

We are grateful to Saez and Zucman for their constructive and thoughtful comments in “Comments on Smith, Zidar, Zwick (2021).” We respond to each of the main comments in this note.<sup>1</sup>

We list their comments in bold and our responses in plain text.

The three topics are: (1) differences in top wealth estimates due to total wealth denominators across papers; (2) matching the wealth of the Forbes 400; (3) the interest rate earned via pass-through businesses.

## 1 Differences in top wealth estimates due to total wealth denominators

*The main difference is that top wealth shares are lower in SZZ 2021 than in Saez- Zucman throughout the period. This note shows that this difference is largely due to a larger total wealth denominator used by SZZ 2021, primarily reflecting the choice to include unfunded pensions in wealth and to exclude some debts.*

We revised the paper to move all denominator changes to supplemental/appendix series. This revision addresses the concern about differences in aggregates (e.g., unfunded pensions and bottom-up business wealth estimates) since we now exactly match SZ20’s aggregates for each wealth category for our baseline series and all of the key results.

- In Table 1, we now present three approaches: (1) our baseline, (2) equal returns, and (3) the SZ20 approach. Each of these has the same denominator component-by-component, making the comparisons less confusing than the previous draft.
- Table 3 provides a summary of results across different supplemental series. Specifically, for each approach—including our baseline, equal returns, PSZ, and SZ20—it shows (a) top wealth shares and per-capita wealth in 2016, (b) growth in top shares, (c) top portfolio shares in 2016, and (d) growth in top portfolio shares. We then present additional series that change different components of the denominator, add Forbes under various assumptions, and incorporate robustness exercises for the top boutique interest rate.

In terms of the results for wealth shares overall and by component, the introduction provides a summary discussion:

Overall, although we estimate a large degree of return heterogeneity, accounting for this heterogeneity does not change the fundamental story for top wealth shares and their growth—wealth inequality is high and has risen substantially over recent decades. Figure 1A shows that in the past two decades, our baseline top 0.1% wealth share estimates hover between the raw Survey of Consumer Finance (SCF) and the benchmark series in SZ and PSZ. Figure 1B telescopes into the top 1% wealth share and compares our baseline to alternative capitalization approaches and a harmonized SCF series that aligns aggregates and includes the Forbes 400. Across all approaches, top wealth shares have steadily risen since the 1980s.<sup>2</sup>

In terms of top portfolios, we find that accounting for estimated return heterogeneity makes a difference. First, relative to an equal returns approach, we find a larger role for pass-through business wealth and a smaller role for fixed income wealth. Second, the fixed income portfolio share falls and the equity share rises with wealth at the top. Pass-through business and C-corporation equity wealth are the primary sources of wealth at the top. At the very top, C-corporation equity is the largest component, accounting for 53% of top 0.001% wealth, and pass-through business accounts for 22%. In contrast, pensions and housing account for almost all wealth of the bottom 90%. Third, we find that the fixed income portfolio share at the very top remained relatively stable, whereas under equal returns, the fixed income portfolio share increased substantially since 2000.

Regarding the assessment of results in Table 1 of the earlier 10/2021 version of our paper, it’s important to recognize that both the aggregates and method of estimating top wealth were changing in these prior comparisons between our

<sup>1</sup>For replies to “Comments on Smith, Zidar, Zwick (2020),” please see here [http://www.ericzwick.com/wealth/reply\\_to\\_sz.pdf](http://www.ericzwick.com/wealth/reply_to_sz.pdf).

<sup>2</sup>From 1989 to 2016, the top 1%, 0.1%, 0.01%, and 0.001% wealth shares in our baseline series increased by 6.6, 4.6, 2.9, and 1.7 percentage points, respectively, to 33.7%, 15.7%, 7.1%, and 3.2%. In the PSZ series, wealth shares increased by 10.0, 7.9, 5.4, and 3.1 percentage points to 36.6%, 18.6%, 9.5%, and 4.6%. In recent follow-on work, Saez and Zucman (2020) take a different approach from ours to incorporating heterogeneity; in their series, wealth shares increased by 7.7, 6.3, 4.1, and 1.8 percentage points to 36.3%, 18.4%, 9.3%, and 4.1%.

estimates and those of PSZ. Changing more than one thing at a time can lead to confusion and incorrect assertions.<sup>3</sup> The revised version presents results using different aggregate wealth measures in supplemental rows in Table 3.

***If one uses the actual Forbes estimate for the top 400 and a more reasonable rate of 3% to capitalize interest earned via pass-through businesses, then the SZZ methodology delivers almost the same top 0.1% wealth share as Saez-Zucman.***

We report these specifications in Table 3. Table 3 row 11 shows how the baseline results change when replacing the top 400 tax units with Forbes estimates. Row 15 presents a robustness series (“Low Boutique”) that sets the boutique interest rate in our information-returns approach to the minimum of either the estimated boutique rate or the 5%-confidence-level top-0.1% interest rate in our CMD-based approach (equal to 3% in 2016).

As we discuss below in Section 2, replacing the top 400 tax units with Forbes estimates is problematic because even taking the Forbes estimates as given, the Forbes estimates represent the wealth not only of the Forbes individuals, but also many of their families, children, and spouses as well. Adding the 400 Forbes billionaires, their spouses, and their adult children plus spouses amounts to 2,370 individuals who are possibly represented in Forbes.<sup>4</sup> When using this estimate of the number of individuals, the effects of replacing our richest with Forbes estimates is immaterial—the top 0.001% in our baseline has 2,400 people and \$2.5T in aggregate wealth; Forbes has \$2.4T.

See our full reply to the Forbes concern below in Section 2. See below for our full reply to the concern about interest rates earned via pass-through businesses in Section 3.

***The important point is that even if the pass-through interest rate of the rich really is 6% and Forbes really over-shoots by 20%, the implications for the top 0.1% wealth are small. The very many deviations that SZZ implement end up having small net effects on top wealth levels, showing that the Saez-Zucman capitalization methodology and results are robust.***

In the results section of our revised paper, we now describe the top wealth level results of Table 1 as follows:

The top 1% share of total wealth is 33.7% under our baseline approach, compared to 38.9% under equal returns and 36.3% in SZ20. Similarly, for the top 0.1%, who have wealth exceeding \$17.2M, our estimates reduce the share from 20.4% under equal returns to 15.7%. The SZ20 estimates lie roughly in between these estimates at 18.4%. Thus, the combined effect of accounting for estimated heterogeneity, estimating private business values, and other adjustments has a modest effect on the estimated concentration of top wealth. Although the difference between equal returns and the baseline increases within the very top group, these differences only represent a few percentage points of overall wealth.

***But this should not obscure the key fact that SZZ now pretty much agree with original Saez-Zucman on the wealth level of the rich (hence on potential wealth tax revenue), and on the dramatic increase in US wealth concentration. SZZ and updated Saez-Zucman also largely agree regarding asset composition: In both series the top 0.1% owns about a quarter of its net wealth in fixed-income claims in 2016.<sup>7</sup> Thus there is now broad agreement on all the key features of the graph below (copied from Saez and Zucman 2020, Figure 24): the level, trend, and composition of the wealth of the top 0.1%.***

In the results section of our revised paper, we now describe the top wealth growth results as follows:

Figure 1 plots our baseline estimates from 1966 to 2016 for the top 0.001%, top 0.01%, top 0.1%, and the top 1%. For the top 0.1%, top wealth falls from 10% in the late 1960s to a low of 7.1% in 1978, then steadily rises to 15.7% in 2016. From 1978 to 2016, the PSZ top 0.1% series grew from 6.3% to 18.6%, and the SZ20 series grew from 7.1% to 18.4%. Thus, all approaches agree that the top 0.1% share increased by around 10 percentage points, give or take a few points, since the late 1970s nadir. Focusing

<sup>3</sup>Previously in our 10/2021 manuscript, we had four updates to aggregates: (1) Independent estimate of private business wealth, including missing business wealth as requested by a different referee, (2) adding Forbes wealth using the BHV approach, (3) data updates to the financial accounts, some of which increase the level of top wealth (e.g., municipal bond values) and some of which increase the level of bottom wealth (e.g., changes in non-mortgage debt), and (4) updates to the pension model using the latest estimates from Sabelhaus and Volz, which follows the approach used in the DFA that includes aggregate unfunded DB pensions. Increased pension aggregates also increased top wealth more in our revised series than previously, because in the revision we include the labor component of pass-through income alongside wages in allocating pension wealth. These prior changes did not only affect bottom wealth. Several caused top wealth to increase substantially relative to our prior estimates and to PSZ 2018.

<sup>4</sup>Based on marriage rates by age of those with high-incomes (Appendix Table B.10), there are around 360 Forbes spouses. Based on Forbes 400 data on age and number of kids as well as dependent-claiming rates by age of those with high-income, around 880 of the 1,051 children of Forbes are adults. Many of these adult children are also married. Assuming children are 30 years younger than their parents and applying marriage rates by age gives another 730 adults, amounting to 2,370 Forbes adults overall (Appendix Table B.11).

on the 1989-2016 period, the top 0.1% share grew 4.3 p.p. in the SCF, 7.9 in PSZ, 6.3 in SZ20, and 4.6 in our series.

For the top 1%, these approaches reflect similar growth. Since 2000, the SCF top 1% share hovers between the PSZ and SZ20 series and our baseline, though shows a sharper increase between 2013 and 2016 that appears to have partly reversed in the 2019 survey. For groups within the top 0.1%, our series are somewhat below PSZ and SZ20 in terms of recent levels but display similar growth, especially compared to SZ20. For all these top groups, our series closely track the harmonized SCF with Forbes in recent years.

In terms of composition as mentioned above, we find that accounting for estimated return heterogeneity makes a difference. We find: (1) a larger role for pass-through business wealth and a smaller role for fixed income wealth, (2) the fixed income portfolio share falls and the equity share rises with wealth at the top, and (3) the fixed income portfolio share at the very top remained relatively stable, whereas under equal returns, the fixed income portfolio share increased substantially since 2000.

## 2 Matching the Forbes 400

### *SZZ undershoot the Forbes 400 by about 18% in 2016 with no good substantive reason*

Following the advice of editors and other referees, we do not include Forbes in the baseline series in the revised manuscript. We do report a supplemental series that replaces the top 400 wealthiest with the Forbes estimates to show how that affects results. The results are shown in Table 3 row 11 as well as Appendix Figure A.8.

We now highlight a few substantive reasons (based on recent research on estate tax collections of Forbes individuals and rich lists in the UK), and now discuss the implications of a new insight about the uncertainty regarding the number of adults represented in Forbes due to spouses and families.

We do not incorporate Forbes estimates in our baseline estimates for several reasons. First, Forbes only knows something about the wealth of people who cooperate with it and tell the truth, and some types of wealth like private business are hard to value, especially without official data on firm characteristics like revenues and EBITD. Second, evidence from Raub, Johnson and Newcomb (2010) and Moretti and Wilson (2020) suggests estate tax collections are substantially smaller than implied by Forbes wealth estimates for Forbes individuals. Third, the number of wealth holders for each Forbes entry is larger than one, but estimating the number of adults is difficult to do precisely. Comparing probated wealth against rich list wealth in the UK, Alvaredo, Atkinson and Morelli (2018) found that, if wealth holders are treated as individuals, that would suggest a Pareto parameter of 4.7 in recent years, which is about twice as high as in their baseline population.

Regarding undershooting, we also add the following discussion comparing Forbes 400 wealth to our estimates for subgroups at the top:

Our top 0.001% group of 2.4K adults holds \$2.5T of wealth, slightly above the Forbes total. If we take Forbes at face value, this figure suggests our top 0.001% estimate may be too low. However, each member listed in the Forbes 400 usually corresponds to more than one adult, which complicates comparisons with our baseline individual-level estimates. The average Forbes individual in 2019 is 67 years old and has 2.6 children. The many adult children of Forbes individuals may also be represented in Forbes.<sup>5</sup> Adding the 400 Forbes billionaires, their spouses, and their adult children plus spouses amounts to 2,370 individuals who are possibly represented in Forbes.<sup>6</sup> Thus, the number of adults whose wealth is represented in the Forbes 400 estimate of \$2.4T might be close to the number in our top 0.001% group.

<sup>5</sup>Conversations with journalists who have worked on the Forbes estimates confirm this point. The Camden Family Office Report suggests it is common to move shares of companies to kids from an early age: “Families with private wealth in excess of USD 150 million are ideal candidates for establishing a single family office structure. While it is not uncommon for first-generation entrepreneurs to establish a family office, family offices often support families with more complexity in terms of households and generations.”

<sup>6</sup>Based on marriage rates by age of those with high-incomes (Appendix Table B.8), there are around 360 Forbes spouses. Based on Forbes 400 data on age and number of kids as well as dependent-claiming rates by age of those with high-income, around 880 of the 1,051 children of Forbes are adults. Many of these adult children are also married. Assuming children are 30 years younger than their parents and applying marriage rates by age gives another 730 adults, amounting to 2,370 Forbes adults overall (Appendix Table B.9).

When using this estimate of the number of individuals, the effects of replacing our richest with Forbes estimates is immaterial—the top 0.001% in our baseline has 2,400 people and \$2.5T in aggregate wealth; Forbes has \$2.4T. In other words, there is no “undershooting” when using empirical estimates of the number of individuals represented by the Forbes 400.

Nonetheless, in Section 6, we present supplemental series that take alternative approaches to incorporating Forbes estimates into our wealth series, including ignoring this issue about the number of adults represented in the Forbes estimates. Replacing the top 800 capitalized individuals (which are the top 400 capitalized tax units split equally) with Forbes estimates raises the baseline top 0.01% wealth level from \$5.43T to \$6.16T. Table 3 and Appendix Figure A.8 show the effects on top wealth shares. Appendix R.3 provides additional discussion.

### 3 Interest rate earned via pass-through businesses

*SZZ assume that interest-bearing assets owned via pass-through businesses have an interest rate of about 6 % in 2016. A large body of evidence suggests that this interest rate is too high by a factor of two.*

We present a large body of new evidence to support our estimates and show that the prior evidence has several important limitations.

**New Evidence.** First, we construct a novel data set on the universe of taxable interest sources linked to owners using de-identified data from income tax records spanning 2001-2016. These 3.2 billion source-owner observations allow us to disaggregate taxable interest income into subcomponents. This disaggregation reveals that rich individuals earn a much larger share of their interest income in the tax data in higher-yielding forms (such as boutique investment partnerships of distressed debt or mezzanine funds).

Second, we develop a complementary approach that uses the covariance structure of interest rates, assets, and returns to estimate fixed income returns by group. Intuitively, we estimate risk exposure to credit and interest-rate risk for different groups by observing how their interest income flows vary and covary with aggregate risk factors. Consistent with our information-returns estimates and qualitative evidence, we find that top wealth groups have much greater exposure to credit risk.

Third, we present three types of qualitative and quantitative evidence in Appendix J. First, looking at what these rates imply for aggregate quantities, our approach generates aggregate boutique asset estimates that align with the relevant components in the USFA and the SCF (see reply to point 2 below for details). Second, a word cloud analysis of boutique fund names reveals that many of these funds invest in subordinate securities in private equity and real estate transactions, mezzanine and distressed debt, mortgage servicing rights, foreign bonds, etc., which carry considerably more credit risk than investments in government securities or bank deposits. Third, data on fixed income portfolios from family office surveys, conversations with wealth managers and fixed income fund managers, and public disclosures from high wealth politicians all point toward substantial exposure to risky credit.

Together, these data confirm that wealthy individuals tilt their fixed income portfolios toward riskier, higher-yielding strategies that are not widely held by the typical investor and likely require a certain level of wealth to access. As a result, these individuals expect much higher returns than the typical bank deposit holder, even in the low-interest-rate environment. The evidence presented here also supports our top return estimates quantitatively.

**Limitations of Prior Evidence.** Prior approaches to capitalize interest income use either an equal-returns assumption (SZ, PSZ) or map estimated interest rates from other data sources. In robustness analyses, SZ present results that scale down fixed income assets for those at the top using either the 10-year US Treasury rate or estate tax data.<sup>7</sup> BHKS also consider a top-0.1% capitalization factor chosen to match the 10-year US Treasury rate.<sup>8</sup> BHH use the 10-year US Treasury and estate approaches and compare these to an approach that matches households in the SCF to their individual tax returns. In the latter approach, they estimate interest rates as interest income

<sup>7</sup>The scale factor that they use is the ratio of the equal-returns interest rate to the estimated interest rate for estate tax decedents with more than \$20 million in estates. They also alternatively use the 10-year US Treasury bond rate for the top 1% (ranked in terms of adjusted gross income less capital gains).

<sup>8</sup>They note that this rate appears “conservative” relative to estimated interest rates in the SCF, and that the capitalization model for creating the SCF sampling frame applies the Aaa corporate bond rate.

divided by the sum of SCF fixed income assets. In each case, they then apply these interest rates for different top 1% groups (i.e., ranked by total wealth, total income, or interest income) to estimate capitalized fixed income wealth.

These approaches suffer from three key limitations. The first is an absence of direct data on the degree of portfolio and return heterogeneity in terms of fixed income flows. Moreover, in the SCF data and estate tax data, it is not possible to isolate the boutique funds that we find are key for generating the bulk of interest income for those at the very top in recent years. The second is an imperfect mapping from the SCF and estate tax wealth data to the corresponding income flows. Specifically, the interest rates estimated in these papers include money market and fixed income mutual funds that do not pay taxable interest, thus downward biasing the estimated interest rates and the degree of return heterogeneity.<sup>9</sup> Third, interest rates at the top in the SCF and estate tax data are imprecise due to sampling uncertainty, volatility from mortality rates, and small sample sizes.<sup>10</sup>

Appendix Figure A.6 compares interest rates derived from the SCF following the BHH definition to a definition that removes non-taxable-interest-generating assets from the denominator. Removing these assets from the denominator increases the 2016 rate of return for the top 0.1% wealth group from 2.3% (s.e.=0.4%) to 3.9% (s.e.=1.0%). The implied ratio of this rate of return to the equal-returns rate from Figure 4A increases from 2.2 (s.e.=0.4) to 3.7 (s.e.=0.9), slightly above that from our information-return and minimum distance estimates. The effects of this refinement increase within the top 1%, which reflects greater exposure to non-interest-generating funds at the very top.<sup>11</sup>

Our approach has several advantages relative to other ways of measuring interest rate heterogeneity. First, past work (e.g., SZ, BHKS, BHH) has likely underestimated rates of return at the top because the interest rate is measured with a denominator that includes too many assets—specifically, fixed income and money market mutual funds—which are more prevalent at the top.<sup>12</sup> These assets pay non-qualified dividends, not interest, so should not be estimated by capitalizing interest flows. Removing non-taxable-interest-generating assets from the denominator increases the rate of return in 2016 in the SCF for the top 0.1% wealth group from 2.3% (s.e.=0.4%) to 3.9% (s.e.=1.0%). The same issue affects interest rates measured using estate tax records linked to income tax data. Moreover, in the SCF and estate tax data, it is not possible to isolate the boutique funds that we find are key for generating the bulk of interest income for those at the very top in recent years. Consequently, disaggregating and separately capitalizing these flows is not possible in these other data sets. In contrast, our data permit us to characterize and incorporate heterogeneity across fixed income sources and further into the tail. Second, our ability to isolate these flows allows us to shed light on why different groups earn such different returns. Third, because we measure return heterogeneity with population data, our estimates are much more precise than those derived from either the SCF (due to sampling error) or the estate tax (due to volatility from mortality rates and small sample sizes). Last, our risk-exposure approach permits us to generate standard errors for characterizing uncertainty in returns and wealth estimates.

**Other evidence and critiques.** We also directly address limitations of other evidence and other critiques below. We address SZ’s first point about internal consistency and representativeness of the information returns data, the second addresses concerns about hedge fund interest rates, the third addresses interest rates earned by S-corporations, the fourth addresses estate tax rates, and the fifth addresses portfolio shares from estate taxes.

To summarize, we address SZ’s large-body-of-evidence comment in two ways:

1. Marshaling a large body of new evidence (from billions of new information returns, new methods, and substantial corroborating qualitative and quantitative evidence from family offices, public disclosures of rich politicians, market participants, and other sources).

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<sup>9</sup>SZ20 also observe that bond mutual funds should be capitalized using non-qualified dividends, not interest, and revise the PSZ capitalization method accordingly. We confirmed this issue when talking to practitioners during the first revision of this paper. To estimate interest rates in the SCF, SZ20 remove an estimate of interest generated by boutique-style investments from the numerator. Two limitations of this method are (1) boutique sources are hard to identify in the SCF, and (2) they account for the bulk of top taxable interest flows in tax data.

<sup>10</sup>Appendix Figure A.5 plots top interest rates under uncertainty for estate tax data using a definition that removes non-interest-generating fixed income funds from the fixed income asset definition. This uncertainty reflects the small underlying sample: in 2016, there are approximately 700 estates with > \$20M of net worth in the matched-income-estate-tax data, and their collective interest income is \$117M, an order of magnitude smaller than the amount of interest income we use for matched fixed-income partnerships. Appendix R.4 discusses other limitations of using the estate tax data.

<sup>11</sup>The figure also highlights the uncertainty in estimating interest rates for the very small sample of SCF respondents in the top 0.01% (e.g., there are 527 observations in 2016). For this group, standard errors for the BHH interest rate definition and our preferred definition are 1.3% and 2.8%, respectively, such that the confidence intervals include our preferred interest rates for both definitions.

<sup>12</sup>We discuss the relationship between our work and contemporaneous and subsequent work, including SZ, PSZ, BHKS, BHH, and Saez and Zucman (2020), in Section 2.3 and Appendix R.

2. Identifying limitations of prior evidence and systematically addressing other concerns, which we do below.

*First, the 6% assumption is inconsistent with SZZ’s own data. To obtain this 6% rate, SZZ compute the interest rate of partnerships that only earn interest, and thus only have interest-bearing assets. These are the only partnerships for which an interest rate can be computed in the US tax data, because interest-bearing assets are not isolated from other assets in partnerships’ balance sheets. SZZ find that the average interest rate in this sample of partnerships is about 3.25%: see SZZ Appendix Table B1. However when they match it to individuals, the average interest rate of this sample of partnerships becomes much higher, around 6%: see SZZ Figure 4A. No reconciliation or explanation is provided for this discrepancy. Strikingly, 67 out of the 73 types of interest-paying partnerships for which SZZ compute an interest rate in Appendix Table B1 (“venture”, “CDE”, “sub-CDE” etc.) have an interest rate lower than 6%. How can this be reconciled with the notion that households get a 6% interest rate on average in their investments in interest-paying partnerships?*

Thanks for pushing us to clarify this point.

Note that old Appendix Table B1 (now Appendix Table B6) only includes funds with strings in their names that are sufficiently common to permit disclosure. These funds might not be representative of the broader set of funds that individuals are investing in. To evaluate this idea, we computed the share of interest income for matched fixed income partnerships based on the number of individual partners. A substantial amount of interest income (\$3.5B out of the \$6B total) comes from funds with fewer than ten partners. These funds tend to have higher interest rates than those with more partners (on the order of 3-5% vs. 2% on average for funds with more than 100 partners or with no individual partners, asset-weighted). Many of these funds have interest rates well above 6%, which corresponds approximately to the 75th percentile in the matched funds sample.

It therefore looks like many fixed-income funds in these data are more specialized in their nature and may reflect closely held investments with relatively few investors. For example, venture debt investments in a venture capital deal typically feature an interest rate of 12-15%.<sup>13</sup> Such investments would have relatively few partners and their names would be deal-specific and so unlikely to enter the Appendix Table. The remaining gap between the asset-weighted interest rate for these funds and the top-AGI-group rate likely reflects sorting of high income individuals into higher interest rate funds.

In terms of representativeness, we suspect two categories of partnerships account for the interest that does not flow through these fixed income funds. One is mixed strategy funds. If these funds invest in a combination of equity, real estate, and fixed income, it is unclear whether the fixed income assets would be riskier or less risky than the single-strategy funds. The second is tiered partnerships that pool investments in multiple unrelated partnerships. Such structures are commonly used for family offices, who make single-strategy investments on behalf of their owners and distribute the proceeds through a parent partnership. For such structures, the evidence from family office surveys on the most popular fixed income investment strategies can be informative (see Appendix J.3). These surveys suggest risky debt and higher yielding bonds account for the bulk of fixed income investments for family offices.

Overall, this additional evidence helps bolster the case for our approach to estimating boutique interest rates. Thanks so much for asking us to do more here. Despite this evidence, we nevertheless agree the accuracy of these interest rates depends on well reported flows and assets and a representative mapping between interest rates from matched data and unmatched individuals. We cannot perfectly test these assumptions. As noted above, to address other concerns about this approach, we present supplemental series that do not use these boutique rates when capitalizing interest income flows. These alternatives deliver very similar estimates.

In particular, the minimum distance estimates—which don’t face these concerns—produce very similar interest rate estimates to our information returns approach, which alleviates concern about the interest rates we use for those at the top.

We also provide alternative estimates following your suggestion of haircutting the partnership information returns rates. We implement this idea by using the smaller of the lower-bound of the minimum distance estimates and the boutique rates since this provides a conservative estimate and is implementable in the time series. We show that using this approach lowers our top 0.1% estimate by 0.3 percentage points. Rows 15-17 show how this approach affects key results in Table 3 Panels (a), (b), (c), and (d).<sup>14</sup>

***Second, the 6% rate assumed by SZZ is inconsistent with the interest rate earned by hedge funds,***

<sup>13</sup>See, e.g., <https://flowcap.com/founders-guide-to-venture-debt/>.

<sup>14</sup>In addition, Figure 4C shows the effects on top 0.1% wealth shares of using more conservative top rate estimates. For example, as we discuss in the paper, using the 10-year Treasury rate for those in the top 1% (ranked in terms of baseline non-interest wealth) would increase the top 0.1% share by 0.7 percentage points relative to our baseline approach in 2016.

*key pass-through owners of interest-bearing assets (Saez and Zucman, 2020). From the Financial Accounts Table B.101.f, US domestic hedge funds held about \$1 trillion in fixed-income claims in 2016, most of which were low-yield. Additional details about the types of assets owned by hedge funds are provided in tabulations of SEC-PF (“private funds”) forms, which are the raw source for the Financial Accounts Table B.101.f. Our analysis of these data shows that the average interest rate of qualifying hedge funds was 2%–3% in 2016. Given the high share of cash, cash equivalents, US Treasury securities, and high-income countries’ sovereign bonds in the interest-bearing assets of these hedge funds, it is impossible to realistically obtain a 6% interest rate. One would need to assume that MBS, corporate bonds, other bonds, ABS, and convertible bonds owned by hedge funds had a roughly 18% average interest rate in 2016. SZZ do not analyze SEC-PF statistics, a critical source of information on the yield of private funds.*

Thanks for this comment. The funds represented in Table B.101.f include many funds owned by non-US-individuals, such as pension plans, non-profits, sovereign wealth funds, and insurance companies. For example, in 2016, Form PF tabulations from the SEC suggest just 11% of fund NAV accrue to US individuals.<sup>15</sup> Thus, it is unclear whether tabulations based on these data are useful for informing the particular slice of fixed-income holdings that generate partnership income for individuals.

Our supplemental series using the minimum-distance approach to capitalize interest income also shows the effect on our estimates from setting a lower rate in line with this B.101.f calculation would be small.

We discuss the aggregate implications relative to external sources (including USFA Table B.101.f) in Appendix J.1:

One way to approach this question is by looking at what these rates imply for aggregate quantities. The top 0.1% boutique rates in Figure 3A of 6–7% in 2016 correspond to \$16B in taxable interest flows from boutique sources, which implies aggregate boutique assets for this group of \$230–270B, equal to approximately 2% of top-0.1% wealth. This category of assets is not separately identified in the SCF; according to experts at the Federal Reserve Board, it is most likely to appear in the category of “Other Managed Assets.” For the top 0.1% in the SCF in 2016, this category amounts to \$620B, which includes both fixed income and non-fixed income holdings. Alternately, one can look at aggregate holdings of debt securities by the hedge fund sector in USFA Table B.101.f, which includes holdings by both individuals and non-individual investors such as pensions and endowments. In 2016, these holdings equal \$670B in 2016. Thus, our approach appears to generate reasonable aggregates compared to external sources.<sup>16</sup>

*Third, the 6% rate assumed by SZZ is inconsistent with the interest rate earned by S- corporations, which is no higher than 3.6%. S-corporations account for about 15% of interest earned at the top (SZZ Figure 3C). Based on public tabulations of S-corporation tax returns (see Saez and Zucman, 2020), one can compute an upper bound for the interest rate paid by S-corporations as interest / (US government obligations + loans to shareholders + mortgage and real estate loans). This upper bound is 3.6% in 2016. This is an upper bound since it excludes cash, notes receivable, and other current assets at the denominator, all of which include some interest-bearing assets (which cannot be isolated from non-interest-bearing assets). A reasonable set of assumption is that 10% of “trade notes and accounts receivable,” 30% of “other current assets” (which includes bonds) and 30% of “cash assets” (which include interest-bearing deposits) are interest-bearing. Under these assumptions the interest rate of S-corporations is 1.4%—including for S-corporations with more than \$100 million in assets whose ownership is concentrated in the top 0.01%. 6% simply does not work for S-corporations.*

Thanks for raising this question of what interest rate to apply for S-corps. We investigated this aggregate-based calculation of the S-corp interest rate to evaluate whether to incorporate it into our approach.

We use data from these public tabulations and from the SOI corporate sample to explore the distribution of these assets and their corresponding interest distributions. Two of the three asset categories you include (US obligations and mortgage and real estate loans) are primarily held in a few industries (depository and non-depository credit intermediation and holding companies, including bank holding companies). In the public tabulations, these industries account for  $\$81B/\$100B = 81\%$  and  $\$51B/\$61B = 84\%$  of US obligations and mortgage and real estate loans, respectively. In the contrast, the distribution of interest income is much more dispersed, as these industries only

<sup>15</sup><https://www.sec.gov/divisions/investment/private-funds-statistics/private-funds-statistics-2016-q4.pdf>

<sup>16</sup>In contrast, capitalizing these boutique interest flows using the equal-returns rate delivers aggregates of \$1.5–2T, which appears much too large relative to these external sources. This total even exceeds aggregate non-bond liabilities of the non-financial corporate sector (\$1.1T in 2016), which provides a benchmark for the amount of non-traditional fixed income assets that may be held in boutique partnerships.

account for at most 27% of the total, \$2.3B/\$8.5B total for NAICS 2-digit codes 52 and 55 combined. For the third category of assets, loans to shareholders, these industries account for less than 5% of the total \$76B.

This heterogeneity in flow-versus-stock concentration reflects the difference between bank balance sheets and asset management versus that for non-financial operating companies. Bank interest income is substantially offset by interest expense on deposits. In addition, their business model is likely quite different from non-deposit-financed fixed-income funds or the interest income of operating companies.

As it turns out, this calculation usefully illustrates the problem with not accounting for underlying heterogeneity in stocks and flows. If we performed the same calculation as above separately for the bank industries and non-bank industries, we would have a rate of 1.8% for the banks and 6.0% for the non-banks. The latter rate is quite close to the boutique rate we currently apply.

Ideally, we would apply industry-specific capitalization factors to account for this heterogeneity. However, we believe our approach leads to fairly similar results for a few reasons. First, for the non-banks the boutique rate is similar to the rate based on these aggregates. Second, our private business estimates uses asset-based valuation models to assign wealth to those who have ownership stakes in S-corporations, whether they are banks or non-banks.<sup>17</sup> So the low interest deposits will effectively be credited to these people as wealth through this approach. Third, for the S-corporation banks, equity owners will receive wealth through their ownership shares of distributed profits, assets, and total revenues. For these banks, depositors will receive wealth through our capitalization of interest income via the 1099-INT form.

Our supplemental series using the minimum-distance approach to capitalize interest income also shows the likely effect on our estimates from modeling this heterogeneity explicitly would be small.

*Fourth, the 6% interest rate assumed by SZZ is inconsistent with evidence from linked income and estate tax returns (first analyzed in original Saez-Zucman). Matched estates-income data are the only administrative data source where the interest rate of the rich can be observed in the United States. The interest rate for large estates tracks the economy-wide interest very well overtime and shows only a modest premium for very large estates, much lower than the one implied by SZZ's 6% assumption; see Saez and Zucman (2020) for a detailed discussion.*

We respectfully disagree. The limitations of the estate tax series raised by SZ 2016 still apply. Specifically, SZ defended not using the estate tax series at the top on the following grounds: “We retain our baseline top 0.1% wealth share estimate because only a few hundred non-married individuals die with estates above \$20 million each year. As a result, **there is likely significant noise in the annual series, making it difficult to make a precise and systematic inference of the true interest premium at the top.**” (p.550, emphasis added).

Our estate tax estimates reveal substantial uncertainty and sensitivity to mortality adjustments. In addition, the estate tax series is a selected sample that reflects the portfolio composition that not match that of the population of wealthy individuals. For example, estate planning or taking less risk near death can affect portfolios within and across asset classes. There are also not that many estates overall. In 2017, there were only about 5,200 taxable returns. Importantly, as mentioned above, in and estate tax data, it is not possible to isolate the boutique funds that we find are key for generating the bulk of interest income for those at the very top in recent years

We discuss the limitations of the estate tax estimates in detail in Appendix R.4.

We believe our information return data makes a meaningful advance in terms of representativeness compared to past evidence, for example, using estate tax data. In 2016, for the approximately 700 estates with > 20M of net worth in the matched-income-estate-tax data, the total amount of interest income received is \$117M, an order of magnitude smaller than the amount of interest income we use for matched fixed income partnerships.

*Last, the 6% rate assumed by SZZ delivers a share of fixed-income assets in the net wealth of the top 0.01% which is inconsistent with estates tax data. Specifically, SZZ (Figure 15) estimate that the share of fixed-income claims in the net wealth of the top 0.01% (adults with more than \$84 million in wealth) was 18.8% in 2016. In estates tax data, the share of fixed-income claims in the net wealth of individuals with more than \$50 million was 26.2% in 2016; see public SOI tabulations of estate tax returns filed in 2017 (typically for deaths that occurred in 2016).*

First, as mentioned in the prior reply, there is substantial uncertainty in the estate tax sample due to small samples, uncertain mortality rate adjustments (that vary by wealth group, gender, and age), inability to isolate the boutique

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<sup>17</sup>Our approach to estimating private business wealth includes an asset-based estimate (as well as sales- and profits-based measures). To the extent business owners hold significant deposits on their firms' balance sheets, these assets will be accounted for in our private business estimates (and missed in an approach that only uses operating income to estimate business wealth).

funds in estate tax data, and lifecycle-profile portfolio composition changes as one nears death. Second, our Figure 7C (which was the old Figure 15) shows that our fixed income portfolio share in the baseline is 26%. Thus, our baseline estimate matches the 26.2% share that they cite from the raw series, so the inconsistency is no longer present.

An important point of clarification is that our estimate in Figure 9C for the estate-tax-based fixed-income share is a *mortality-rate-adjusted* share of 17.3%. SZ previously called for using mortality weight adjustments: p. 549 of SZ says “one should weight matched estate-income observation by the inverse of the mortality rate conditional on age, gender, and wealth. We leave this difficult task to future research.” Targeting this *mortality-rate-adjusted* estate-tax fixed income share would require higher, not lower top interest rates (since higher rates would correspond to smaller top fixed income assets).

***Capitalizing passthrough interest at 3% (a reasonable upper bound in light of the above evidence) instead of 6% adds around \$0.5 trillion to the wealth of the top 0.1% in 2016. This closes the residual gap between SZZ and the original Saez-Zucman series—while reconciling SZZ with evidence from partnership tax returns, hedge funds SEC reports, S-corporation tax returns, and estates tax returns.***

We provide alternative estimates following your suggestion of haircutting the partnership information returns rates. We did not use this 3% approach in part because it is hard to implement systematically in years before 2016. Instead, we implement this idea by using the smaller of the lower-bound of the minimum distance estimates and the boutique rates since this provides a conservative estimate and is implementable in the time series. We show that using this approach lowers our top 0.1% estimate by 0.3 percentage points. Rows 15-17 show how this approach affects key results in Table 3 Panels (a), (b), (c), and (d).

The reason why our baseline estimates are not as sensitive to small changes  $\delta$  in the top interest rate is that the capitalization factor  $\left(\frac{1}{r+\delta}\right)$  is much more sensitive at low rates than at high rates. For example, if  $r = 1\%$  initially, a 1.0 percentage point perturbation changes the capitalization factor from  $100 = \left(\frac{1}{.01}\right)$  to  $50 = \left(\frac{1}{.01+.01}\right)$ , whereas the same perturbation only increases the capitalization factor by 5 units if the initial  $r = 4\%$  as  $25 = \left(\frac{1}{.04}\right)$  and  $20 = \left(\frac{1}{.04+.01}\right)$ . In the former case, a dollar of interest income amounts to \$50 of additional wealth, whereas in the latter case a dollar amounts to only \$5 of additional wealth. Thus, as we mentioned above, alternative approaches such as using our minimum distance estimates or even the lower-bound of our minimum distance estimates from section 2, have modest effects on top wealth shares relative to estimates from our information-returns based approach.

Figure 4C shows the effects on top 0.1% wealth shares of using more conservative top rate estimates. For example, as we discuss in the results section 3.4, using the 10-year Treasury rate for those in the top 1% (ranked in terms of baseline non-interest wealth) would increase the top 0.1% share by 0.7 percentage points relative to our baseline approach in 2016.

We hope you agree that these results allow readers to see the effects of a wide range of top rate estimates.

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