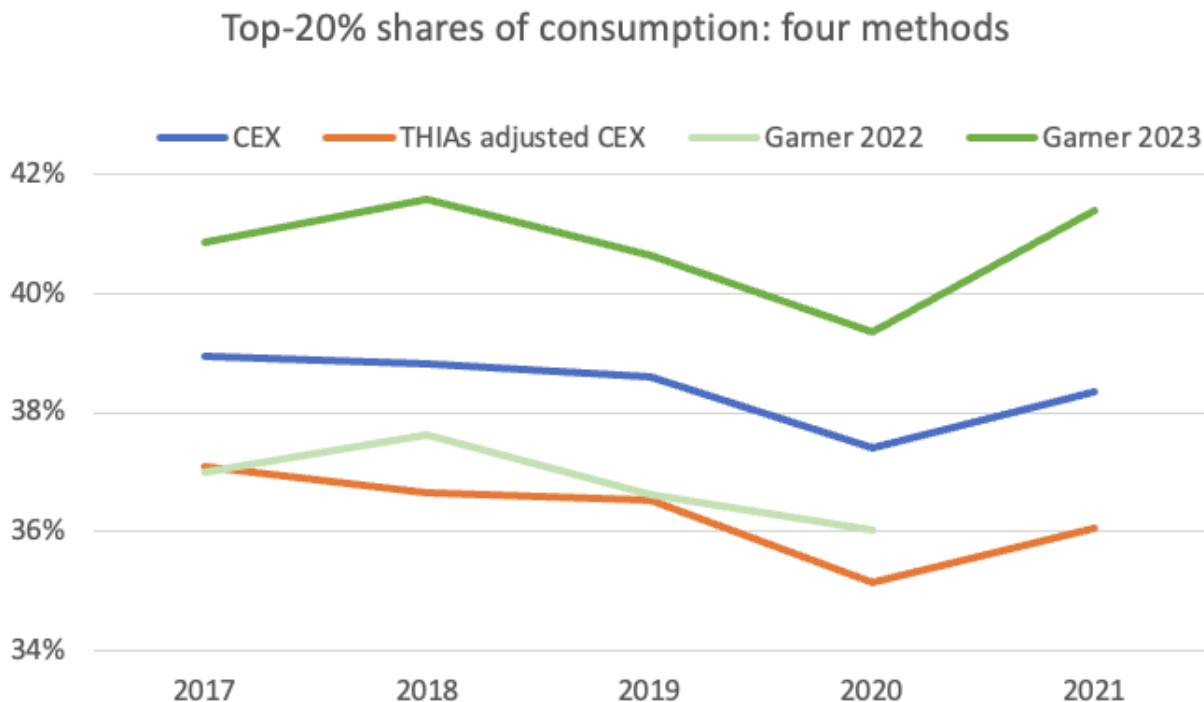
The DPCEAs (Garner et al 2023, and "Garner" in the graphs here) seek to serve a somewhat different purpose than other projects ("to provide a fuller picture of the well-being of households"), and they use a more complex construction. Firstly, they don't construct income quintiles, but consumption quintiles, and they focus on (adjusted) consumption rather than consumption spending *per se*. This in itself renders the DPCEA results inapplicable to the THIAs, which are based on income quintiles. (Consumption distributions are more uniform, less concentrated at the top, than income distributions.) But the comparison still merits scrutiny. The DPCEAs further adjust and augment CEX categories and measures to make them more comparable to PCE's categories, then sort/rank the resulting households by their household-size equivalized, and adjusted, consumption. So DPCEA quintiles are very different from others examined here — their purpose, construction, measures, and other methodology.

Despite all these differences, at least in the published 2022/23 first-year data, DPCEA quintiles' shares of consumption were quite close to CEX-quintile shares, and almost identical to the THIAs' SS-corrected CEX shares. The top-quintile share is much higher in the 2023 data, because in that year DPCEA top-5% (hence top-20%) consumption was adjusted upward using pareto adjustment "to mitigate understatement of inequality" arising from the CEX survey sample and etc.

Returning to the SCF income-shares series in Figure 14: these are significant for the THIAs' distributional measures because the DFAs construct their income quintiles based on SCF income,

and the THIAs use the DFAs quintiles' assets-holdings shares to quintile-allocate holding gains — 18% of total income. (Likewise some smaller Other change measures.)

The DFAs may construct more income-concentrated quintiles for two reasons:

1. For sorting/ranking purposes, the DFAs adjust the weights of SCF survey respondents to include the wealth of the Forbes 400, which is unsampled or poorly sampled in the SCF. Since Forbes wealth is big in individual terms but much less so as a percent of total wealth, this seems unlikely to explain (much of) the large income-share differences in Figure 14.

2. The DFAs rank households based on the SCF "Income" measure, which includes holding gains (and other unusual or one-off income) in a year. It also calculates the quintiles' shares of income based on that measure. (The SCF "Normal Income" measure — more equivalent to the DPIA/CEX measures that don't include holding gains — only includes the "Value of income the household would expect to receive in a "normal" year.") This choice might explain more of Figure 14's large income-share difference.

Whatever explains these income-quintile differences, it raises a conundrum in the THIAs. It results in more holding gains being allocated to the top quintile in the THIAs (and less to lower quintiles) than a less-concentrated distribution would. But Figure 6 shows exactly the opposite: according to the DFAs, lower quintiles net-accumulate *more* assets than is calculated in the THIAs. Further research is needed. Again, this is only pertinent to the distributional discrepancies; it has no effect on the THIAs' aggregate, all-households measures (Figure 5), which match the B.101.h/DFAs (and households-only-adjusted B.101 personal sector pre-1989) quite precisely over decades.

The comparisons in this appendix suggest that income-quintile methodology differences, different definitions of economic units and measures, and etc., are probably not a large contributor to the quintile discrepancies displayed in Figure 6. The large additional and different measures suggested in Appendix B seem to hold more promise in efforts to track down those discrepancies.

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