Spending by Bottom-80% U.S. Households Is Persistently Greater than Income. What Funds the Deficit? Balance Sheets, Asset Accumulation, Propensity to Spend, and the Survival Constraint

Working Paper, v. 2, May 2022

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Abstract: This paper employs the recently released BEA Distribution of Personal Income accounts to explore economic measures that have been surprisingly hard to assemble: household income quintiles' annual spending relative to annual income. The personal sector's income-minus-spending surplus ("saving") is heavily dominated by the top quintile. The bottom 80% runs persistent spending deficits, dissaving, implying ongoing asset disaccumulation that should encounter Minsky/Hicks' "survival" or "sustainable-consumption" constraint. The bottom 80%'s annual propensity to spend, or spending multiplier, is consistently greater than one. Employing balance-sheet-complete stock-flow-consistent accounting, the deficit is found to be largely explained or "funded" by two additional asset sources that are not included in income: borrowing from the financial/banks sector, and — to a far greater extent — holding gains on asset holdings. The accompanying workbook provides time series of annual propensities to spend out of 1. Disposable income and 2. Haig-Simons income, for each quintile, 2000–2019. Accuracy and possible extensions to the data sources and methodology are discussed.

All source data (with source links), calculations, derivations, and figures are included in the Excel workbook at wealth-economics.com/propensity.xlsx.

The initial impetus for this paper was simple curiosity about a rather basic economic measure that's surprisingly hard to lay hands on: How much do different household income quintiles in the U.S. spend each year, relative to their income?[1] How have those numbers changed over time? It seemed that such a time series could be a useful input to long-term predictive macro modeling. That question gave rise to some surprising results with important empirical and theoretical implications. The exploration resulted in a transparently derived time series of annual propensity to spend relative to income, by income quintile. The series shows strong consistency over two decades.

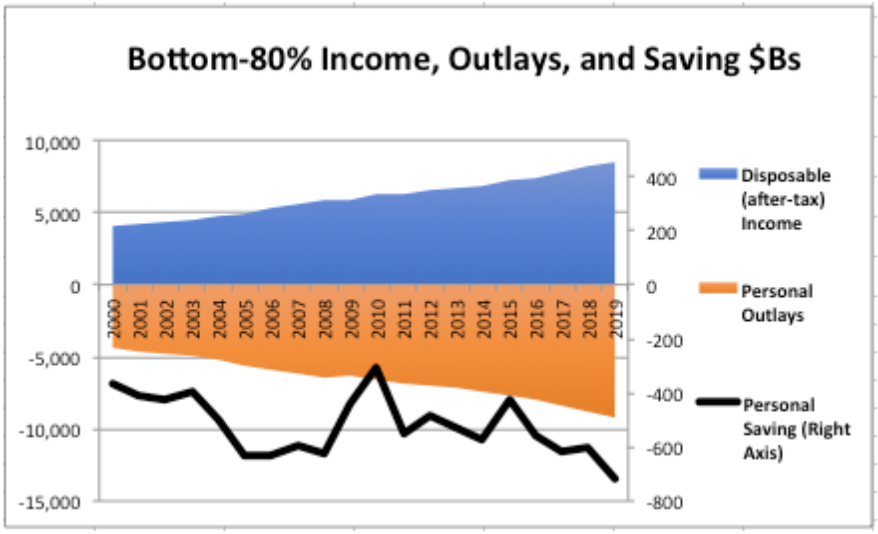
The difficulty in finding these measures is simply explained: you can't calculate a quintile's spending relative to income without knowing its income, and the national accounts have only

[1] Most analysis on this topic has focused on marginal changes/differences in spending (or more commonly saving) relative to or out of marginal changes/differences in income — as opposed to total annual spending and income. The saving rates or ratios — (income - spending) / income — are based on somewhat diverse income/spending/saving definitions (examples in Dynan et. al.) discussed herein. This literature also employs somewhat diverse time elements: propensity to spend over what period, relative to a given income period? Fisher et. al. 2020 assembles annual spending:income ratios/multipliers for 1999 and 2013 from the Panel Study of Income Dynamics (PSID), *en route* to calculating marginal propensities. See Note 13 here. But the derived measures are quite removed from the NIPA and FOF/IMA/DFA aggregates. (Fisher et. al. 2021 derives its measures from the Survey of Consumer Finances [SCF].) The propensity measures in this paper simply divide annual spending/outlays by income.

offered distributional breakdowns of personal income since December, 2020, with BEA's first prototype release of its Distribution of Personal Income accounts (here, the DPIAs) by income decile, covering twelve years 2007–18. The latest Dec. 15, 2021 release shows quite large revisions, and it expands the scope to twenty years, 2000–19. The DPIAs fill a lacuna that has existed in the national accounts for more than sixty years.[2] Over all that time, "that's just distribution" has been an operational reality for economists seeking to rely on national-accounts data series.

This paper highlights one surprising result that's visible thanks to these new time series, as a jumping-off point illustrating the importance of distribution (and balance-sheet-complete accounting) to empirically-based macroeconomic modeling: Outlays by the bottom 80% of U.S. households are persistently (much) greater than income (Figure 1).

Figure 1. Income and outlays of the Personal sector, bottom four income quintiles. Income is from the DPIA tables. Outlays are Personal Consumption Expenditures (PCE) allocated to quintiles based on quintile's spending shares from the Consumer Expenditure Survey (CEX), plus other outlays (3–4% of total outlays) — mostly personal interest paid, allocated based on the quintile's non-mortgage liability shares from the Distributional Financial Accounts (DFAs).



[2] The importance of this effort is exemplified in the extensive early work on the topic by Simon Kuznets, the primary creator of the national accounts. The last sustained and significant (but under-resourced and short-lived) government effort in the 1950s was spearheaded by Selma Goldsmith, who unfortunately died at age 50, and her research program along with her. Private work by Wolff, Atkinson, and others, plus the White House Office of Management and Budget (OMB), continued the effort intermittently, most notably brought to prominence of late by Piketty, Saez, Zucman, and co. (PSZ). Their 2017 and ensuing Distributional National Accounts (DINAs) could potentially have allowed for the analysis here a few years earlier. They provide income breakdowns by bottom 50%, next 40%, top 10%, and smaller slices above that. But: 1. Quintile breakdowns are necessary for the exercise here, because it also relies on the Consumer Expenditure Survey's distributional breakdowns of spending, only available by quintile (though multiple efforts have been made to derive finer upper-percentile share estimates from CEX, eg Fisher 2022 and Mian et. al. 2021a); 2. The DINAs by their very name and purpose focus on national, not personal/household, income — the derivational and methodological differences are complex, and the quantitative differences are large (PI = 87% of GDI/GDP; Fixler 2020 p. 7); and 3. Extracting quintile breakdowns from the DINA micro-files would be a somewhat opaque exercise.

The bottom 80% consistently *dis*saves. It seems this should very quickly encounter a straightforward version of Hyman Minsky's "survival constraint" (following Henry Simons), or John Hicks' sustainable-consumption constraint: "the amount which [people] can consume without impoverishing themselves."[3] An economic unit's income increases its balance-sheet assets; outlays decrease them. If income is insufficient to fund outlays, the unit should simply run out of assets to spend — especially given the magnitudes revealed here. But it continues without exception over twenty years. Where do the additional assets come from to explain and "fund" bottom-80% spending?

This paper addresses that question using balance-sheet-complete stock-flow-consistent or -coherent (SFC) accounting, by income quintile, in which the "stock," the bottom-line benchmark of accounting consistency, is total asset holdings.[4] It 1. Tallies the personal/household sector's asset increases and decreases, including increases that aren't included in Personal Income and Saving, in a form that allows accounting-coherent comparison with 2. Observed changes in balance-sheet assets.[5]

The PDIAs are the final piece of household-sector national accounting needed to deliver this balance-sheet-complete distributional account. Several other sets of national accounts, including crucial ones only released in this century or even just in the past few years, are also employed here.

National Income and Product Accounts (NIPAs). Bureau of Economic Analysis (BEA). First assembled in the 1930s and frequently misperceived as "the" national accounts, these provide tallies of total Personal-sector (disposable) income, spending, outlays, and saving. The DPIAs are both based on and provide breakouts of these NIPA totals, by income deciles.

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[3] Minsky/Simon: See Bezemer, and Neilson 45–49. Hicks: Chapter 14, "Income." See also Mehrling 1999, pp. 139 *passim*: "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." (Total assets are examined here, not just "cash" assets.) Unlike Minsky's focus on firms, finance, debt obligations, and firms' "death" by bankruptcy, the constraint here is personal; in a monetary economy, every person is born with it. If they or their family don't have assets so can't spend (spending *is* transferring assets), notably on shelter, food, and medical care, they can't survive. That immediacy is more widely and starkly visible in poorer countries with weaker social-support programs, but (diverging) life expectancies by income levels tell a clear, similar, and quite dire story in the U.S. as well.

[4] Assets are the focus because they are clearly defined, universally understood stock measures, transparently tallied on balance sheets of households and firms, on bank- and brokerage-account statements, and notably for this exercise, in the modern national accounting of economic sectors. Focusing on assets avoids the ambiguous term, "money." Where that term is used here it explicitly means a particular *type*, class, or category of (fixed-price) assets that are tallied in the M2 monetary-stock aggregate: bank and money-market deposit holdings, plus a small amount of physical currency (~10% of M2). It's worth noting that "money" never appears in national-accounts tables, except in "money market mutual funds." It's inherently crippled by imprecision as a technical economic term of art, because it's not defined by any accounting identities. The stock of assets, including M2 assets, is, quite precisely.

[5] It's not necessary to consider liabilities or net worth to answer the "survival" question posed here. An economic unit with negative net worth can still have assets to spend, so not hit the survival constraint. For magnitude reference: household liabilities have comprised 12–19% of assets over recent decades, 12% as of 2020. (It's a quite different story for firms.) For all the attention they receive, household liability levels don't change very much, and that rather slowly via net borrowing. 2013–19, post-GFC, annual percent change in household liabilities was between 0.9% and 3.8%. Annual change in assets (a far larger stock to begin with) range from 3.1% to 10.9%.

Consumer Expenditure Survey (CE or CEX). Bureau of Labor Statistics (BLS). Annual survey published since 1984, provides quintile breakdowns of personal-sector spending that can be aligned with the PDIA breakdowns of personal-sector income.

Financial or Flow of Funds Accounts (FOFs or FAs). These Federal Reserve accounts track financial levels and flows (recently renamed "transactions"), necessarily incorporating much data from the NIPAs. The Fed's quarterly Z.1 report was formerly the "Flow of Funds Accounts," and was renamed the Financial Accounts to reflect its extension beyond the FOFs over the decades. Household balance sheet tables were added in 1997, along with limited reconciliation tables accounting for balance-sheet changes not included in the NIPAs. Detailed accounting of those changes arrived with the IMAs.

Integrated Macroeconomic Accounts (IMAs). BEA and Federal Reserve. Released in 2006 with annual measures back to 1960, based on the international System of National Accounts (SNAs). They provide balance sheets for every sector, and importantly, accounting for both the (parallel) capital and financial accounts of each sector. Included as the S tables in the Z.1 report. Significantly for the current exercise, the IMAs also add a Revaluation account for every sector, tallying holding gains from asset-market price changes, broken down by asset types. (Plus an "Other changes in volume" account.) These allow for complete and transparent accounting of change in assets (and net worth) from period start to period end.

Distributional Financial Accounts (DFAs). Federal Reserve. Released in 2019 with coverage starting 1989, these provide distributional breakouts of household balance-sheet stock measures (asset holdings, liabilities, and net worth) by income quintile — including detailed breakdowns for different categories of assets and liabilities. These estimates are heavily based on the triennial Survey of Consumer Finances (SCF); DFA measures for non-survey years (and quarters) are based on interpolation.

Household vs NPISH balance sheets. The B.101.h and B.101.n balance sheet tables were released in 2019, splitting out asset and liability measures for "pure households" (the personal sector) from nonprofit institutions serving households (NPISHes)—measures which previously had only been available for the combined sector. NPISH assets only comprise about 5% of the combined-sector total, but that amount is significant when checking balance-sheet consistency against personal-sector transactions/flows, especially at the quintile level. B.101.h and DFA personal-sector asset totals match, with only tiny discrepancies.
fred.stlouisfed.org/graph/?g=P4Wk

All of these accounts provide annual measures for the twenty-year period 2000–2019 — the period covered by the PDIAs, and the period analyzed here. All measures employed here are annual, to comport with what's available from the PDIAs and CEX.[6]

The current exercise reconciles the NIPA-based PDIAs with distributional breakouts of the FOF/IMA/DFA balance-sheet levels and changes. This "meeting of the minds" approach is reflected in national accounts. NIPA Table 2.1 derives Personal Saving from "transactions" — income minus outlays. FOF Table F.6 derives Saving from the other end, from (selected) balance-sheet changes: 1. Change in financial asset holdings ("volume" changes only, not

[6] It's often difficult to find annual series on FRED; its search engine favors quarterly series. Annual series are often easily found by replacing a Q with an A in the series ID/url.

including “valuation”/holding gains), plus 2. “real-world capital”/nonfinancial-asset formation from net investment spending. (Table F.6 also details the necessary adjustments to resolve the fairly large differences between the NIPA and FOF Saving concepts and measures.)

To complete the balance-sheet accounting, the treatment here necessarily adds distributional breakouts of two other asset sources that aren’t included in Personal Income, but that do increase household-sector assets (by a lot): borrowing, and revaluation/holding gains on assets. To “check the math,” the sum of all these “economic flows”[7] for each quintile is then compared to the change in balance-sheet assets from the DFAs.

Table 1 displays the national-accounts derivation for change in total assets. Each category is independently allocated here by income quintile. (Likewise sub-categories not shown here, notably the sixty different categories that are individually allocated *within* the DPIAs.) Table 2 provides a condensed and simplified version.

Table 1. Derivation of changes in total household assets.

Start-of-period assets (FOFs/DFAs)
+ Personal Income (NIPAs, DPIAs)
    Labor compensation
        Wages and salaries
        + Employers’ share of Social Security, Medicare, pensions, etc. contributions
    + Net transfers (mostly Social Security, Medicare, pensions, etc.)
        Transfer receipts
        - Household contributions
    + Property Income (dividends, interest, rental profit, and pass-through profits)
- Personal Taxes (NIPAs, DPIAs)
= Disposable Personal Income (NIPAs, DPIAs)
- Personal Outlays (NIPAs)
    Personal Consumption Expenditures
    + Other outlays, mostly Personal Interest (FOFs, DFAs)
= Personal Saving (NIPAs)
+ Borrowing, net: gross new borrowing less loan payoffs (FOFs, DFAs)
+ Holding gains accrued from market-price asset revaluation (IMAs, DFAs)
+ Adjustment for NIPA vs. FOF concepts of Personal Saving (FOF, DFA)
+ **Other (other) changes in volume.**
= End-of-period assets (FOF)

[7] The Financial Accounts address the issue of “economic flows” that aren’t “flows” or “transactions,” so aren’t included in the FOF “volume” measures, in a note to the June, 2018 release of the Z.1 report. For a detailed discussion see Roth 2021a.

Table 2. Simplified derivation of change in household assets.

Change in household-sector assets =
Personal saving (FOF concept and methodology)
+ Net new borrowing
+ Holding gains (net of losses)
- Personal taxes
- Personal outlays

This quintile-based approach using national-account measures differs from post-Keynesian/Kaleckian (including most SFC) models that employ "functional classes" or categories, such as "capitalists" and "workers."[8] National-accounts measures for those classes (however defined) do not exist. Modelers must assemble their own time series, generally derived from particular surveys' microdata (PSID, SCF, etc.). The necessary criteria, categorizations, and class-allocation choices and resulting measures are unavoidably somewhat idiosyncratic, often opaque, and rarely comport with headline aggregates, making it difficult to understand individual models or compare the findings and conclusions from different models. Similar issues arise in heterogeneous-agent new-Keynesian (HANK) models.

The purely income-quintile-based time series in the accompanying workbook, derived from and consistent with national accounts' macroeconomic aggregates, may provide a tractable, transparent, and accounting-complete basis for more comparable modeling. The series are provided in nominal dollars, hoping to provide a transparently bottom-up and "close to the ground" sense of absolute and comparative magnitudes.[9] Inflation-adjusted series, and many pertinent sums, differences, and ratios/percentages, are easily derived from these series.

The treatment here only tallies measures that alter the whole personal-sector asset balance. In aggregate they match and explain changes in that stock very precisely — though less so for bottom quintiles (Figure 15). As a direction for future research explaining remaining quintile discrepancies, the final section of the paper briefly considers significant shifts of assets across quintiles *within* the Personal sector, including compositional changes whereby economic units move between quintiles, with their assets. The focus there is on systematic, ongoing asset shifts up or down the quintiles — particularly on income quintiles' age compositions and age-associated asset transfers and compositional changes.

Running the Numbers

A long-term aggregate view of personal income and spending/outlay measures, for the whole personal/household sector, is easily available (Figure 2).

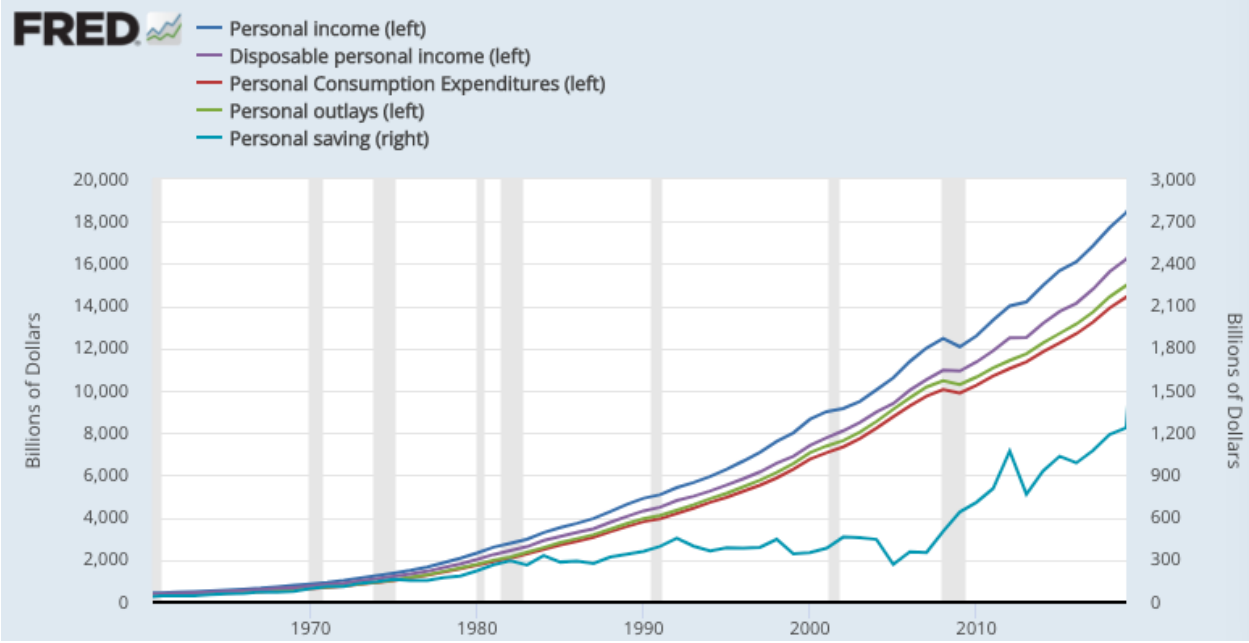
Figure 2. Personal income, outlays, and saving, NIPA measures, annual through 2019. Disposable income = personal income - personal taxes (not shown). Outlays = consumption

[8] Waltl, following Fessler and Schürz, is an impressive recent example.

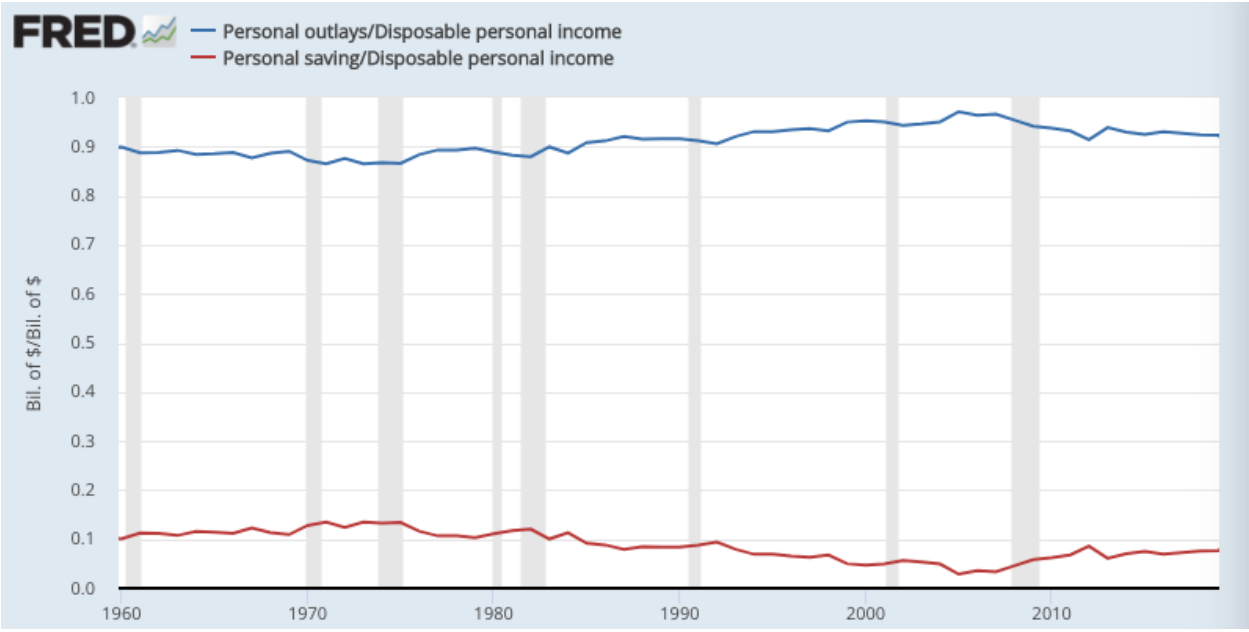
[9] "Discussions of shares sometimes lose context and grounding in terms of dollar amounts. The dollar amounts help illuminate the magnitude of the inequality underlying the share analysis." Fisher et. al. 2021.

expenditures + personal interest and etc. (not shown). Saving = disposable income - outlays. fred.stlouisfed.org/graph/?g=MNtH

A) Nominal dollars



B) Outlays and saving relative to disposable income, annual through 2019.



Over the period examined here (2000–2019), 3–7% of assets received from (after-tax, disposable) income do not flow back out of the personal sector, to firms for spending and interest payments. They're held, accumulated in the household sector as asset holdings.[10]

[10] The asset-type portfolio mix or "composition" of households' asset holdings is not necessary for this total asset calculation. The same is true for constant "portfolio churn" — individual households swapping M2 assets for equity assets, for instance (and necessarily the reverse) — whereby individual households readjust their asset mixes, and "liquidate" non-cash assets when they want to spend from their asset holdings. These asset sales/purchases are dollar-for-dollar asset swaps, with no effect on

(Assets paid *among* households for spending or transfers likewise stay within the household sector — though the asset holdings may/do move across quintiles.)

Quintiles' Spending Surpluses/Deficits

The DPIAs and CEX combined allow us to derive annual propensity-to-spend measures relative to income, by quintile (Figures 3 and 4). Those accounts themselves do almost all the work of allocation/distribution to quintiles. The DPIAs allocate/distribute and compile more than sixty different categories comprising the NIPAs' (Disposable) Personal Income (Fixler 2020 p. 8). Individually allocated categories therein include wages, salaries, and benefits/supplements, property income (of different types), transfers (gross, and net of household social/pension contributions), and taxes.

CEX provides detailed dollar spending breakdowns by income quintile, but the CEX sum of total-sector spending misses a great deal of what's captured in the NIPAs' aggregate PCE measure.[11] So in this treatment total PCE is allocated across quintiles based on quintiles' percent spending *shares* from the CEX. PCE comprises 96–97% of Personal Outlays. Personal interest outlays,[12] the dominant component of other outlays, are allocated here based on quintiles' shares of non-mortgage debt, from the DFAs. The very small remaining portion of other outlays — adjustments to pension entitlements — are allocated equally across quintiles.

Note that in Figures 3 and 4 and ensuing, the Y axes vary, and are pertinent to understanding each graph's import — the dollar and percentage magnitudes being depicted.

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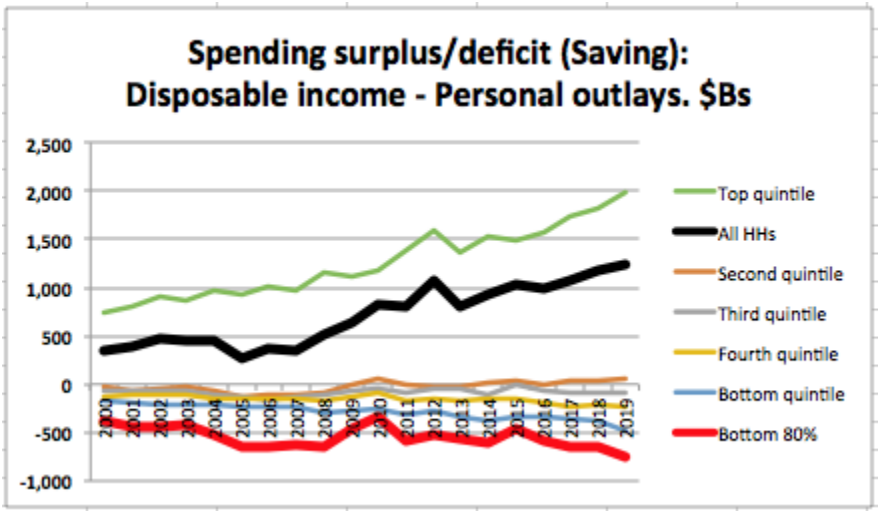
households', quintiles', or the personal sector's total assets. (This explains why these swaps are ignored in the derivation of GDP, for instance.)

[11] Note that PCE includes consumer durables purchases as consumption spending; see "Personal Saving: NIPA vs FOF," below. CEX probably understates top percentiles' spending shares, perhaps by quite a lot, while overstating lower quintiles'. But it's "the only truly comprehensive source of micro-level spending data in the US." bls.gov/cex/pistaferri_consumption_symposium.pdf 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

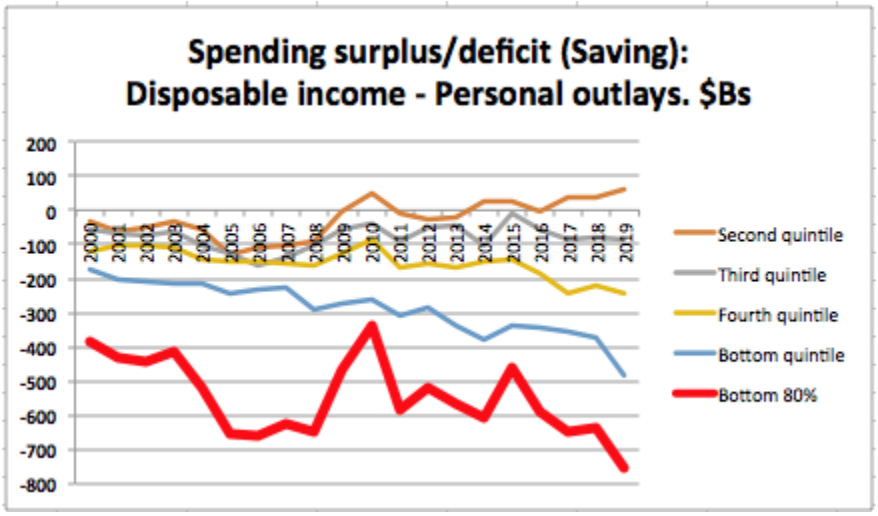
[12] Personal interest payments = Non-mortgage interest. Mortgage interest, by contrast, is "pre-deducted" from NIPA's personal income*;* it's "an expense item in the calculation of [net] rental income [profit] of persons" (NIPA Table 2.1 note 4) — including both landlord profits of sole proprietors, and imputed landlord profits of owner-occupiers. (*N.B.* In the IMA household table S.3, the "Operating Surplus" measure that includes rental profits is *not* consistent with the BEA's "[Net] Rental income [profit] of Persons," because mortgage interest is *not* deducted in that operating surplus derivation. So Operating Surplus in the S.3 is based on rental profits before mortgage interest expense. Mortgage interest is still included in that table, but is instead included along with non-mortgage interest in "Uses of property income." In short, income (and saving) in both the NIPAs and the IMAs is after deducting mortgage interest; it's just deducted in different places. *Non*-mortgage personal interest is an outlay in the NIPAs; in the IMAs it's pre-deducted from income instead.)

Figure 3. Personal income and outlays by quintile.

A) All quintiles



B) Excluding top quintile

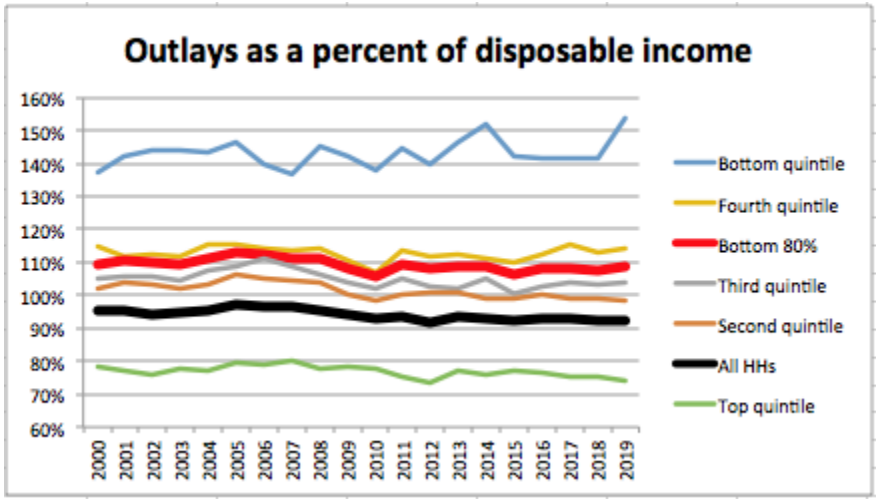


The saving surplus for the all-household aggregate is heavily dominated by large top-quintile income-to-spending surpluses. The second quintile ran some surpluses over the past decade, but otherwise the bottom four quintiles have all run spending deficits for twenty years, averaging $570B a year combined over the last decade (For reference, 2019 disposable income was $16.2T, $8.5T for the bottom 80%.)

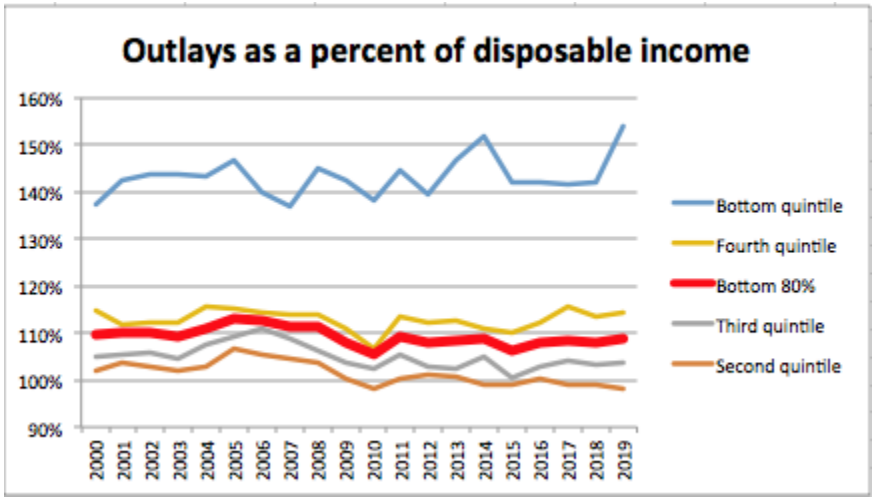
Answering the question that initially prompted this paper, Figure 4 shows annual outlays relative to annual income in more typical percentage “propensity” or “multiplier” form. (The multipliers would be very slightly smaller if PCE vs outlays was used as the ratio numerator.)

Figure 4. Propensity-to-spend multipliers: Annual household outlays as a percent of annual disposable income

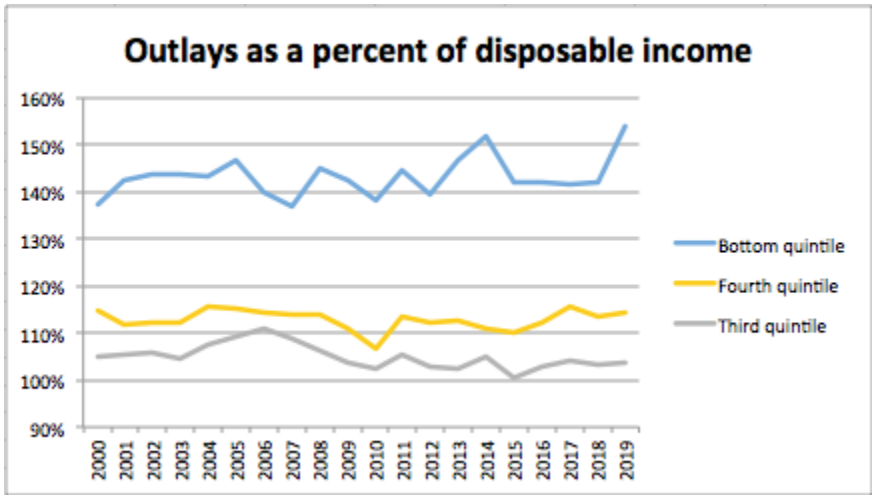
A) All households



B) Excluding top quintile



C) Excluding top two quintiles



The ratios are all pretty consistent over the period, though with a notable decline for the top quintile starting 2006/7. All households combined spend 93–97% of income (matching the aggregate in Figure 2b). The multipliers for the bottom four quintiles are all greater than 1; they range from just above 1x for the second quintile to ~1.5x for the bottom quintile. The top quintile multiplier ranges between .73x and .79x, while the bottom 80 is between 1.05x and 1.11x. In short form: the bottom 80's multiplier is about 1.4x the top quintile's.[13]

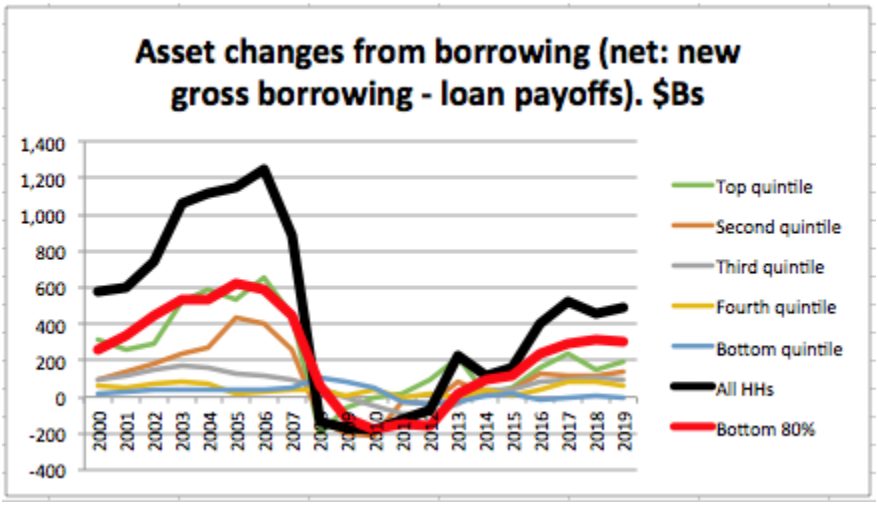
Having derived those propensity time series, we now return to the question of how bottom-80 spending deficits are funded.

Household Borrowing

Many may quite reasonably jump to household borrowing as the most likely funding source for bottom-80 deficit spending. The best measure of that asset inflow is change in household debt, representing *net* new borrowing: gross new borrowing minus loan payoffs.[14] This measure by income quintile is conveniently available from the DFAs (Figure 5).

Figure 5. Households' annual net new borrowing

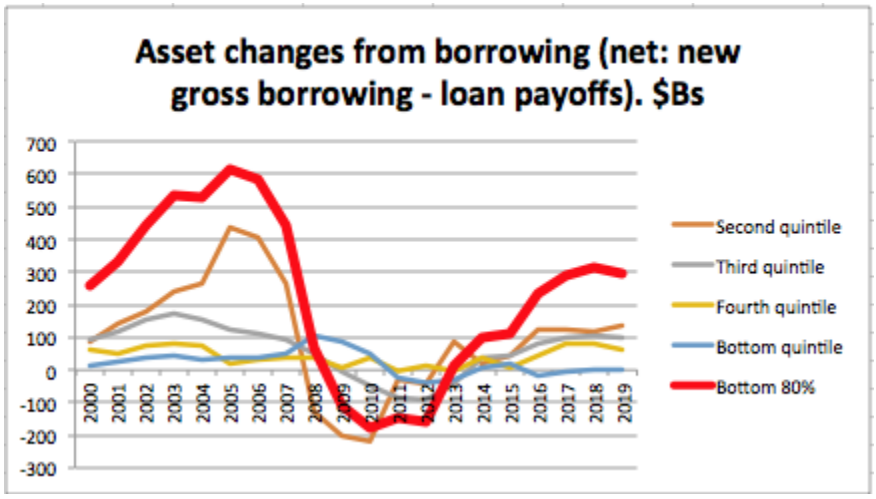
A) All households



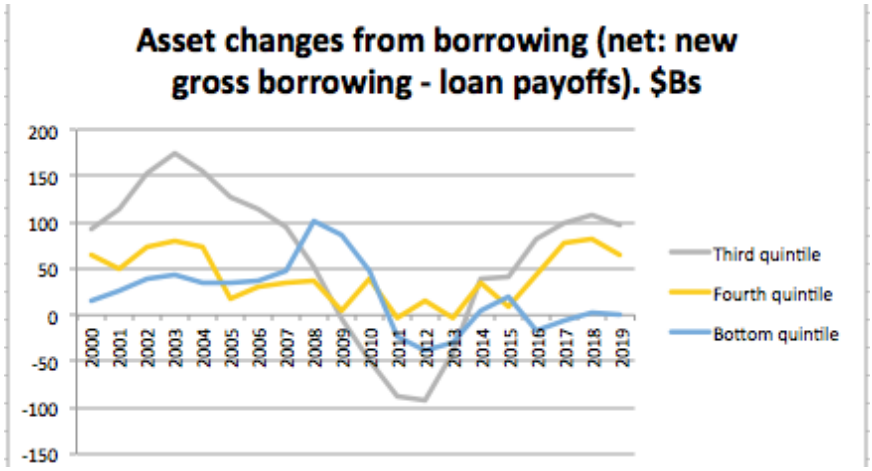
[13] Fisher et. al. 2020 (Table 1) finds an annual propensity to consume/spend of less than one in both 1999 and 2013 for all income *and wealth* quintiles. But as mentioned in Note 1, the assembled measures of income and spending there are different from the national accounts' aggregate measures. Likewise, the allocation of disposable income to quintiles is quite different from the DPIA allocations employed here.

[14] New borrowing increases household assets and liabilities in equal amounts, for net-zero change to net worth. Households may of course spend down newly-borrowed assets by buying and consuming goods from firms. But that spending, already incorporated in spending measures here, is a separate event from the borrowing. This notwithstanding an operational reality: in practice borrowing and spending are often simultaneous and conjoined, for example in credit-card spending and mortgage home purchases. Credit-card purchases are mostly borrowing plus consumption spending (the purchased goods are consumed, so vanish), while mortgage purchases of residences are borrowing plus a dollar-for-dollar asset swap: M2 exchanged for a title to real estate.

B) Excluding top quintile



B) Excluding top two quintiles

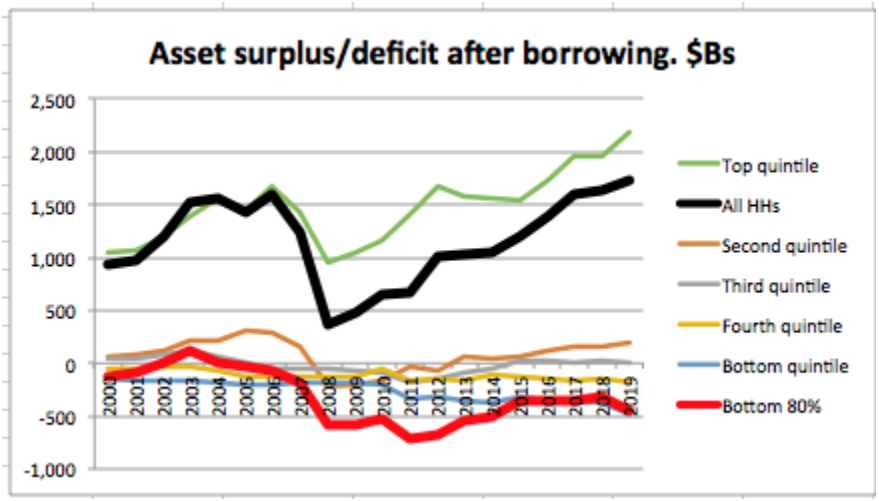


Excluding the anomalous years during/after the Global Financial Crisis (GFC), 2009–2012, when households paid down debt and "repaired their balance sheets," bottom-80 net borrowing adds quite a lot to bottom-80 asset holdings. But even 2017-19, annual bottom-80 net borrowing was only about $300B — compared to $500B–$800B of annual bottom-80 deficit spending revealed in Figure 3.

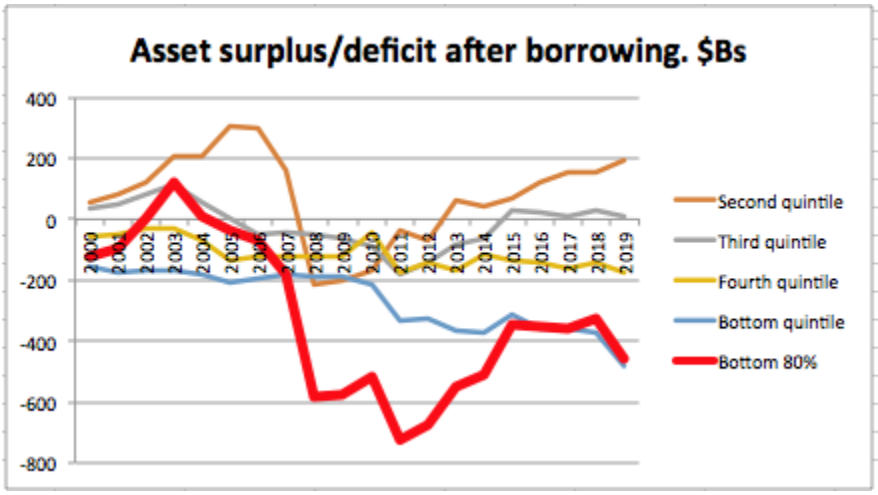
Figure 6 tallies the remaining household asset surpluses/deficits after including asset additions from borrowing.

Figure 6. Quintiles' asset surpluses/deficits after borrowing

A) All households



B) Excluding top quintile



Assets from borrowing pull the second and third quintiles into asset surplus in many (non-GFC) years. But the bottom two quintiles remain in deficit, and the bottom-80 combined deficit still runs to $350B a year or more post-GFC. Borrowing by itself doesn't come close to explaining how the bottom-80 spending deficit is funded.

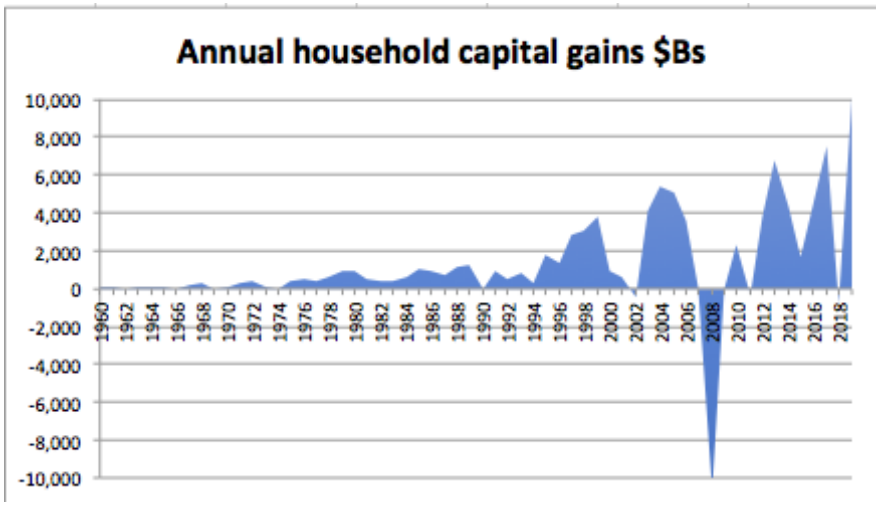
Holding gains

Households also accumulate assets via holding gains from price runups in the asset markets (Figure 7). These accrued increases appear instant by instant on account statements (and less frequently when balance sheets are assembled), regardless of whether some particular units choose to swap their variable-priced assets for fixed-price M2 assets, thus "realizing" a taxable gain relative to the unit's original purchase cost. When equity-market or home prices increase, the household sector has more assets. These gains ("valuation" as opposed to "volume" changes in the national accounts) are not included in personal income. These increases are often imagined as just temporary, up-and-down *fluctuations* around some unnamed and unmeasured "true" "value," but in fact that accumulation is persistently positive, ongoing, and

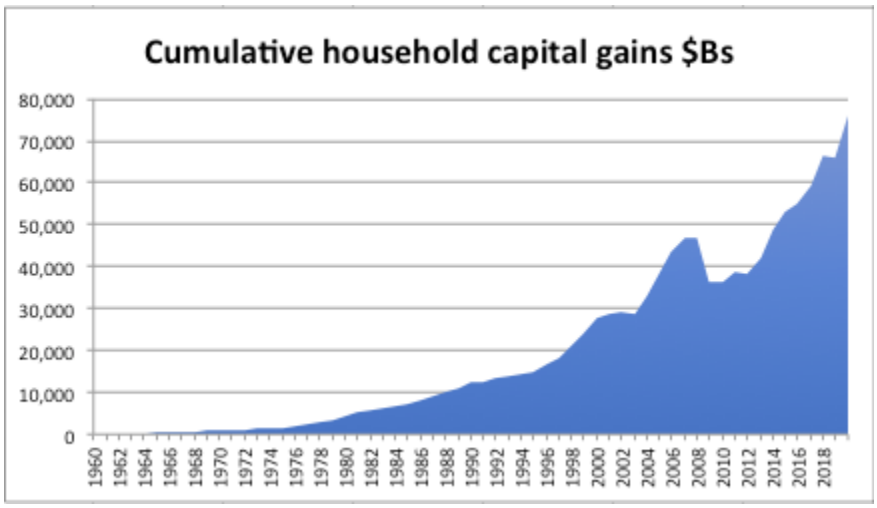
very large — actually comprising the overwhelmingly dominant mechanism of household asset accumulation over decades.[15]

Figure 7. Household holding gains. Integrated Macroeconomic Accounts, Households table S.3.a, line 95. fred.stlouisfed.org/release/tables?rid=52&eid=810656

A) Annual



B) Cumulative



Over six decades there has been only one significant drawdown in Panel B's sum of steadily-accumulating assets, in 2008 (down $10T, 23%). To repeat: when asset-market prices go up, households have more assets. *Individual* households that want to spend out of their appreciated assets can swap them with other economic units for M2 assets (sell or "liquidate" them) — a necessary mechanical step because sellers demand fixed-price M2 assets in payment. These individual asset swaps/"realizations" are significant to the IRS, but not to the asset analysis here. They're dollar-for-dollar swaps, so have no effect on total assets. In aggregate they're best understood as "portfolio churn."

---

[15] The $76T sum of holding gains accumulated 1960–2019 represents 56% of households' $134T of accumulated assets, end of year 2019. Roth 2021 provides a detailed explanation of national accounts' treatment of household income, asset accumulation, and comprehensive "Haig-Simons-Hicks" income including holding gains.

Holding gains for the household and NPISH sector are available in the IMAs, with quite detailed breakdowns by asset type.[16] The NPISH sector holds ~5% of the combined-sector assets, so only ~95% of combined-sector holding gains are attributed here to the personal sector.

Since holding gains are based entirely on asset holdings, it's straightforward to allocate those gains to income quintiles, based on each quintiles' percentile share of asset holdings from the DFAs (Figure 8). Quintiles, however, hold very different types of assets (generally, far more equities for the top quintile, relatively more real estate and pension entitlements for the bottom), and gains accrued from different asset types can vary by a lot (Xavier, Kartashova, Balloch).

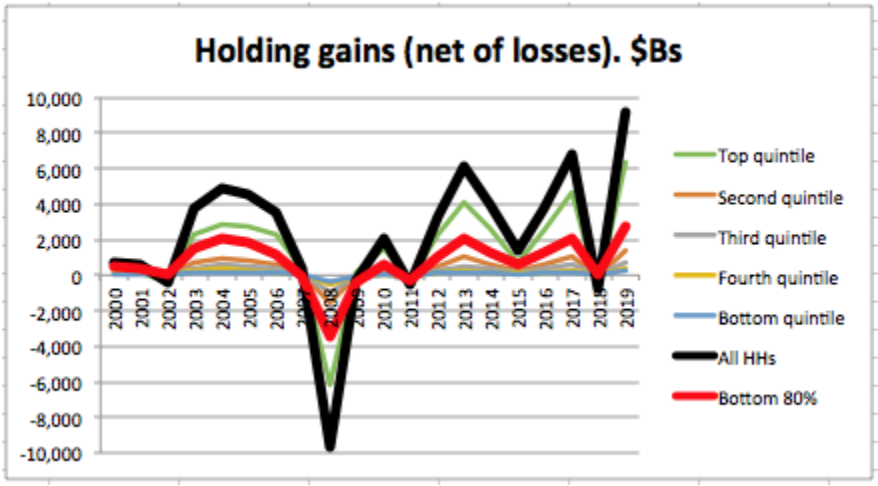
The treatment here allocates IMA-tallied revaluation gains from financial and nonfinancial assets separately, based on quintiles' shares of FA and NFA holdings. This captures the big, key difference between higher and lower quintiles. A more difficult but somewhat smaller issue arises within financial assets, between the two largest asset classes therein: equity holdings and pension entitlements. This is compounded because the DFAs and the IMAs use different categories for those assets. No attempt is made here to resolve that difficulty, but non-systematic efforts to allocate with finer asset-type granularity don't appear to make significant differences to the overall quintile distributions of holding gains. Further work on this topic would be in order.

---

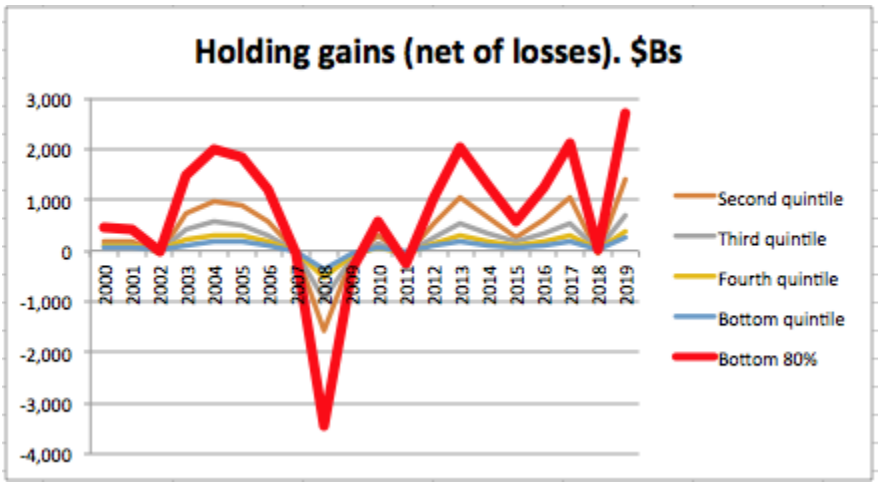
[16] See Table S.3.a, Revaluation Account, line 95 and preceding. The IMAs' label for this line, "Changes in net worth due to nominal holding gains/losses," would be more precise as "Changes in *assets* due to…" These changes have no effect on balance-sheet liabilities of the household or any other sector. (N.B. On the IMAs' firm-sector balance sheets, "equity liability" *at market prices* is posted as "just another liability." Compare the distinction on firms' balance sheets: "Liabilities *and Shareholders' Equity.*" That SHE is the firm's book value — assets minus *non*-equity liabilities. As a result, firm's "Net Worth" bottom line in the IMAs is just the book-to-market discrepancy. And indeed, that "net worth" measure for nonfinancial firms has been *negative* since the mid-90s ($10s of Ts in recent years: fred.stlouisfed.org/graph/?g=OjCA); when equity prices rise, this "net worth" declines. In *Monetary Economics*, Godley and Lavoie similarly treat shareholders' equity at market prices as just another liability that's deducted from assets to derive firms' "net worth." But they issue a strong caveat: (p. 31): "the measured net worth of firms is of no practical significance. Indeed, in the book, no behavioral relationship draws on its definition." More simply put: firms don't have net worth; their shareholders own the remainder. Their proper bottom-line balance-sheet measure is shareholders' equity at book value, which is unaffected by equity-market prices.)

Figure 8. Household capital gains by quintile.

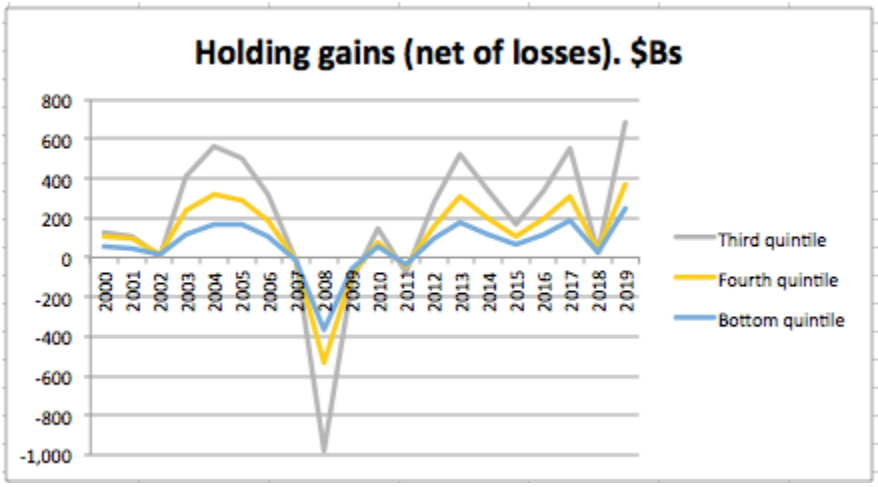
A) All households



B) Excluding top quintile



C) Excluding top two quintiles



Even the bottom three quintiles accumulate significant assets from holding gains in typical years pre- and post-GFC.[17] Note that these holding-gain measures are often an order of magnitude larger than the borrowing measures seen above. (In recent years for the bottom 80%, $3-4T a year for holding gains vs. ~$300B at most for borrowing; Table 3.)

Table 3. Funding bottom-80% spending deficits: bottom-80 borrowing and and holding gains as a percent of bottom-80 spending deficits. Post-GFC years.

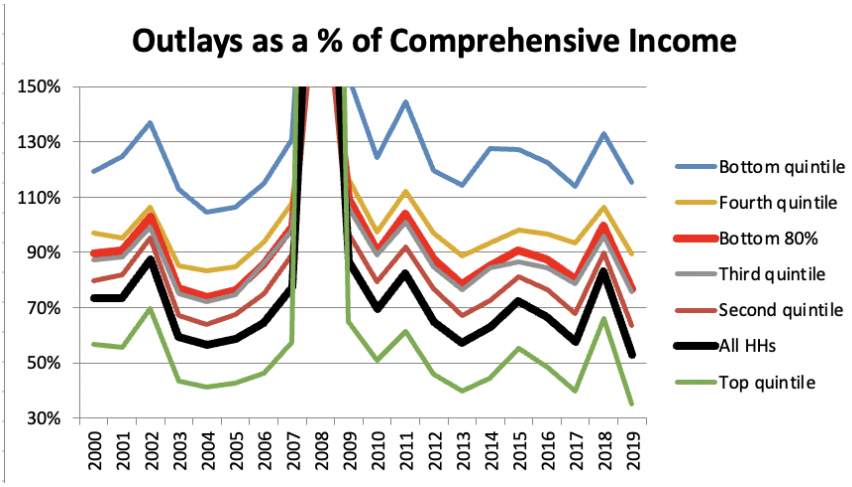
	2013	2014	2015	2016	2017	2018	2019
Borrowing	2%	16%	24%	40%	45%	49%	40%
Holding gains	362%	214%	129%	214%	325%	7%	360%

Including holding gains here as a contributor to balance-sheet asset accumulation is effectively the same as replacing the balance-sheet-incomplete Personal Income measure with Haig-Simons-Hicks "comprehensive" income — which economists considered to be the "preferred" measure of household income prior to the mid/late 20th century, and even to this day (Roth 2021a, pp. 14 *ff*).[18] Comprehensive income is also the foundation of the "survival" constraint, for instance in Hicks' chapter on income. This in turn makes it easy to derive a different "propensity to spend" measure: outlays as a percent of comprehensive income (Figure 9).

[17] Those lower-quintile gains largely accrue on real estate and pension entitlements, which are less immediately "liquid" than stocks and bonds. But those asset increases are nevertheless very salient in any understanding involving lifetime income/consumption, and the intertemporal budget constraint. Households with large gains on real estate accrued over years or decades can save less for retirement, old-age care, and inheritance bequests, so spend more — either spending from current income or if necessary borrowing against homeowners' equity and spending down the borrowed assets. Or they can (do) sell their houses, downsize or rent, and spend down the surplus "realized" assets/profits from sale.

[18] See tables in accompanying workbook. Many studies in the income and distribution literature refer to Haig-Simons in passing, parenthetically, or in a footnote. Fisher et. al. 2020 raises the issue explicitly: "Our measures of income and consumption do not completely characterize the Haig-Simons income measure." In a footnote they cite a previous paper by two of the authors (Smeeding et. al.) that discusses Haig-Simons, and add, "As no household survey has the necessary variables to create a full measure of Haig-Simons income, few studies use these definitions." (That "few" is quite close to zero.) As demonstrated here, the IMAs' Revaluation account adds the previously-unavailable holding-gains measures necessary to derive that full income measure, while the DFAs add the means to allocate holding gains (and hence comprehensive Haig-Simons income) across income quintiles, based on quintiles' shares of asset holdings.

Figure 9. Spending propensity out of comprehensive Haig-Simons income.



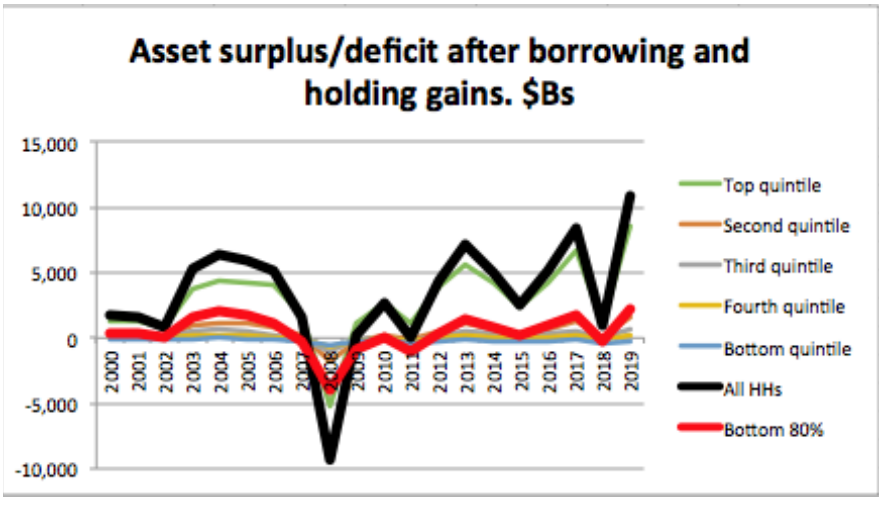
The total household sector spends about 70% of comprehensive income each year. The bottom quintile's spending multiplier (~120%) is about 2.4x the top quintile's, and the bottom 80's (~90%) is about 1.8x. Modelers working in balance-sheet-complete constructs (in which "saving" is effectively equivalent to changes in assets or net worth) might find these to be useful time series for model parameters.

Asset Surpluses/Deficits

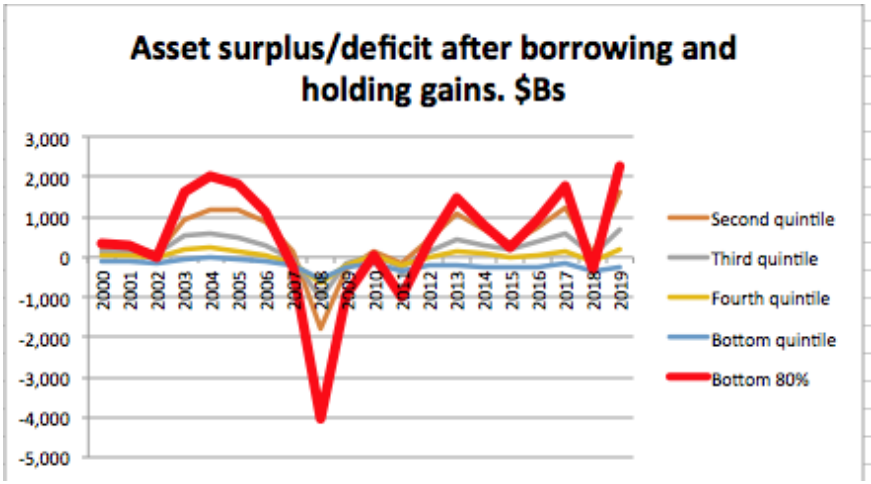
Combined with borrowing, holding gains do serve to explain and "fund" most of the lower quintiles' spending deficits, shifting the bottom 80% to a large asset surplus in most years (Figure zz).

Figure 10. Households' asset surplus/deficit after borrowing and holding gains

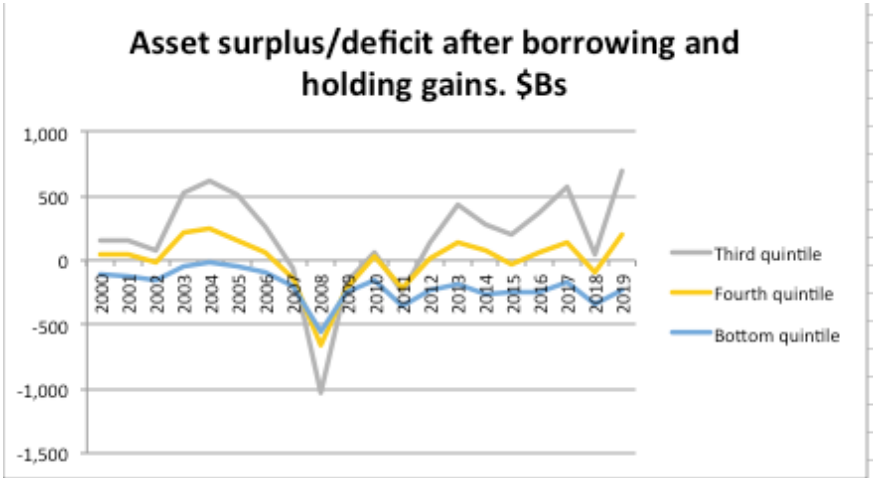
A) All households



B) Excluding top quintile



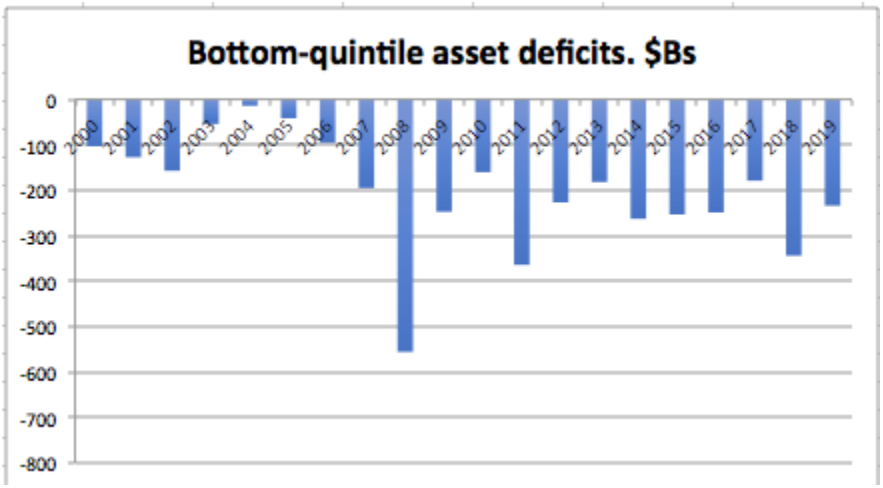
C) Excluding top two quintiles



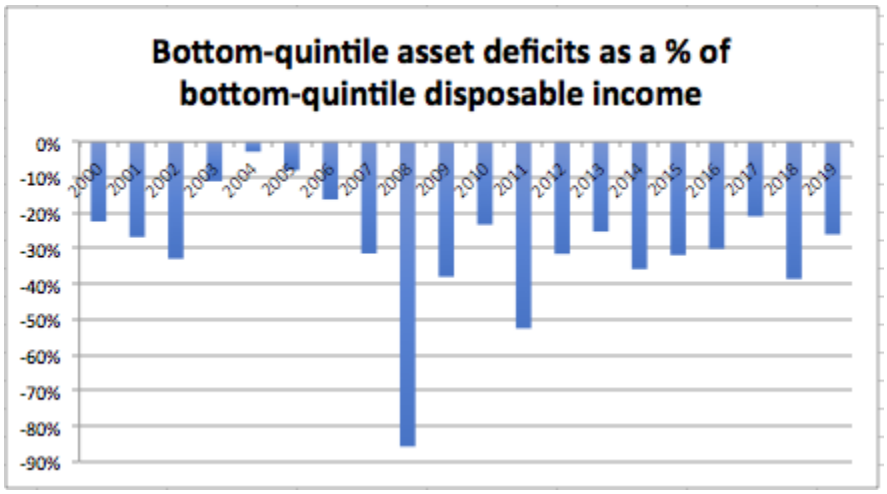
After accounting for borrowing and holding gains, only the bottom quintile remains in persistent asset deficit after 2011 (the fourth quintile shows intermittent deficits). These unexplained, un-"funded" bottom-20 deficits are small in total-economy terms, but they're quite large relative to the bottom quintile's income (Figure 11).

Figure 11. Bottom-quintile asset deficits

A) Annual dollar measures of bottom-quintile



B) Bottom-quintile deficits relative to bottom-quintile disposable income.



Before cross-checking these derived asset changes (saving + borrowing + holding gains) against the DFAs' balance-sheet changes, a few more measures need to be reconciled to attain balance-sheet-complete accounting. With one very small exception, they're all tallied in the IMAs' Other Changes in Volume account.

Figure 12. Other Changes in Volume account from the iMAs, Table S.3.a

	▼ Other changes in volume account
78	▼ Total other volume changes
79	Net investment in consumer durable goods
80	Disaster losses
81	Other volume changes
82	Less: Statistical discrepancy (lines 38-77)

For clarity it's useful to break these measures into two groups, beginning with lines 79, durable goods, and 82, statistical discrepancy, which serve to explain another important difference: between the FOF's and the NIPAs' Saving measures.

"Personal Saving": NIPA vs FOF

The NIPA Saving concept used so far in this paper differs from the FOF concept, which is the saving measure on which tallied balance-sheet changes depend. FOF Table F.6 provides a derivation for this difference (Figure 12).

Figure 12. NIPA vs FOF Saving-concept discrepancy and derivation, from Federal Reserve Table F.6.

41	Personal saving, FOF concept (FOF)
42	- Net investment in consumer durables
43	- Government insurance and pension fund reserves
44	+ Contr. for govt. soc. insur., U.S.-affiliated areas
45	= Personal saving, NIPA concept (FOF)
46	Personal saving, NIPA concept (NIPA)

This derivation is somewhat opaque, however. An alternative, derivation is used here, which is more tractable and understandable for transparent allocation across quintiles (Table 3).[19] It goes in reverse order to the F.6 derivation in Figure 12: from NIPA to FOF.

Table 3. Reconciling NIPA and FOF saving concepts

Personal Saving, NIPA concept and measure
+ Net accumulation of durable goods
+ Statistical discrepancy
+/- Government (social) insurance and pension adjustments
= Personal Saving, FOF concept and measure

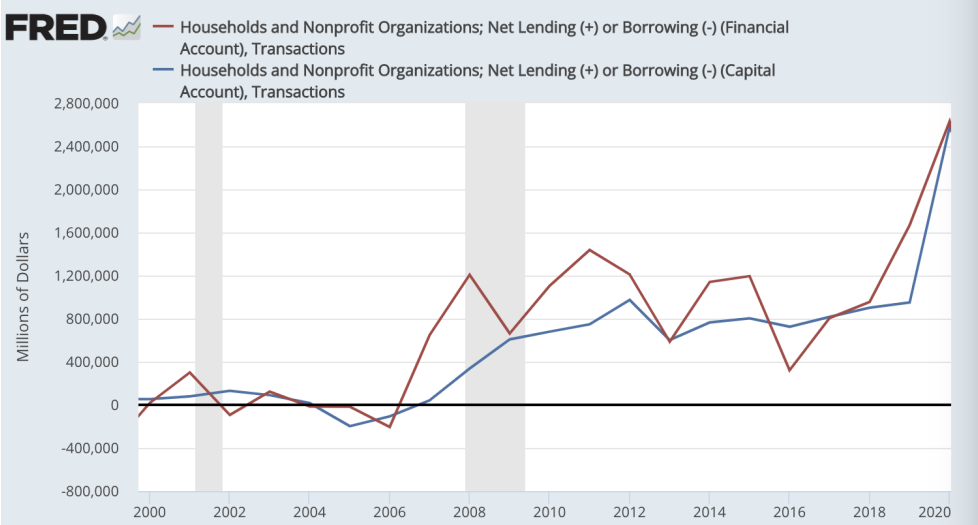
Durable goods. Both the NIPAs and FOF include durable-goods purchases (mostly vehicles) as consumption expenditures, which reduce household assets (and saving). But the FOFs also post the *net* value of those accumulated goods — after subtracting Consumption of Fixed Capital (CFC)/depreciation for existing durables — *back* to household balance-sheet assets, via the capital account. This is necessary because durable goods are included in the FOF tally of household balance-sheet assets, so levels changes from year to year must be accounted for. (The NIPAs don't have balance sheets.)

In brief, the FOF Saving concept includes new long-lived nonfinancial assets created and added to balance sheets by net investment spending on durable goods. (These are volume changes. In the IMAs, investment is called "capital formation.") The NIPA concept doesn't. This extra asset increase is allocated here based on quintiles' percentage-share holdings of durable goods, from the DFAs.

[19] The measures and cross-check for correctness of this derivation are available in a FRED graph here: fred.stlouisfed.org/graph/?g=N4fu.

Statistical discrepancy. This measure resolves the discrepancy between the bottom-line measures of the sector's (parallel) Financial and the Capital accounts. In theory their net *net* accumulation of assets should match, but they don't.[20] There's generally more financial-asset accumulation (volume only, not including revaluation) than there is capital formation (Figure 13).

Figure 13. Net net asset accumulation (volume only) per the Capital and Financial accounts. IMAs Table S.3.a, lines 38 and 77. fred.stlouisfed.org/graph/?g=OZ3z



When deriving volume change in assets, the FOFs and IMAs both start with "real" capital formation/accumulation from net investment — the Capital account's bottom line — then add the statistical discrepancy, yielding the *Financial account's* bottom line, to explain the full observed volume change. The simpler alternative would be to just use the Financial account's bottom-line change in assets from the get-go in the derivation of Δ Assets and Net Worth, effectively ignoring the capital account (whose estimation is decidedly dicey in any case — conceptually, theoretically, and empirically).

In short, the statistical discrepancy adds financial assets to the household sector balance sheet that are unexplained and absent in the capital account. Because the statistical discrepancy is all about extra accumulated financial assets, those extra additions are allocated to quintiles here based on each quintile's percentage-share holdings of financial assets, from the DFAs.[21]

Insurance/pension entitlements. These very small adjustment measures, a few $B a year at most, are allocated to quintiles based on each quintile's existing percentage-share holdings of pension entitlements, from the DFAs.

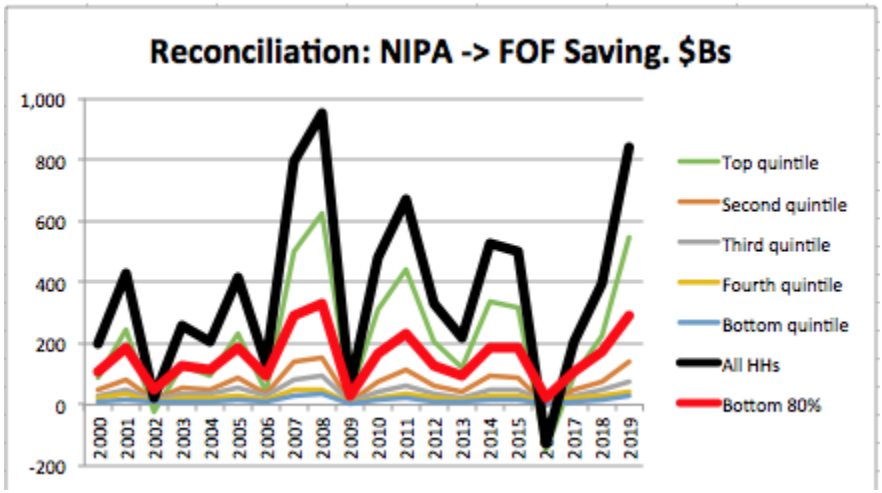
---

[20] Both accounts' bottom-line measures are labeled "Net Lending/Borrowing," even though they can change for a sector even with zero actual net lending/borrowing — for instance if government transfers assets to households. For the Financial account the bottom line is *net* accumulation of financial assets minus *net* incurrence of liabilities — hence the "Net *net* accumulation" label used here for the financial account's bottom-line measure. (See Roth 2021b.)

[21] The statistical discrepancy is usually presented as capital account minus financial account. The opposite is used here for simplicity and clarity, so the sign on this measure is reversed. The (usually) positive remainder is added to assets, as opposed to subtracting the negative.

These combined adjustments are not insignificant, running to $100s of billions in most years (Figure 14).

Figure 14. Asset changes from NIPA -> FOF Saving reconciliation



It's not surprising that these asset increases redound largely to the top quintile; they're all best understood as property/ownership income, and the top quintile owns most property (pertinent here, ~50% of durable goods and ~68% of financial assets).

A superior method for dealing with these FOF vs NIPA saving concepts would be to use the balance-sheet-consistent FOF saving measure from the very beginning of this exercise (see Table 2) — including the allocated asset increases from durable goods and statistical discrepancy *within* the NIPA/DPIA personal income measures. This would be fairly straightforward but would require revisiting all the ensuing measures and graphs here, and would impart potential confusion, so it's left for a future effort.

Other Changes

Two more measures from the IMAs' Other Changes in Volume account must be accounted for to finalize the balance-sheet-complete accounting.

Disaster Losses. These are very small measures, often zero and never exceeding $55B in the period examined.[22]

Other (other) changes in volume. These measures are much larger, often hundreds of $Bs, and exceeding $1T in 2004 and 2013. They comprise "bad debts, accounting changes, data discontinuities," etc. (Teplin et. al. p. 6.)[23]

These two measures, combined, are allocated equally to quintiles.

---

[22] Data series: fred.stlouisfed.org/graph/?g=OKbi. There is some potential labeling confusion here. When you click on the Disaster Losses line in Table S.3.a, it yields a Fred measure labeled Nonfinancial Assets, Other Changes in Volume (which makes sense, but…). It is identical to the another (NIPA) measure, Saving and investment: Disaster losses: Private: Households and institutions.

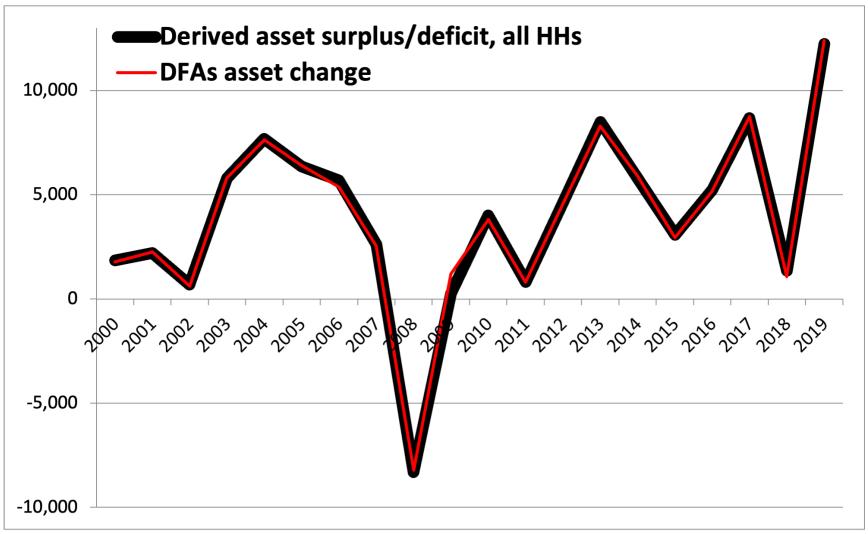
[23] Data series: fred.stlouisfed.org/graph/?g=NDEp

Checking the Math

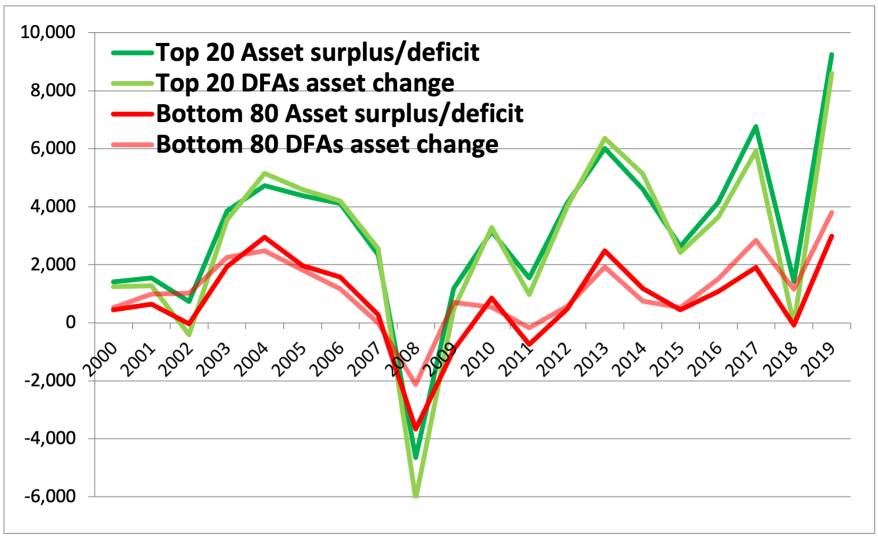
The final step in this balance-sheet-complete accounting exercise is cross-checking the derived asset surpluses/deficits against changes in assets on the personal-sector balance sheet, here using the DFA asset measures (Figure 15). A lot of different data sources and allocation methods are used here. Are the results consistent with observed changes in balance-sheet assets?

Figure 15. Derived household asset surpluses/deficits vs balance-sheet asset changes

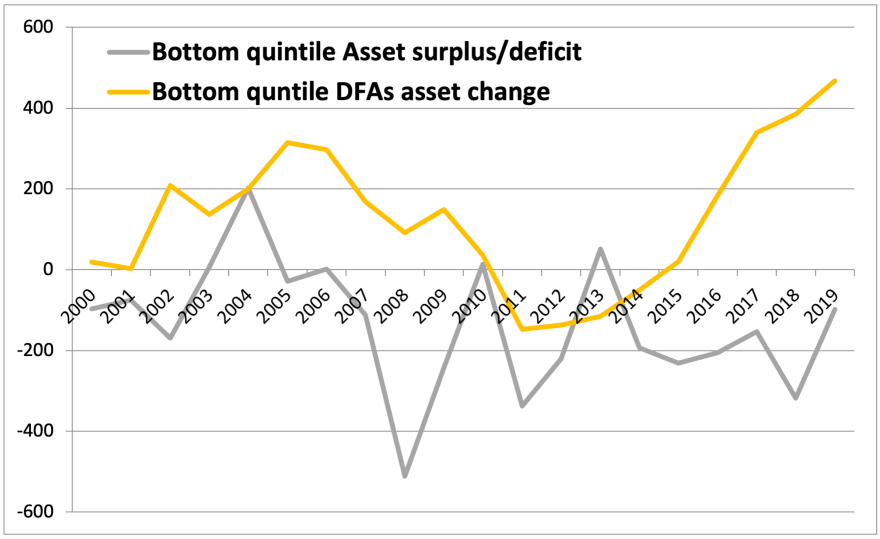
A) All households/total sector



B) Top quintile, and bottom four quintiles combined



C) Bottom quintile



The all-household series match quite precisely. Over the 20-year span, the discrepancy is only $52B. Not surprisingly, the largest discrepancy ($925B) is in 2009. Other years' discrepancies are in the single-, double-, or low triple-digits ($Bs).

There's somewhat more discrepancy for the top quintile, there's still more for the bottom 80%, and the bottom-quintile comparison fails both quantitatively and qualitatively. The lower quintiles seem to be accumulating more assets than expected from the measures summed here. These lower-quintile discrepancies comprise fairly small-magnitude errors in the big picture ($6.4T over 20 years for the bottom 80%), but nevertheless, they remain. It's worth noting that the bottom-20 discrepancy over 20 years comprises 80% of the bottom-80 discrepancy.

These quintile discrepancies may be due to errors here in the quintile allocations of the total-sector measures. PCE allocation for instance, is a very large measure, and the CEX share-allocations are potentially problematic; see Note 11. Allocation of holding gains, another very large measure, also merits scrutiny; a larger portion might need to be allocated to higher quintiles based on their higher "total returns" (including holding gains) on assets (Balloch, Kartashova, Xavier). The DFA asset measures themselves also bear consideration. They're unavoidably based on interpolation in non-SCF-survey years. (The smallest bottom-20% discrepancies are in 2001, 2004, and 2010 — all SCF survey years.)

Alternatively, the lower-quintile discrepancies may be equally or more attributable to shifts and movements of assets across quintiles *within* the personal sector.

Intrasectoral Asset Shifts Across Quintiles

If time series of intrasectoral asset shifts could be assembled, they could be straightforwardly "bolted on" to the accounting construct employed here. At least two large-magnitude mechanisms bear consideration. Each would involve significant measurement challenges.

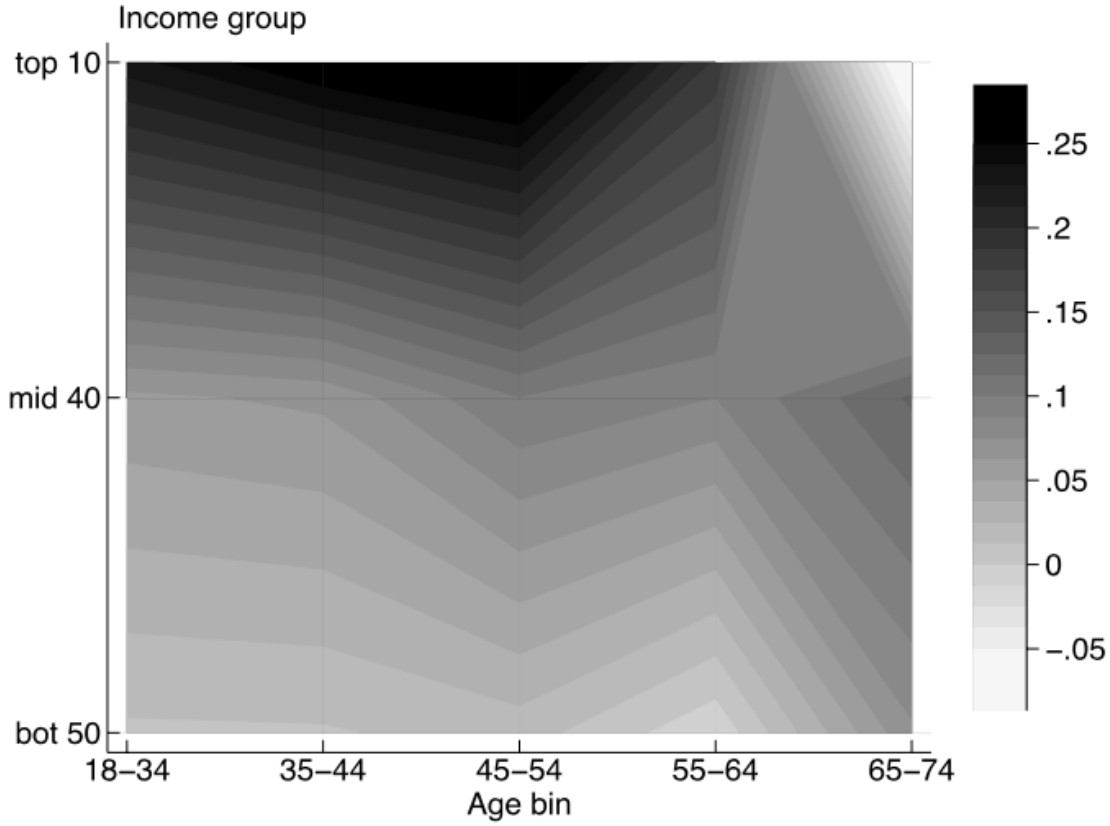
Inheritance, gifts, and bequests. Despite much valuable research on this topic in the past decade or two, none currently provides the time series needed for the methods used here: each quintile's net asset outflows/inflows from inheritance, gifts, and bequests (by year). Bequests given and received should net fairly close to zero (excluding gifts to NPISHes, foundations, and

etc.). A back-of-the-envelope estimate suggests the transfer magnitudes are quite large, totalling in the ballpark of $1.7T in 2018, for instance.[24] (About $13,000 per U.S. household, $5,000 per person.) Transfers “down the quintiles” from these bequests may be limited (with quite high estimated ginis for transferred wealth; Nolan, Salas-Rojo), but they may still explain a meaningful portion of the lower-quintile discrepancies.

Compositional changes. When households with assets retire, they generally move into lower income quintiles — and take their assets with them. These compositional changes are a function of the income-quintile approach itself, but the asset shifts nevertheless may do much to explain the remaining quintile discrepancies.

Both of these intrasectoral mechanisms raise a key issue that has lurked largely in footnotes throughout this paper: age. It suggests a need to add an age dimension to the time series provided here. (A fourth dimension added to the approach in Fisher 2022’s “Inequality in 3-D: Income, Consumption, and Wealth”; see also Waltl.) A recent example of such an approach appears in Mian 2021b (Figure 17).

Figure 17. Saving behavior by age and income level. From Mian 2021b.



Note: Saving rate heat map across the within-birth-cohort income distribution and the age of household head distribution. The sample period is 1953 to 2019.

This is a very promising approach (emphasis in original):

[24] Estimated using CDC % annual deaths by age group and DFAs’ total net worth by age group. This is a rough estimate as the age categories are somewhat different.

> The main novelty in this study is to further break down each birth cohort into three income groups: the top 10%, the next 40%, and the bottom 50%. It is crucial to note that this further breakdown is done *within birth cohort*.[25]

Alternately or equivalently, one could examine age cohorts within income groups. The figure displays quite different lifetime (dis)saving patterns for the top-10 versus bottom-50 income groups. Over-55 households in particular (which hold 66% of household assets per the DFAs) show notable though perhaps not surprising discontinuities between these broad income classes.

But the implementation in this graph involves at least two difficulties. 1. Its uses of a saving rate (derived using a "synthetic saving approach"), as opposed to a more straightforward spending propensity/rate, invokes the multiple difficulties of "saving" measures touched on throughout this paper and in the wider literature — especially saving measures vis-a-vis balance-sheet asset/wealth accumulation. 2. It employs the quite coarse lower-percentile breakdowns that are also provided in the DINAs. (The DINAs provide very finely sliced breakdowns within the top 10%.)

The quintile-based methods and series derived here, broken into age cohorts, might provide a more granular view of the age-related intrasectoral macro-mechanisms at play across the whole income spectrum.[26] Unfortunately these methods and series, at least as implemented here, are currently only possible for the twenty years covered in the DPIAs.

Conclusions

Several macro-level takeaways arise from this exercise. Examining raw dollar measures of households' and quintiles' annual income and outlays/spending yields important insights.

- The bottom 80% of households consistently spends significantly more than it receives in personal (disposable) income.

- Household borrowing explains how some of this spending deficit is funded, but not nearly all.

- Capital gains combined with borrowing do explain and "fund" the remaining spending deficit (and much more) of the top 60% or 80%. But a persistent asset deficit remains for the bottom 20%. Discrepancies suggest that this remaining bottom-20 deficit may result at least in part from the quintile-allocation methods employed here.

- The bottom-80% spending deficit is overwhelmingly funded (and moved into asset surplus) by holding gains, versus borrowing.

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[25] "Next 40%" in this paragraph means the same thing as "mid 40" in the graph's Y-axis labels — the 10%–50% segment. The same is true for PSZ labels and breakdowns. These are the same *wealth-group* breakouts provided in the DFAs; their income groups, employed here, are by quintile (with the top 10% also broken out).

[26] Gindelsky (2022), a DPIA team member, provides ginis of equivalised income for elderly vs non-elderly households (above/below 65) by race, 2007–2018, but not by income quintile. Link to Google Sheets web appendix here: sites.google.com/site/mgindelsky/research.

- The remaining bottom-20% asset deficit requires more detailed exploration and investigation — both regarding allocation of total personal-sector measures, and intra-sectoral asset transfers/shifts between quintiles within the sector.

- The age composition of income quintiles, lifetime patterns of asset accumulation and disaccumulation, and (age-related) asset shifts between quintiles seem necessary to a robust understanding of quintiles' income/spending dynamics.

- The large multiplier differences in quintiles' annual propensities to spend out of income, which show significant empirical regularity over the period examined, suggest that marginal propensity measures, by construction, may greatly understate the potential effects of income concentration and (re)distribution on aggregate spending, GDP, economic growth, and associated macroeconomic measures and changes.

The author would like to express thanks to D.T. Cochrane for his interest, support, and insights contributing to this paper, and Dirk Bezemer for his deep interrogation of previous drafts. Errors are of course the author's.

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