For Online Publication

This appendix supplements our paper "Capitalists in the Twenty-First Century" with the following sections:

- Section A provides institutional detail.

- Section B details variable definitions and additional data construction steps.

- Section C uses the Piketty, Saez and Zucman (2018) (henceforth PSZ) published appendix to illustrate that pass-through income is large in top imputed national income.

- Section D explains our replacement of PSZ's extrapolated wealth data 2011–2014 with actual aggregate wealth estimates, which affects the composition of top equity incomes in imputed national income.

- Section E documents that realized capital gains often do not reflect C-corporation income and that using 100% of realized capital gains to impute retained earnings may allocate too much retained earnings to top earners.

- Section F studies the relative importance of pass-through and C-corporation income under different assumptions for imputing C-corporation retained earnings. This section explains and replicates the imputed national income estimates for business income in PSZ. It then quantifies the level and growth of top 1% retained earnings under alternative scenarios.

- Section G discusses other types of capital income in imputed national income that do not appear in fiscal income.

- Section H contains supplemental robustness analyses.

- Section I contains appendix figures.

- Section J contains appendix tables.

A   Detail on How U.S. Businesses Are Organized and Taxed

A.1   Detail on how U.S. Businesses Are Organized and Taxed

This subsection provides additional detail on sole proprietorships, the tax treatment of different business entities and types of compensation, and more background on policy changes.

Sole proprietorships   There are other types of businesses besides C-corporations, S-corporations, and partnerships.[61]   For example, sole proprietorships (e.g., self-employed house cleaning enterprises) are unincorporated business entities owned by individual taxpayers. Their annual income is taxed at ordinary personal income tax rates at the owner level on Form 1040, Schedule C. Sole proprietors lack limited liability and sole proprietorship dividends are not taxed.[62]

Tax Treatment by Corporate Form   We describe the tax treatment as of 2014, which is the most recent year for which tax data are available.

Considering only federal taxes for simplicity, C-corporations pay the corporate income tax, which is a nearly flat 35% rate on their annual taxable income, and their owners are liable for the dividend income tax or capital gains tax (23.8% in the top personal bracket, which includes the 2013 Affordable Care Act (ACA) surtax of 3.8% on investment income) on the remaining 65% of income when it is distributed to owners. These taxes amount to an estimated all-in top tax rate on C-corporations of 44.7%.[63]   Partnerships typically enjoy lower taxes than identical C-corporations: annual partnership income is taxed at the owner level at ordinary income tax rates and self-employment tax rates (totaling 43.4% at the top),

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[61]Other entity types include regulated investment companies (RICs), real estate investment trusts (REITs), real estate mortgage investment conduits (REMICs), and disregarded entities.

[62]Note that, as pointed out by Thomas Brennan, one can use an LLC and check the box to treat sole-proprietorships as a disregarded entity. We thank him for his close reading of the institutional detail section and many helpful comments.

[63]Economists typically assume that half of distributions face the statutory dividend tax rate while the other half is taxed at one quarter of the capital gains tax rate due to tax deferral from retained earnings and other avoidance. The estimate 44.7% equals $35\% + 65\% \times (.5 \times 23.8\% + .5 \times \frac{1}{4} \times 23.8\%)$.

with no other income taxes or taxes on distributions.[64]

S-corporations usually face the weakly lowest taxes. S-corporation income is taxed identically to partnership income, except that if the owner "materially participates" in the firm's operation, the income is classified as active ("non-passive") income and faces only the ordinary income tax (39.6% at the top).[65] Owners determine their material participation status, which typically requires the owner to supply at least 500 hours of labor to the firm in the year the income was earned. Owners face tax incentives to classify themselves as material participants in order for their income to be deemed active and face lower taxes.[66] Note that whereas a partnership owner typically faces identical taxes when receiving her income as W-2 wage income and business income, an S-corporation owner faces lower taxes when receiving her income as business income.

Policy Changes   Historically, U.S. business activity was largely organized in one of two forms: sole proprietorships (accounting for 25% of 1985 taxable business income) or C-corporations (accounting for 75%) (Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick, 2016; Clarke and Kopczuk, 2017).

The Tax Reform Act of 1986 lowered the top individual tax rate below the corporate tax rate and raised relative tax burdens on C-corporations. These rate and base changes resulted in the steady growth of the pass-through sector. There are other policy changes the affected S-corporations and other pass-throughs.[67] In 1993, the cap on wage taxes for Medicare was removed, which provided additional incentive to receive compensation in the

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[64]This tax treatment applies to general partners. Limited partners are exempt from self-employment taxes but are subject to the Net Investment Income Tax, which also yields a top rate of 43.4%. Limited partners can sometimes be classified as non-passive and therefore taxed at 39.6% at the top, like non-passive S-corporation owners. However, owner-managers typically must be classified as general partners.

[65]Passive S-corporation owners are subject to the Net Investment Income Tax, which yields a top rate of 43.4%.

[66]An S-corporation owner-manager's W-2 compensation is required to be "reasonable" and to reflect the market-value of labor services. The IRS rarely adjusts tax liabilities by deeming W-2 compensation to be unreasonable. Before the Net Investment Income Tax of 2013 that assessed a surtax on passive but not active S-corporation income, the incentive to declare one's S-corporation income as active rather than passive was limited to deducting active losses from one's other active income like wage and salary income. Auten, Splinter and Nelson (2016) document shifting of passive to active S-corporation income in response to the 2013 change.

[67]We thank Thomas Brennan for pointing out many of these changes, some of which we hadn't highlighted in the previous version of the draft. Nelson (2016) provides a detailed account of how rules governing S-corporations have evolved over time and have generally made adopting this form more favorable.

form of S-corporation profit as S-corporation profits do not face the 2.9% Medicare tax. From 2001 to 2003, the top rate on personal income declined from 39.6% to 35%, which increased the relative attractiveness of pass-through corporate forms. However, over that same period, the dividend tax rate was cut from 39.6% to 15%, increasing the relative attractiveness of C-corporations. In 2004, the AJCA relaxed S-corporation rules in the following ways: up to 100 owners were allowed, "families" count as one owner, ESOP restrictions were relaxed, bank S-corporations were allowed, and IRA ownership of bank S-corporations were allowed. From 2009-2015, there were reductions in the holding period required for built-in-gains. Finally, as mentioned above, the introduction of ACA taxes in 2013 includes an effective 3.8% tax on wages and dividends, but active S-corporation income does not face this additional 3.8% tax.

B   Data Appendix

Variable Definitions

This appendix subsection defines variables in the linked firm-owner-worker data, introduced in Section 1.3. All variables are annual and are available in all years. Year refers to calendar year, which by law is also each S-corporation's and partnership's fiscal year. All dollar values are inflated to 2014 dollars. Deflators were calculated using price data from the BEA Table 1.1.4 ("Price Indexes for Gross Domestic Product").

1. Firm-level.   A *firm* is an S-corporation or partnership. *Sales* is the firm's operating revenue (gross sales minus returns) as listed on the 1120S or 1065. For example, see Form 1120S line 1a-1b. Passively earned income (e.g., interest on bank deposits) is excluded. *Profits* is the firm's ordinary business income, equal to operating revenue minus costs as listed on the 1120S or 1065. *Costs* equals the sum of inputs (cost of goods sold), employee and owner wage compensation, rent, interest, capital asset tax depreciation, and other deductions related to ordinary business. Profits are divided among owners (pro rata according to ownership stakes at S-corporations) on Forms K-1, which owners then include on their Form 1040, Schedule E. Hence, except for Form 1040 loss limitations, profits are exactly the S-corporation and partnership income concept that appears as pass-through income on personal income tax returns.

Profits per worker equals profits divided by the number of workers. *Number of workers* and *number of employees* equals the number of individuals who received a W-2 from the firm that year. *Industry* is the four-digit North American Industry Classification System (NAICS) code reported by the firm on its 1120S or 1065 as corresponding to its principal business activity. A firm is a *top-owned firm* if it has an owner in the top 1% or top 0.1% of the income distribution. Million-dollar owners are with over one million dollars in income.

2. Owner-level.   A firm owner is a *top 1% owner*, a *top 1-0.1% owner*, or a *top 0.1% owner* if her tax unit's fiscal income lies in a year's top 1%, the top 1% but not the top 0.1%, or the top 0.1% of all tax units in the year, respectively. She is a million-dollar earner

if her tax unit's fiscal income exceeds one million dollars. *Pass-through income* equals the owner's share of the profits from the pass-through. *Owner wages* equals W-2 payments from the pass-through, as reflected in merged W-2 records. *Entrepreneurial income* equals pass-through income plus owner wages. An owner's pass-through income is reported as *active* if the owner reports any of her pass-through income in the personal income tax return boxes indicating material participation (typically at least 500 hours over the calendar year) in the operations of any of her pass-throughs and is reported as *passive* otherwise. Owners face tax incentives to classify themselves to classify themselves as material participants in order for their income to be deemed active and face lower taxes.[68]

Imputations for Owner Wages

Before merging owner wages from our linked-firm-owner data to our top incomes data, we impute owner wages to some rows. As explained in Section 1.3, some firms pay W-2 wages but cannot be linked to any W-2s. We start by dividing all individuals in the linked-firm-owner-worker data into two groups: candidates for imputation and non-candidates for imputation. We define candidates for imputation as all owners of firms that (a) deducted salaries-and-wages, officer compensation, or guaranteed payments to partners from their pass-through tax returns and (b) were not linked to any W-2s. All other individuals are non-candidates for imputation. For every non-candidate, we compute the owner-wages share of the owner's total wages.[69] Many non-candidate observations have owner-wages share of 0.

We then impute owner wages to candidates for imputation as follows. We group all firm-owner observations into bins defined by year, organizational form (S-corporation or partnership), type and number of owners (passive, active and the firm has only 1 owner, active and the firm has 2 owners, active and the firm has 3-4 owners, or active and the firm has

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[68]Before the Net Investment Income Tax of 2013 that assessed a surtax on passive but not active S-corporation income, the incentive to declare one's S-corporation income as active rather than passive was limited to deducting active losses from one's other active income like wage and salary income. After the NIIT, active S-corporation income enjoyed lower taxes than passive S-corporation income; the same distinction was not applied to partnership income. Auten, Splinter and Nelson (2016) document shifting of passive to active S-corporation income in response to the 2013 change.

[69]An owner who received wages only from a firm she owns has an owner-wages share of 1. An owner who received no owner wages has an owner-wages share of 0. An owner who received owner wages and wages from another firm has an owner-wages share $\in (0, 1)$.

5 or more owners), and firm sales bin ($0-100K, $100-500K, $500K-1M, $1M-5M, $5M-50M, and $50M+). Then for every candidate observation, we find the non-candidate observation within the same group that has the closest total owner wages and impute owner wages equal to the product of the non-candidate's owner-wages share and the candidate's total wages.[70] This procedure ensures that the distribution of imputed owner wages exactly replicates the distribution of directly observed owner wages, including numerous zeros. Finally, we merge owner wages from the linked data to the top incomes data by owner-masked SSN. If an individual in the top incomes data does not match to the linked data, she is assigned owner wages of zero.

Imputations for Private C-Corporation Wages

Our second robustness analysis of Section H.2 required us to identify 2014 top earners whose highest-paying W-2 was issued by a private C-corporation. We identify them in five steps. First, we compile a list of the universe of 2014 businesses, including C-corporations, S-corporations, partnerships, and non-profits. Second, we define private C-corporations as all C-corporations whose EINs do not appear in Compustat. Third, we merge our universe of businesses to our top incomes data by the EIN on individuals' highest-paying W-2 and thereby classify 8.1% of top 1% individuals (by imputed national income) as being paid wages by a private C-corporation.

At this point in the procedure, a substantial share of individuals with a W-2 are "ghost payees": they were not matched to any business in step 3, either because they were government employees (and thus were correctly unmatched to a business) or because their non-government employer issued W-2s under a different EIN from the one under which it paid taxes (and thus were erroneously unmatched to a business). Similarly, many private C-corporations are "ghost payers": they deducted wages and salaries or officer compensation on their tax returns but matched to no W-2 in the universe of W-2s, suggesting that they issued W-2s under a different EIN from the one under which it paid taxes. There are thus

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[70]Consider an example. Suppose that in 2014, Jane Doe had $100,000 in total wages and was an owner of the S-Corporation Acme Inc. Acme deducted officer compensation but was linked to no W-2s. Suppose that the nearest non-candidate owner in Jane's group had $100,002 in total wages, $50,001 of which came from the S-corporation. Then we would impute $50,000 of owner wages to Jane.

likely missing matches between private C-corporations and our top incomes data.

In our fourth step, we impute those missing matches by assuming that—within size bins—the match rate between ghost payers and ghost payees is the same as between directly observed private C-corporations and eligible top earners, in the third step above. Specifically, we divide top-earning individuals into three income bins based on imputed national income: those in the top 1% but with less imputed national income than \$1M, those with greater than \$1M but not in the top 0.1%, and those in the top 0.1%. We divide all private C-corporations into five firm size bins based on the sum of their deducted wages and salaries and officer compensation: \$0, (\$0,\$100K], (\$100K,\$1M], (\$1M,\$10M], and \$10M+. Within each income bin b, we compute the weighted number $matched_{bf}$ of individuals who matched to a private C-corporation by firm size bin f. We then impute private-C-corporation-payer classification to the weighted number $matched'_b$ of ghost payees in each income bin b:

$$matched'_b = \sum_f matched_{bf} \times \frac{NumGhostPayers_f}{NumNonghostPayers_f}, \tag{4}$$

where $NumGhostPayers_f$ is the number of private C-corporations in size bin f and $NumNonghostPayers_f$ is the number of all other private C-corporations in size bin f. We therefore classifiy a large number of ghost payees as having a private C-corporation payer to the extent that a large number of similar-earning individuals were matched directly to a private C-corporation payer and that a large number of private C-corporations were ghost payers. This imputation step classifies an additional 4.9% of top-1% individuals as having a private C-corporation payer.

In our fifth step, we conservatively classify *all* of an individual's wages as capital income if and only if she is classified as having a private C-corporation payer in step 3 or 4 above.

C   Pass-Through Income in Imputed National Income

Pass-through income constitutes one-third (32.5%) of top 1% imputed national income (Figures 1C and 8B). PSZ's Online Appendix Section C.2 focuses on S-corporation income in discussing an earlier draft of our paper and indicates that S-corporation income is a small share of top imputed national income. This appendix uses PSZ's published appendix to reconcile these two facts and show that pass-through income is indeed large in top imputed national income.

Like the current version of our paper, the first version studied all pass-through income. However, for data reasons, the first version focused much of the empirical analysis on S-corporation income. PSZ plot the share of top 1% income over time earned in the form of S-corporation income, non-S-corporation labor income, and non-S-corporation capital income. Figure I.14A replicates Appendix Figure S.34 from PSZ using data from the supplementary spreadsheet.[71] PSZ conclude that S-corporation income is minor.

PSZ do not include partnership or other non-S-corporation pass-through income in their discussion, instead focusing only on S-corporation income. PSZ also divide non-S-corporation pass-through income into 65% labor income and 35% capital income. Including *all* components of pass-through income reveals the large and growing importance of pass-through income for top incomes for two reasons. First, because other components of top labor and capital income have been shrinking over time, the importance of partnerships is muted in PSZ's composite labor and capital income series. Second, fiscal partnership income accounts for 46% of pass-through business income at the top in imputed national income. Our paper's focus on private pass-through business income includes both S-corporations and partnerships.

Figure I.14B uses PSZ's supplementary spreadsheet to modify Figure I.14A by applying shading to the components of labor and capital income that reflect allocations from non-S-corporation pass-through income ("mixed income").[72] Figure I.14C applies the same shading to all pass-through income.

Including partnership and other mixed income makes clear the importance of pass-

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[71]Sheet TB2f in `http://gabriel-zucman.eu/files/PSZ2017AppendixTablesII(Distrib).xlsx`.

[72]In defining mixed income, the supplementary spreadsheet does not separately break out sole proprietor's income and unreported non-corporate-business income from partnership income. This section therefore does not attempt to decompose mixed income further.

through income in imputed national income. Pass-through income has grown dramatically since the 1980s. Pass-through income was less than half the size of other capital income in the 1960s and rose to surpass other capital income briefly in the 2000s. In 2014, one-third of top 1% imputed national income is pass-through income, with the rest split nearly evenly between non-pass-through labor and non-pass-through capital income.

In imputed national income, pass-through income has been secularly rising since 1990, while retained earnings steadily declined from the 1960s and then recovered somewhat since 2000. C-corporation income was much more important for top incomes in the 1960s and 1970s, prior to the 1986 tax reform, than in recent decades. In 2014, pass-through income in imputed national income is much larger than C-corporation income, including imputed retained earnings.

D   Imputed National Income Data Update

For their analysis of the composition of top 1% incomes (Online Appendix Section C.2 and Sheet TB2f), PSZ use actual aggregate S-corporation and C-corportion wealth estimates from the US Financial Accounts for the years prior to 2011. For 2011–2014, PSZ extrapolate top 1% S-corporation and C-corporation wealth: they start with the 2010 values and then grow them using the growth rate of aggregate household equity wealth. We update this series to reflect actual aggregate wealth estimates. This update does not affect an individual's total income; it alters the allocation of that income among sources. See Appendix F for the formulas we use to replicate estimates in PSZ with unextrapolated data.

Figure I.15 presents results of this update. The updated Financial Accounts wealth estimates increase aggregrate S-corporation wealth and reduce aggregate household C-corporation weath. Accordingly, imputed S-corporation income rises by approximately 21%, or $47B, and the sum of C-corporation dividends and retained earnings falls by this amount.

Figures I.16A-B show the effect of this update on relative contributions of S-corporation and C-corporation income to top 1% business income growth. The graph also includes partnership income (first two bars) and other non-S-corporation pass-through income (third bar) to study the evolution of all business income. Figure I.16A focuses on the period from 1990 to 2014 to study the full time series after TRA86 (including transition years). Figure I.16B focuses on the period from 2000 to 2014 (as emphasized by PSZ). For each scenario, we compute the contribution of business income to top 1% income growth (e.g., business income increased by 2.8% of national income from 1990 to 2014) and divide this amount into contributions from each source (e.g., S-corporation income increased by 1.1% of national income from 1990 to 2014, or 40% of the business income increase).

For the time period 2000–2014, the original PSZ series shows S-corporation income contributed 6% to business income growth. Using updated unextrapolated data increases this contribution to 19%. The update increases the total pass-through contribution from 25% to 38% of the growth in total business income over this time. The contribution of C-corporation income contracts symmetrically: in the original PSZ series, C-corporation income contributed 74% to total business income growth; in unextrapolated data, the contribution falls to 61%.

Going back to 1990, the updated series shows a relative contribution of 60% to 63% for pass-through income, up from 51% in the original PSZ series, and 37% to 40% for C-corporation income including retained earnings, down from 49%. Thus, pass-through income is a major contributor to business income growth in the updated data.

E   Imputing Retained Earnings with Realized Capital Gains

The retained earnings of C-corporations is an important component of national income that does not appear in fiscal income. In creating the imputed national income series, PSZ impute retained earnings to individuals based on inferred C-corporation stock that is directly held.[73] Their approach infers aggregate C-corporation ownership using the sum of taxable dividends and 100% of realized capital gains, because C-corporation income can appear on individual tax returns in either form.

Dividends always reflect C-corporation income. This appendix documents that realized capital gains often do not and illustrates the implications for imputing top incomes. Specifically, because realized capital gains are much larger and more concentrated among top 1% earners than dividends, using 100% of realized capital gains to impute retained earnings may allocate too much retained earnings to top 1% earners.

Figure I.17A uses public aggregates from the IRS Statistics of Income for realized capital gains, broken down by asset class.[74] A large share of realized capital gains are not due to the sale of corporate stock. In recent years, the share of net gains attributed to stock sales and mutual funds, most of which is C-corporation stock, is approximately 25%. Another 25% includes directly owned non-C-corporate-stock asset sales, such as real estate and financial securities. The remaining 50% of gains are in the form of pass-through gains, which includes indirectly owned C-corporate stock but also includes indirect ownership of other assets and recharacterized labor income in the form of carried interest for hedge fund and private equity managers. If anything, the importance of C-corporation stock has fallen over time following the stock market boom in the late 1990s.

Hence, 25% to 75% of realized capital gains reflects the sale of C-corporate stock. Figure I.17B plots macroeconomic retained earnings, the household sector's share of macroeconomic retained earnings, and total fiscal realized capital gains over 1962–2014 (all in 2014 dollars).

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[73]The share of C-corporation stock held by pensions and non-profits is imputed to the pension sector and allocated separately as pension income. When PSZ emphasize the importance of retained earnings for top 1% incomes, they refer to the directly held component and not the pension component.

[74]See https://www.irs.gov/statistics/soi-tax-stats-sales-of-capital-assets-reported-on-individual-tax- for the data.

The broad nature of realized capital gains can explain why total realized capital gains of $732B in 2014 vastly exceeds the total household share of retained earnings ($306B). In 2014, total realized capital gains even exceeds the overall macroeconomic flow of retained earnings ($649B). Figure I.17B shows these facts are true in most years between 1962 and 2014. The gap between realized capital gains and the household share of retained earnings widened from the 1980s through the 2000s, suggesting over-allocation of retained earnings to top 1% earners may be increasing over time.

These patterns materially affect top retained earnings imputations in 2014. In the fiscal income inputs to PSZ's imputation, the top 1% receive 74% of the $732B of realized capital gains but only 49% of the $271B of C-corporation dividends. Thus, the top 1% share of allocated retained earnings in imputed national income is $67\%\left(=\frac{\$132B+\$539B}{\$271B+\$732B}\right)$ when using PSZ's 100% assumption. If we instead use 25% of realized capital gains combined with C-corporation dividends when allocating C-corporation retained earnings, the top 1% share of allocated retained earnings is $59\%\left(=\frac{\$132B+0.25\cdot\$539B}{\$271B+0.25\cdot\$732B}\right)$. Hence, imputed national income may allocate too much retained earnings to top 1% earners and not enough to lower earners.

F Imputing Retained Earnings under Alternative Assumptions

This appendix studies the relative importance of pass-through and C-corporation income under different assumptions for imputing C-corporation retained earnings. Section F.1 explains our successful replication of the imputed national income estimates in PSZ. Section F.2 studies the robustness of results to the weight placed on realized capital gains when imputing retained earnings. Section F.3 quantifies the level of top 1% retained earnings in 2014 under alternative scenarios. Section F.4 quantifies the growth of top 1% retained earnings since 1990 and 2000 under alternative scenarios and compares that growth to other components of business income.

F.1 Replicating the INI Retained Earnings Imputation

Overview of calculation. The imputed national income (INI) approach in PSZ uses fiscal income data to build allocation factors and apply these factors to produce a "top down" imputation of all components of national income, which by construction sum to total national income. For equity income, this procedure allocates to different people the aggregate flow of S-corporation income, C-corporation dividends, C-corporation retained earnings, and corporate taxes, which equals $2.15T in aggregate in 2014. The final result is a pretax division of this aggregate flow between S-corporation income, C-corporation dividends, and C-corporation retained earnings. This section replicates PSZ's INI estimates, carefully following the computations in their analysis spreadsheets and replication code.[75]

Imputing retained earnings in 2014. The first step is to compute the share of this $2.15T flow that accrues to the top 1%, which equals 34%. This allocation share equals the sum of estimated top 1% S-corporation and C-corporation wealth divided by macro equity wealth in the household, non-profit, and pension sectors. The top 1% S- and C-corporation wealth estimates capitalize fiscal income following the method of Saez and Zucman (2016).

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[75]The final numbers appear in Sheet TB2f, Columns B through M, in `http://gabriel-zucman.eu/files/PSZ2017AppendixTablesII(Distrib).xlsx`. Note that we convert shares of income to dollars to make comparison of alternative scenarios more straightforward.

In the case of S-corporation wealth, the procedure first allocates macro S-corporation wealth ($2.8T) in proportion to the top 1% share of fiscal S-corporation income (=$229B/$407B=56%). In the case of C-corporation wealth, the procedure first allocates macro C-corporation wealth owned by households ($11T) in proportion to an individual's share of taxable dividends and realized capital gains (=($132B+$539B)/($271B+$732B)=67%). These calculations yield $8.9T of top 1% S-plus C-corporation wealth, or 34% of total macro equity wealth ($26.2T). The top 1% flow of equity income is $733B (= $2.15T×.34).

The second step divides the top 1% flow of equity income ($733B) into proportional contributions from C-corporation retained earnings, C-corporation dividends, and S-corporation income. As above, each source of equity income uses wealth estimates based on fiscal income to apportion macroeconomic flows.

C-corporation retained earnings are defined as macroeconomic retained earnings ($649B) multiplied by top 1% estimated C-corporation wealth ($7.4T) divided by macro C-corporation wealth ($23.4T), yielding $205B. Similar steps yield $177B for C-corporation dividends and $231B for S-corporation dividends. Combining these components yields a retained earnings share of $205B/($205B+$177B+$231B), equal to 33%. The final estimate for retained earnings in the top 1% percent is the product of $733B (the result of the first step) and 33% (the result of the second step), which equals $245B.

General formulas and inputs for top 1% imputed retained earnings. This subsection describes in more detail the imputed national income mapping from raw inputs to imputed retained earnings, in order to clarify how alternative assumptions affect the procedure. This mapping combines data from three sources: fiscal income data, macroeconomic income data from NIPA, and macroeconomic wealth data from the US Financial Accounts.

The mapping begins with a top-level number of macroeconomic income from equity to allocate between S-corporations and C-corporations. The formula for S-corp dividends is the product of an allocation factor and total top 1% income from equity (the formulas for C dividends and retained earnings are analogous):

$$\text{top 1\% S-corp dividends} = \text{S income allocation factor} \times \underbrace{\text{Total top 1\% income from equity}}_{=(\text{top 1\% equity wealth})\times(\text{Aggregate equity yield})}$$

(5)

The S-corporation income allocation factor is the proportional contribution of S-corporation income to top 1% pretax equity income. Total top 1% income from equity equals an estimate of top 1% equity wealth multiplied by an aggregate equity yield, which uses only publicly available macro statistics. Following Saez and Zucman (2016), top 1% wealth is a capitalized wealth estimate, derived by multiplying a flow of fiscal income by a capitalization factor combining fiscal income and macroeconomic wealth statistics from the US Financial Accounts.

Several inputs are required to compute top 1% equity wealth and the aggregate equity yield. We first substitute data series from fiscal income data and macroeconomic data into equation (5). We then rearrange this formula to isolate factors derived from tax data and those from macroeconomic data:

$$= \text{S income allocation factor}$$
$$\times \left[(\textbf{top 1\% S divs}) \times \left(\frac{total\ S\ wealth}{\textbf{total S divs}} \right) + (\textbf{top 1\% C divs} + \textbf{top 1\% cap gains}) \times \left(\frac{total\ C\ household\ wealth}{\textbf{total C divs} + \textbf{total cap gains}} \right) \right]$$
$$\times \left[\frac{(total\ C,S\ divs + retained\ earnings + taxes) \times \left(\frac{household\ equity\ wealth\ FoF}{household\ equity\ wealth\ FoF + pension\ equity\ wealth\ FoF} \right)}{total\ C,S\ household\ wealth} \right]$$

(6)

$$= \text{S income allocation factor}$$
$$\times \left[\left(\frac{\textbf{top 1\% S divs}}{\textbf{total S divs}} \right) \times (total\ S\ wealth) + \left(\frac{\textbf{top 1\% C divs} + \textbf{top 1\% cap gains}}{\textbf{total C divs} + \textbf{total cap gains}} \right) \times (total\ C\ household\ wealth) \right]$$
$$\times \left(\frac{1}{household\ equity\ wealth\ FoF + pension\ equity\ wealth\ FoF} \right) \times (total\ C,S\ divs + retained\ earnings + taxes) , \quad (7)$$

where bold is used to denote tax data and italics denote NIPA and US Financial Accounts data. When neither bold nor italic are used, the item combines both tax and NIPA/Financial Accounts data.

Total top 1% equity equals the sum of top 1% S-corporation wealth and top 1% C-corporation wealth. Top 1% S-corporation wealth equals top 1% S-corporation fiscal income

times total Financial Accounts S-corporation wealth divided by total S-corporation fiscal income. Similarly, top 1% C-corporation wealth equals the sum of top 1% C-corporation fiscal dividends and top 1% realized capital gains times total C-corporation wealth held by households divided by the sum of total C-corporation fiscal dividends and total realized capital gains. The aggregate equity yield equals the macroeconomic flow of dividends plus retained earnings from C-corporations plus corporate tax payments from NIPA divided by total macroeconomic equity wealth owned by households, non-profits, and pensions.

The S-corporation income allocation factor equals $a/(a + b + c)$, where a is the S-corporation allocation component, b is the C-corporation dividends allocation component, and c is the C-corporation retained earnings component. These allocation components are similar to the overall formula for S-corporation and C-corporation income, except they allocate a pre-tax macroeconomic income flow across the income distribution. Each allocation component is defined as an estimate of top 1% wealth in either S-corporation or C-corporation form multiplied by a macroeconomic yield on total S-corporation or C-corporation wealth. In the case of S-corporations, because all wealth is held by households, the formula simplifies to allocating macroeconomic S-corporation dividends (which may differ slightly from fiscal income S-corporation dividends due to a different sampling period) in proportion to the top 1% share of fiscal income S-corporation dividends. In the case of C-corporations, because a substantial share of C-corporation wealth is held outside the household sector, there is a third term that reduces the amount of C-corporation income to the share held directly by households.

The formula for the S-corporation allocation component is:

$$
\begin{aligned}
a &= \text{top 1\% S wealth} \times \left(\frac{total\ S\ divs}{total\ S\ wealth} \right) \\
&= \textbf{top 1\% S divs} \times \left(\frac{total\ S\ wealth}{\textbf{total S divs}} \right) \times \left(\frac{total\ S\ divs}{total\ S\ wealth} \right) \\
&= \frac{\textbf{top 1\% S divs}}{\textbf{total S divs}} \times total\ S\ divs
\end{aligned}
$$

The formula for the C-corporation allocation component is:

$$
\begin{aligned}
b &= \text{top 1\% C wealth} \times \left(\frac{total\ C\ divs}{total\ C\ wealth} \right) \\
&= (\textbf{top 1\% C divs} + \textbf{top 1\% cap gains}) \times \left(\frac{total\ C\ household\ wealth}{\textbf{total C divs} + \textbf{total cap gains}} \right) \times \left(\frac{total\ C\ divs}{total\ C\ wealth} \right) \\
&= \left(\frac{\textbf{top 1\% C divs} + \textbf{top 1\% cap gains}}{\textbf{total C divs} + \textbf{total cap gains}} \right) \times \left(\frac{total\ C\ household\ wealth}{total\ C\ household\ wealth + total\ C\ pension\ wealth} \right) \times total\ C\ divs
\end{aligned}
$$

The formula for C retained earnings from the allocation component is:

$$
\begin{aligned}
c &= \text{top 1\% C wealth} \times \left(\frac{retained\ earnings}{total\ C\ wealth} \right) \\
&= \left(\frac{\textbf{top 1\% C divs} + \textbf{top 1\% cap gains}}{\textbf{total C divs} + \textbf{total cap gains}} \right) \\
&\quad \times \left(\frac{total\ C\ household\ wealth}{total\ C\ household\ wealth + total\ C\ pension\ wealth} \right) \times retained\ earnings
\end{aligned}
$$

Figure I.18 implements these formulas and compares the replication of the final imputed income estimates to those in PSZ's appendix spreadsheet, converted to dollars to aid comparison of alternative scenarios. The replication closely matches the imputed national income estimates in PSZ.[76]

F.2 Imputing Retained Earnings with Different Weights on Realized Capital Gains

Figures I.19A-C plot the equity-income-component series under alternative methods for using realized capital gains to allocate C-corporation ownership shares. The graphs compare a dividends-only method to scenarios that use dividends plus 25%, 50%, or 100% of realized capital gains. We make these adjustments for wealth estimates used in both the allocation and total equity income components of the imputed national income formulas above. For comparison purposes, we also plot a Fiscal Income + RE + Tax scenario, which uses fiscal income data for S-corporation dividends, C-corporation dividends, and partnership income; allocates C-corporation retained earnings in proportion to the household share of

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[76]Slight differences appear in the graph; there are minor discrepancies in the underlying raw micro and macro files we were given by PSZ. Note this replication seeks to match PSZ's appendix spreadsheet estimates, including estimates from 2011–2014 based on extrapolated wealth data. Below, we present series with unextrapolated wealth inputs.

C-corporation dividends; and allocates corporate tax in proportion to these pre-tax figures. See Online Appendix E for additional details.

The figures display a wide range in top 1% C-corporation dividends and retained earnings under alternative scenarios. Top 1% S-corporation income is largely unchanged, though the Fiscal Income + RE + Tax scenario shows greater volatility during the recent recession. In 2014, top 1% C-corporation dividends vary from $145B in the dividends only scenario to $182B when 25% of realized capital gains are used to $212B when 100% of realized capital gains are used. For retained earnings, the dividends only scenario yields $167B versus $210B when 25% of realized capital gains are used versus $245B when 100% of realized capital gains are used. The Fiscal Income + RE + Tax scenario yields $150B for top 1% C-corporation dividends and $170B for top 1% retained earnings.

F.3   Quantifying Top 1% Retained Earnings and Pass-through Income in 2014

Figures I.20A-B explore the relative importance of the components of top 1% business income in 2014 under a range of assumptions for imputing retained earnings. The **PSZ (2018)** series presents the imputed national income estimates from PSZ's paper as published, including S-corporation income ($229B), C-corporation dividends ($234B), and C-corporation retained earnings ($270B). Partnership income ($174B) equals fiscal partnership income (without adding a tax imputation) using INI ranks and household definitions to identify the top 1% percent.[77] The **PSZ Updated** series updates the INI series in PSZ (2018) to reflect unextrapolated aggregate wealth estimates. When combined with fiscal partnership income, top 1% pass-through income in this series ($450B) roughly equals C-corporation dividends plus retained earnings ($457B). See Online Appendix D for additional details.

The next series (**Fiscal Income + RE + Tax**) presents a "bottom up" approach that reports raw fiscal income for S-corporation dividends, partnership income, and C-corporation dividends. For C-corporation retained earnings, we allocate a share of macroeconomic retained earnings in proportion to fiscal C-corporation dividends only. We then allocate cor-

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[77]Using fiscal partnership income here is conservative relative to imputed mixed income, which is considerably larger.

porate tax to each component in proportion to these pre-tax figures. This series retains the ranking and household definitions in INI. The next series (**PS (2003) Ranks**) applies the Fiscal Income + RE + Tax method but uses the Piketty and Saez (2003) method to sort households using fiscal income excluding capital gains and define households as tax units, thereby determining which units are considered top 1%.

The remaining series apply the extrapolation update and modify the method for imputing components of equity income. The **Divs Only (A+W)** ("A" for Allocation, "W" for Wealth) series uses fiscal C-corporation dividends (and not realized capital gains) to compute C-corporation dividend and C-corporation retained earnings allocation factors (in step two above) and to compute top 1% equity income (in step one above)—i.e., it only uses the ownership composition of fiscal C-corporation dividends to estimate top 1% C-corporation wealth. The **Divs + 0.25 CapG (A+W)** and **Divs + 0.5 CapG (A+W)** use the sum of dividends and 25% or 50% of realized capital gains to compute allocation factors and top 1% equity income.

The **Divs Only** series uses fiscal C-corporation dividends only when computing the allocation factors, but leaves top 1% equity income unchanged. The **Add Pships** series introduces partnership income as a fourth allocation component and adds this income to total equity income to be allocated, thus treating partnership income as a type of business income to be allocated similarly to S-corporation and C-corporation income. The **Divs Only, Pships** series uses both the Divs Only method for allocation and the Add Pships method to include partnership income. Finally, the **Divs Only (A+W), Pships** ("A" for Allocation, "W" for Wealth) series applies the Divs Only, Pships method and further uses the Divs Only wealth estimates to compute top 1% equity income.

The analysis delivers three findings. First, across scenarios, pass-through income is quantitatively important for top 1% incomes and usually larger than C-corporation income including retained earnings. Estimates of top 1% C-corporation income are sensitive to imputation assumptions.

Second, using only dividends to allocate retained earnings delivers estimates for top 1% C-corporation dividends closer to observed taxable dividends.[78] C-corporation dividends

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[78]If one were to shrink top dividends and inflate top retained earnings, then one would be assuming a

in the PSZ Updated series are \$212B, which exceeds by 46% the \$145B in the Divs Only (A+W) series and by 41% the \$150B in the Fiscal Income + RE + Tax series. Corresponding estimates of top 1% retained earnings range between \$135B and \$215B. The estimate from the Fiscal Income + RE + Tax series is \$170B. Refinements that incorporate partnership income reduce the relative contribution and possible bias from estimated top 1% C-corporation wealth in the calculation of total equity income.

Third, ranking effects are relatively modest. Comparing the PS (2003) series to the Fiscal Income + RE + Tax series, C-corporation dividends and imputed retained earnings fall 19% and 14%, S-corporation income falls 24% from \$306B to \$233B, and partnership income falls 14% from \$229B to \$198B.

F.4 Quantifying the Growth of Retained Earnings

Following the alternative imputation approaches described in the prior section, Figures I.21A-E illustrate the range of implied relative contributions to top 1% income growth from pass-through and C-corporation income.

Figures I.21A, I.21B, and I.21C respectively present the time series from 1990 to 2014 of S-corporation income, C-corporation dividends, and C-corporation retained earnings. Figures I.21D and I.21E quantify the relative contributions from S-corporation income, partnerships, and C-corporation income to overall business income growth, following the same approach as in Figures I.16A and I.16B.

The data support PSZ's finding on the large role in recent years of C-corporation income growth. C-corporation income accounts for 61% in the PSZ Updated series, 49% in the Fiscal Income + RE + Tax scenario, and always at least 44%. Retained earnings account for more than two-thirds of C-corporation income growth since 2000.

In the time series, the year 2000 appears to be a local minimum for C-corporation income, likely driven by business cycle fluctuations. Starting in other nearby years yields smaller relative growth contributions for C-corporation income. Going back to 1990, pass-through income growth exceeds C-corporation growth across scenarios. In the Fiscal Income + RE

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different dividend payout ratio among top-owned C-corporation equity than bottom-owned C-corporation equity.

+ Tax scenario, pass-through income accounts for 67% of the growth since 1990 and 51% of the growth since 2000. S-corporation and partnership growth have provided approximately equal contributions to this growth.

G Other Capital Income in Imputed National Income

PSZ identify the rise of retained earnings since 2000 as the key discrepancy between a fiscal-income-based analysis and an imputed-national-income-based analysis. They write the "macro flow of retained earnings amounts to 5.1% of national income (on average over 2010–2014)," and that this flow contributes 1.2 points to the overall 1.9 point increase in the top 1% share in the PSZ series. For this reason, the prior appendices focus on this component of capital income.

PSZ also write about missing tax-exempt capital income more broadly, noting that observed ordinary capital income misses "two-thirds of economic capital income." In imputed national income, many of the largest components of national income not included in fiscal income are allocated roughly in proportion to fiscal income, including public goods spending, the government deficit, certain taxes, and pension benefits. Allocating these components alters the level of income but not its distribution.

The other components of capital income PSZ mention—imputed housing rents, capital income paid to pension funds, dividends and interest retained in trusts, and corporate taxes— are less important than retained earnings, as shown in the analysis of the composition of top incomes in fiscal income and imputed national income in Figure 1 of our paper:

- *Imputed housing rents.* While a large portion of unobserved capital income, imputed housing rents are broadly held among the top 50% of the population.

- *Capital income (interest and dividends) paid to pension funds.* In fiscal income, defined contribution pensions show up when beneficiaries take distributions. These flows are therefore captured by fiscal income. In imputed national income, pension benefits are allocated in proportion to contributions, proxied by the distribution of taxable wage income. As wage income is more broadly distributed than taxable capital income, this approach has a small effect on the top 1% income composition (as noted in PSZ, footnote 52, p.589, and discussion on p.577, Section IV.A).

- *Dividends and interest retained in trusts.* We have not conducted a full reconciliation for how this income is distributed in imputed national income. At least some of the

income flows through to tax returns and therefore appears in fiscal income. Of the components responsible for top 1% income growth in imputed national income, this item does not appear as a central driver.

- *Corporate tax.* Corporate tax receipts have been falling over time and thus cannot account for the growth in top 1% incomes observed in imputed national income. The retained earnings allocations in the prior sections account for corporate tax distributed across the pass-through and C-corporation sector, consistent with imputed national income estimates in PSZ.

When combined, these components very modestly contribute to top 1% income growth over time and remain smaller than either C-corporation or pass-through income. The key excluded component driving the difference between fiscal income and imputed national income is the allocation of C-corporation retained earnings.

Two additional comments regarding these series deserve mention. First, there is a large gap between pass-through income in imputed national income and in fiscal income, despite the fact that in principle all of this income should appear on tax returns. We believe this gap owes primarily to the allocation of underreported income included in proprietors' income in the national accounts. Auten and Splinter (2017) identify this factor as the most important difference between their estimate of the top 1% share and imputed national income in PSZ. While large, this component did not grow disproportionately over the 1990–2014 period, so focusing on the fiscal partnership income series does not affect our main conclusions (see Figures I.16A-B).

Second, the largest component of non-business capital income that differs from fiscal income and contributes to top 1% growth is interest income. We have not conducted a full reconciliation for this series. With imputed national income ranks, the taxable interest series is substantially lower than the imputed national income series and fell as a share of national income in recent decades. Further evidence of how interest income not present on tax returns is distributed would be valuable.

H   Supplemental Analyses

H.1   Heterogeneous Profitability is Not Risk

Does high profitability at top-owned firms reflects payment for higher undiversifiable risk? For example, if top-owned firms have a higher probability of failure, owners could be compensated for that risk by higher profitability in years of survival. The blue circles (left axis) in Figure I.13 plots the share of year-2001 firms in the main sample that had exited the sample by 2014 (which typically indicates failure) versus 2001 owner personal income rank, weighting by the firm's 2001 number of workers. Rather than experiencing higher exit rates than average, top-owned firms experienced lower exit rates than average. This finding suggests that top-owned firms exhibit higher profitability and lower risk.

Whereas the exit rate measure proxies for risk along the extensive margin of firm exit, we employ a second measure that proxies for risk: a version of the Sharpe ratio, computed within each personal income bin. The Sharpe ratio—defined as an asset's mean return divided by the standard deviation of its returns—is commonly used in finance to assess whether an asset's return compensates for its risk. A high Sharpe ratio indicates returns in excess of what one would expect given the risk. In our context, higher Sharpe ratios among top-owned firms would indicate that top-owned firms' high profitability more than sufficiently compensates their owners for their risk. For each year 2011–2014 in the main sample, we compute each personal income bin's Sharpe ratio as the ratio of employment-weighted mean profitability to the employment-weighted standard deviation of profitability across owner-firm observations. We then average those within-bin Sharpe ratios evenly across years and plot the means in the green triangles (right axis) of Figure I.13. Top income bins have higher standard deviations of profitability, indicating somewhat higher risk. However, profitability is so much higher in top income bins that we find higher Sharpe ratios among top-owned firms. This finding suggests that higher risk does not explain higher profitability among top-owned firms.

H.2 The Human-Capital-Rich Finding Is Robust

Figure 7 used our preferred estimate of 75% for the human capital share of pass-through income. Seventy-five percent is the average of the six estimates—two estimates for each of three income groups—presented in Table 4. Online Appendix Figure I.7 repeats Figure 7 when using the minimum estimate from Table 4 for each income group. Specifically, in Online Appendix Figure I.7, the top 1% bars classify 59.6% of pass-through income as labor income, the million-dollar-earner bars classify 81.6%, and the top 0.1% bars classify 71.7%. In each of the six permutations plotted in Online Appendix Figure I.7, most top earners are human-capital rich.

As discussed in Section 3.3 and by PSZ, the same tax considerations that apparently lead human capital returns among pass-through owners to be characterized as profits can work in reverse at private C-corporations. The wages of private C-corporation owners may therefore contain non-human-capital returns, leading us to classify some top earners as human-capital rich when they are in fact financial-capital rich.[79] Online Appendix Figure I.10 therefore repeats Figure 7 under the conservative assumption that *all* of an individual's wages are capital income and not labor income, if her highest-paying W-2 was issued by a private C-corporation. We did so by merging the universe of Employer Identification Numbers (EINs) from private C-corporation tax filings to the EIN on the highest-paying W-2 of each top earner with a W-2, accounting for the fact that not every private C-corporation can be matched to its W-2s. See Online Appendix B for details. In each of the six permutations plotted in Online Appendix Figure I.10, we continue to find that a majority of top earners are human-capital rich.

H.3 Pass-through Growth Not Just a Reporting Phenomenon

The rising top pass-through income documented in Section 5.1 partly reflects relabeling of business income, as businesses reorganized from C-corporation to pass-through form and entrants increasingly chose pass-through form following the Tax Reform Act of 1986. We now quantify how much of the rise in top pass-through income is in fact a real economic

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[79]Owners of public firms are too numerous to plausibly each receive a W-2 from the firm in order to avoid taxes.

phenomenon.

Figure I.11A uses public SOI aggregate statistics from 1980–2012 to plot the pass-through (S+P) share of three measures of total (C+S+P) corporate and partnership activity: the total number of firms, total profits, and total sales. Figures I.11B-D focus on the period 2001–2014 during which our linked firm-owner data are available. The pass-through share of total business sales—which rose from approximately 10% in the mid-1980s to 20% in 1990 to 35% in recent years—indicates that some share of rising top pass-through income is an artifact of changes in the organizational form through which business income is reported. Figure I.11B shows the rapid increase from 2001 to 2014 in the number of pass-throughs is due mostly to firms that are not owned by top earners.

Figure I.11C decomposes the level of pass-through profits between 2001 and 2014 into actual pass-through profits and the share attributed to organizational form changes. To correct for the effect of differential net entry into the pass-through sector, the decomposition assumes the level of pass-through sales remains a constant share of total business sales (including S-corporations, C-corporations, and partnerships) throughout the time period. The top bars represent the share of pass-through profits due to pass-through firms having a higher share of total business sales relative to 2001. Figure I.11D applies the same transformation to decompose the growth in top 0.1% pass-through profits.

Figure I.11C shows that in 2014, the share of profit levels due to organizational form changes was approximately 26%, while 74% of pass-through profits remain under the constant share assumption. In terms of growth, Figure I.11D shows that actual top profits tripled between 2001 and 2014 in real terms, while counterfactual profits rose roughly 240%. Thus, most of the growth in top profits remains after adjusting for corporate form reorganization.[80]

H.4   Appropriate Correction for Firm Reorganizations

An earlier draft of this paper reported -60.7% as the preferred estimate of the profit impact of top 1% owner deaths at S-corporations (Table 4A Column 2 of Smith, Yagan, Zidar and

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[80]We consider an alternative approach to measuring the role of corporate form switching using the population of businesses that switch from C-corporation to S-corporation form between 2001 and 2014. We find that 70% of the growth in S-corporation profits is due to firms that did not switch from C-corporation form during this time.

Zwick 2017). The current version reports -72.9% (Table 4A Column 8) at pass-throughs (S-corporations and partnerships). Most of the discrepancy derives from an inappropriate handling of firm reorganizations (i.e., firm exits that are not shutdowns) in the earlier draft, rather than sample differences. A back-of-the-envelope correction to the earlier draft's estimate nearly yields the current version's -72.9% estimate.

The earlier draft found that 28.6% of firm exits were reorganizations. Thus when computing the preferred impact of an owner death on firm survival, that draft multiplied the naive estimate of -41.0% by .714, yielding -29.3% (Table 4A Column 1 of Smith, Yagan, Zidar and Zwick 2017). Multiplying by .714 was a sensible correction for the extensive margin impact, since only 71.4% of the naive extensive-margin impact was genuine. However, the earlier draft applied the same correction to the Column 2 analysis of profits, which was inappropriate. Column 2 of that table analyzed profits at all firms, regardless of whether they exited and even though 100% of the profit impact at surviving firms was genuine. An appropriate back-of-the-envelope correction would therefore have multiplied *only* the extensive-margin component of the profit impact by .714, not the full impact. Combining estimates from Columns 1-3 from that table, that correction would have yielded: $.714 \times (-12307+5090)/24015/.602 = -70.9\%$.

The current version appropriately handles firm reorganizations in a simpler and more straightforward way: we replace firm profit at each reorganized firm with the last observed profit for that firm following Chetty and Saez (2005). We then run regressions on the replaced data, with no need for post-regression multiplication of the surviving share of firms. See Section 3.1 for more detail.

I   Appendix Figures

Figure I.1: Working-Age Pass-through Owners Prevail at the Top of the Income Distribution

A. Using Primary Earner's Age   B. Using Imputed National Income
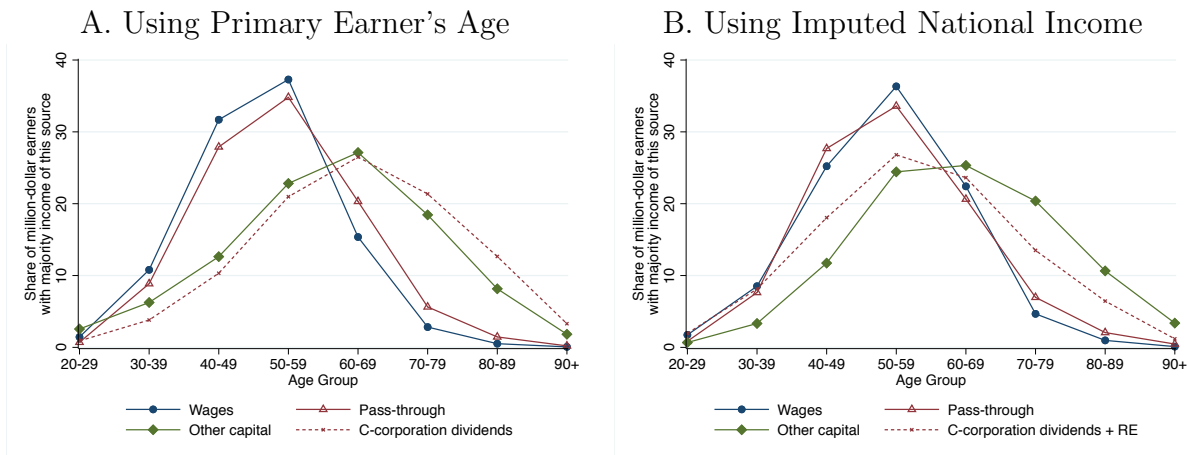
Notes: Panel A replicates Figure 2B when we use the age of the primary tax filer. See the notes to that figure for details. Panel B replicates Figure 2B among million-dollar earners in imputed national income at the individual level.

Figure I.2: Top 1% and Top 0.1% Pass-through Owners are Working Age

A. Top 1%   B. Top 0.1%
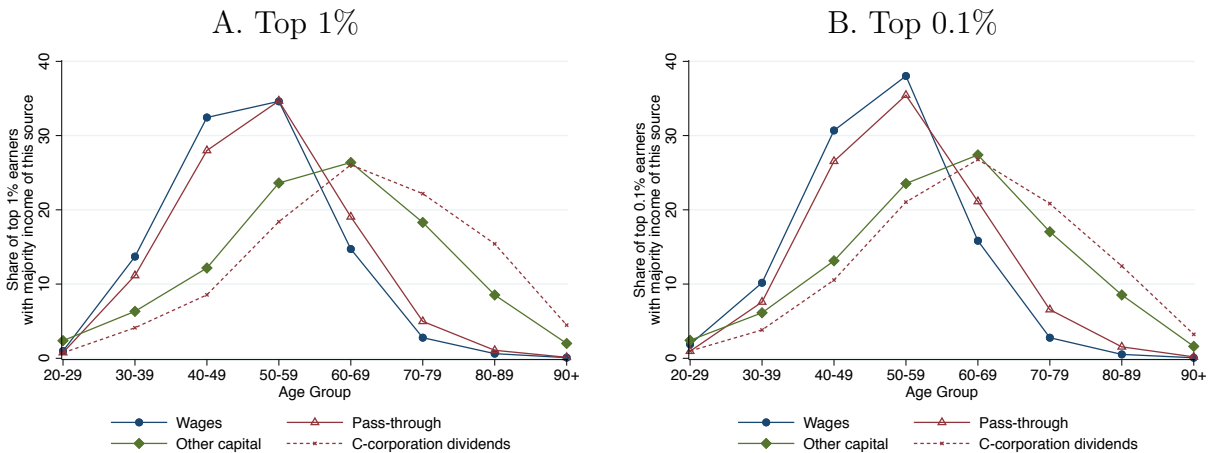
Notes: This graph replicates Figure 2B among the top 1% and among the top 0.1%. See the notes to that figure for details.

Figure I.3: Profit Distribution of Top-owned Firms by Firm Size and Industry

A. Profit Distribution by Firm Size

Top 1%   Top 0.1%
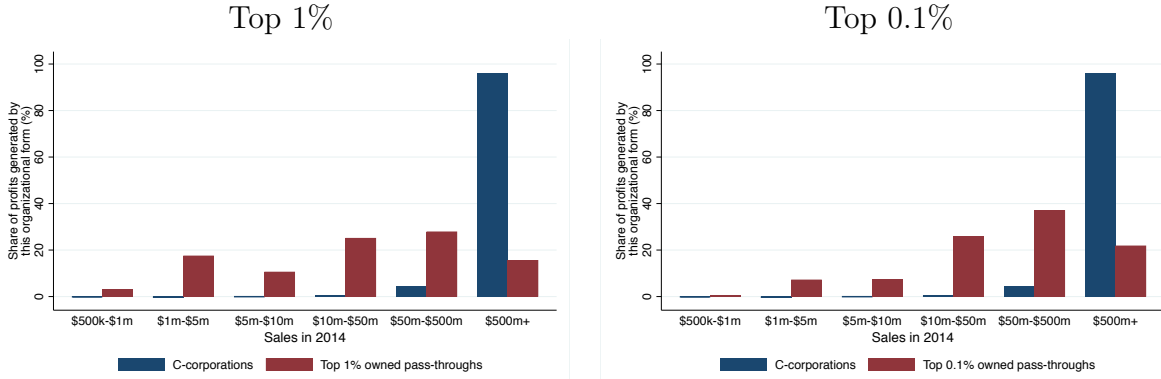
B. Distribution of Profits Across Industries

Top 1%   Top 0.1%
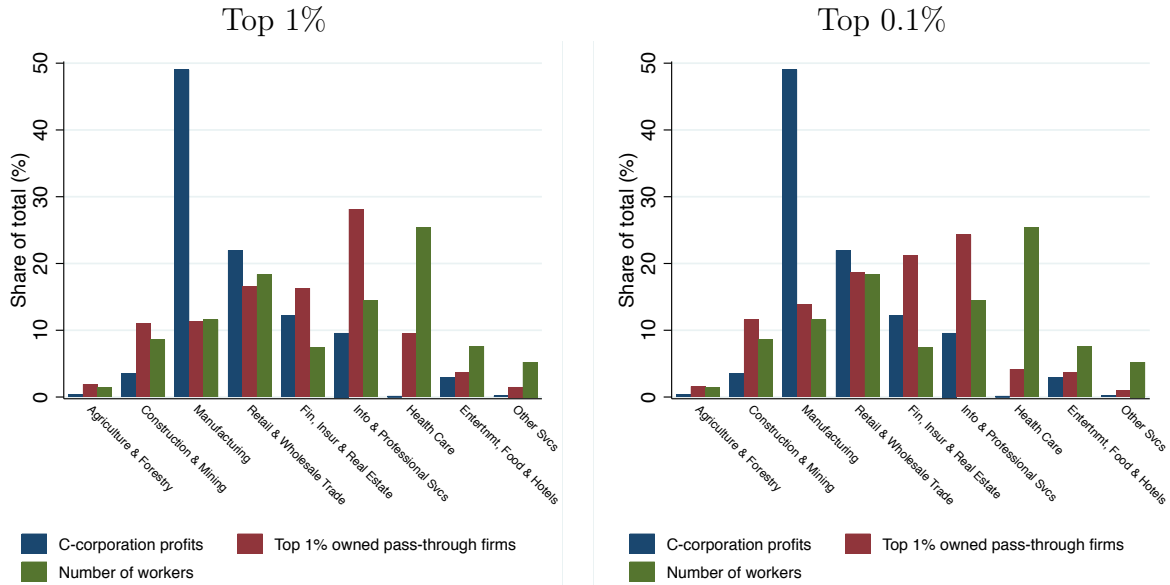
Notes: This figure replicates Figure 3 for the top 1% and top 0.1%. See the notes to that figure for details.

Figure I.4: Profit Distribution of Top-owned Firms by Profit Bin (2014)

A. Top 1%
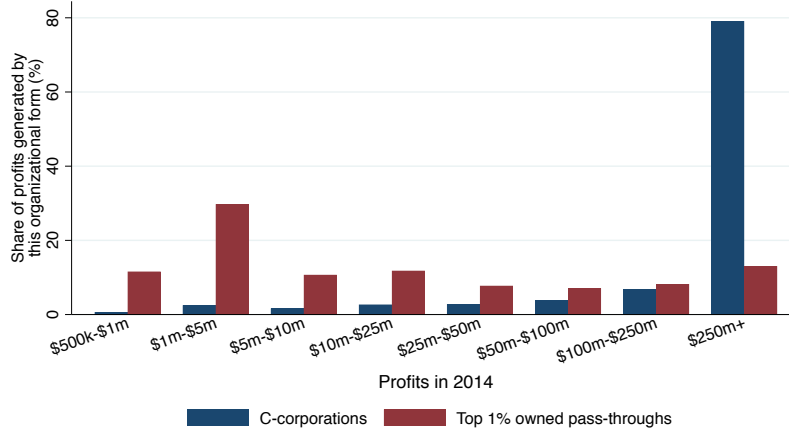
B. Top 0.1%
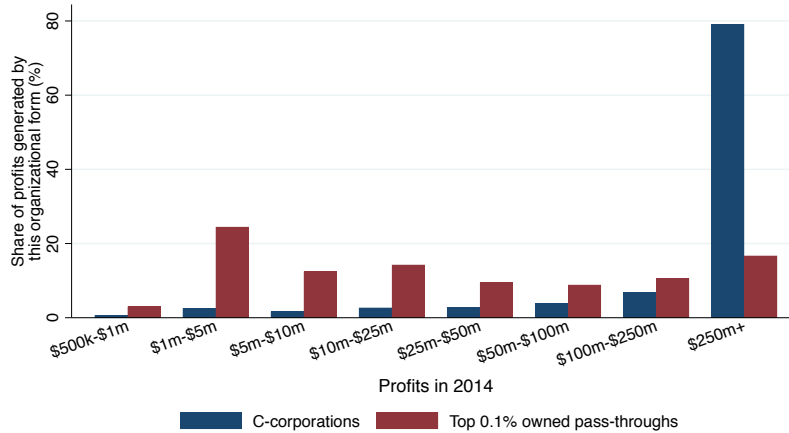
Notes: This figure plots the distribution of profits earned by C-corporations and top-owned pass-through firms in 2014, by total profits and corporate form. The cumulative share of top 1% profits earned by firms with less than $10M in profits is 52.1%. The cumulative share of top 1% profits earned by firms with less than $50M in profits is 71.6%.

Figure I.5: Spatial Allocation of Top-Owned Firms

A. Top 1%   B. Million-Dollar Earners   C. Top 0.1%
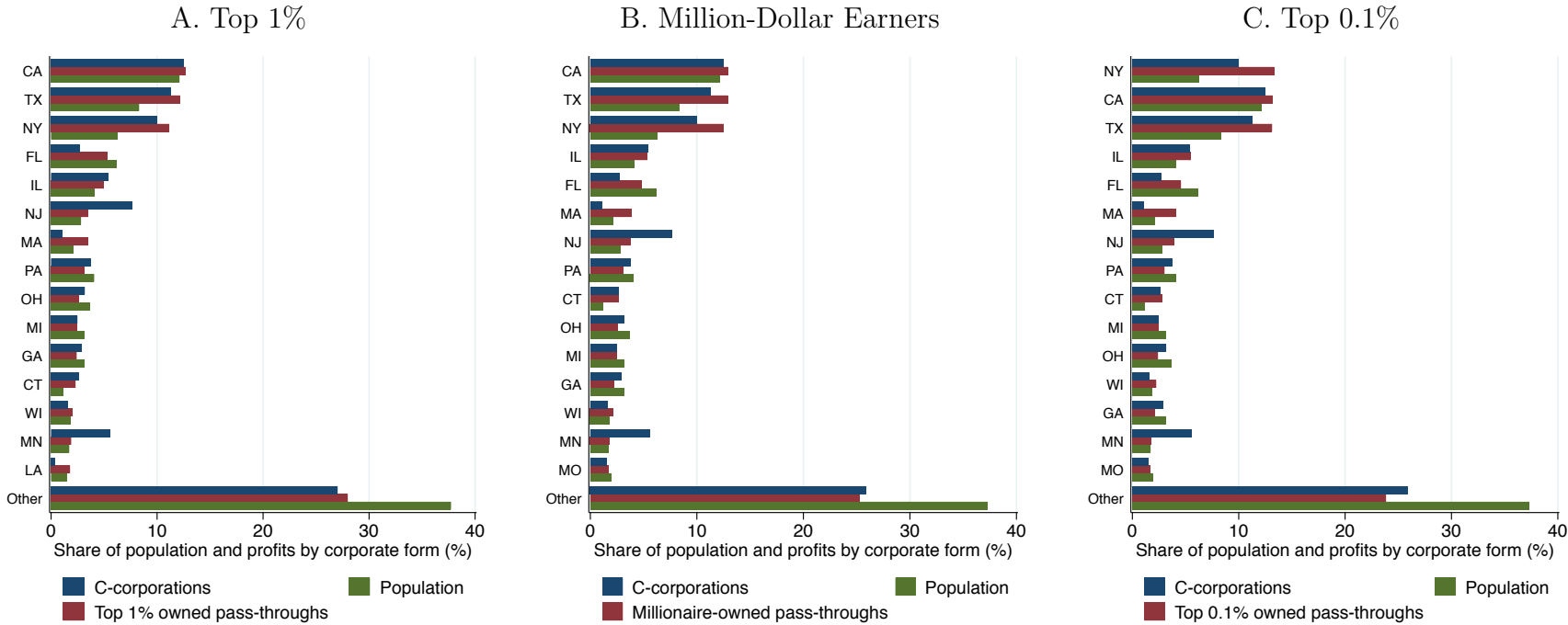
Notes: This figure uses our 2014 linked-firm-owner data and the SOI sample of C-corporations to show that top-owned pass-through profits are widely distributed across states, and roughly proportional to 2014 state population. State refers to the state listed on the business income tax return, typically the state of the firm headquarters. Owners are indexed by their fiscal income. The "other" category comprises all states not explicitly listed.

Figure I.6: Profit Impacts of Owner Deaths and Retirements, Additional Top Groups
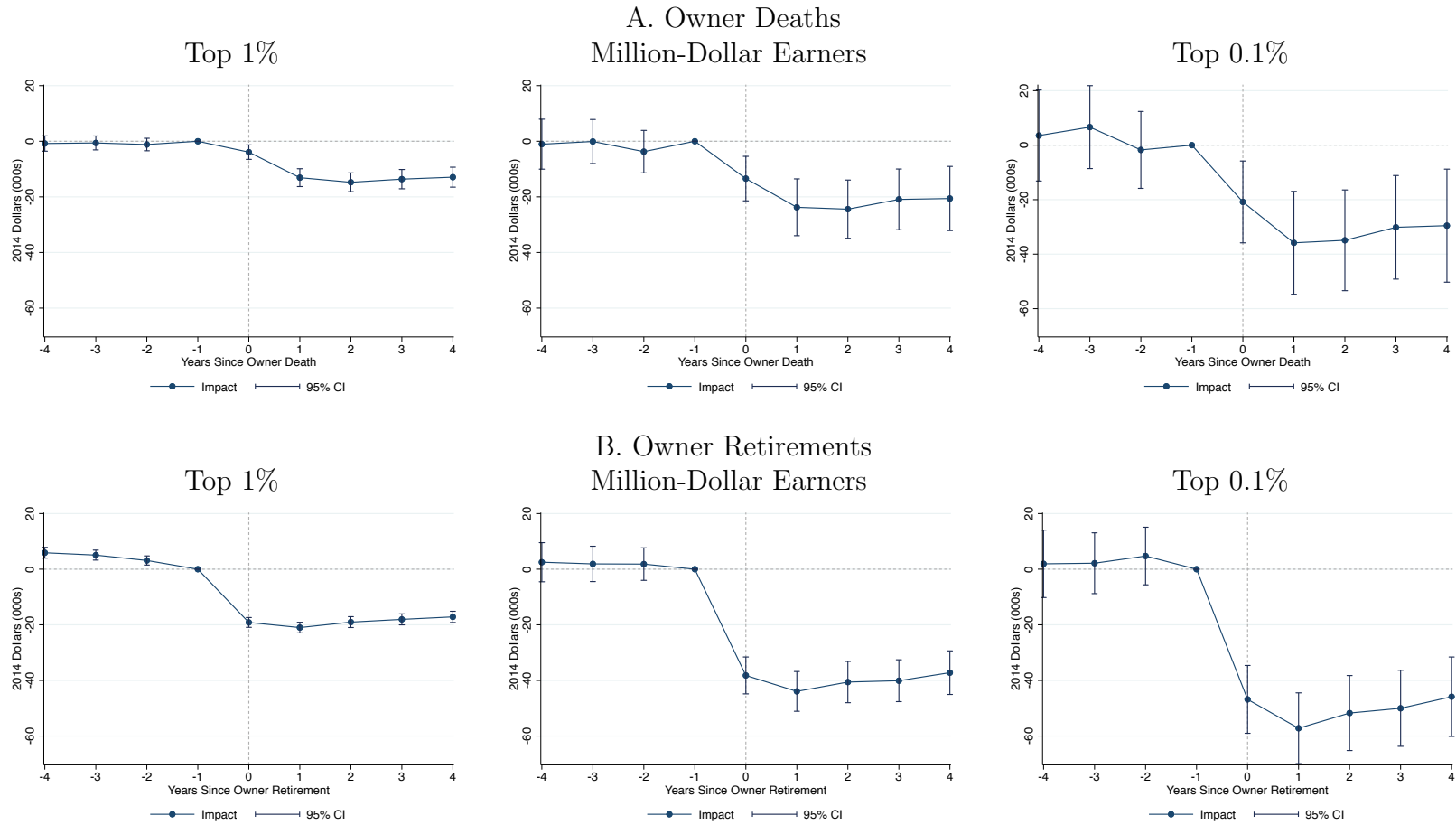
Notes: The middle panels of this figure reproduce the two graphs of Figure 5. See the notes to that figure for details. The left and right panels of this figure repeat the middle panels for owners in the top-1% of the fiscal income distribution and for owners in the top-0.1% of the income distribution, respectively.

Figure I.7: Are Top Earners Human-Capital Rich? Conservative Labor Share

A. Human-Capital Rich and Self-Made Shares of Top Earners (FI)
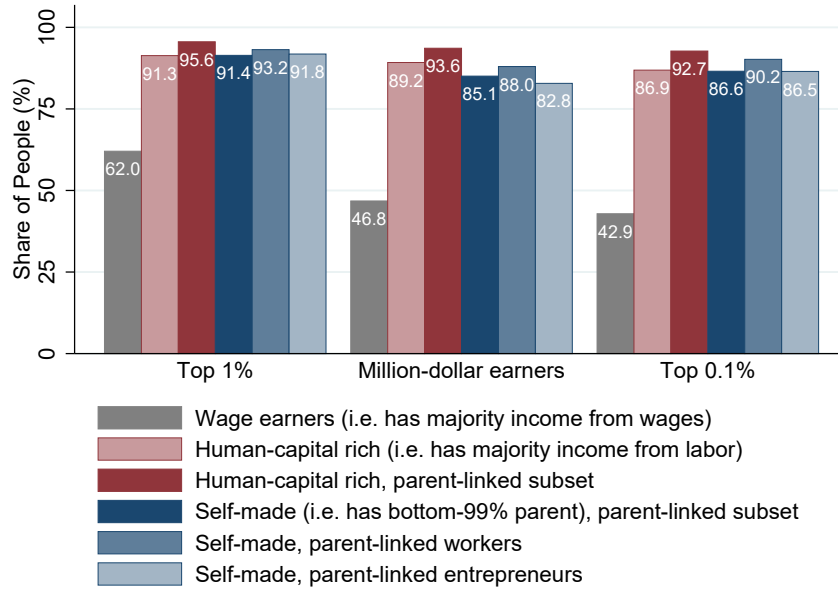
B. Human-Capital Rich and Self-Made Shares of Top Earners (INI)
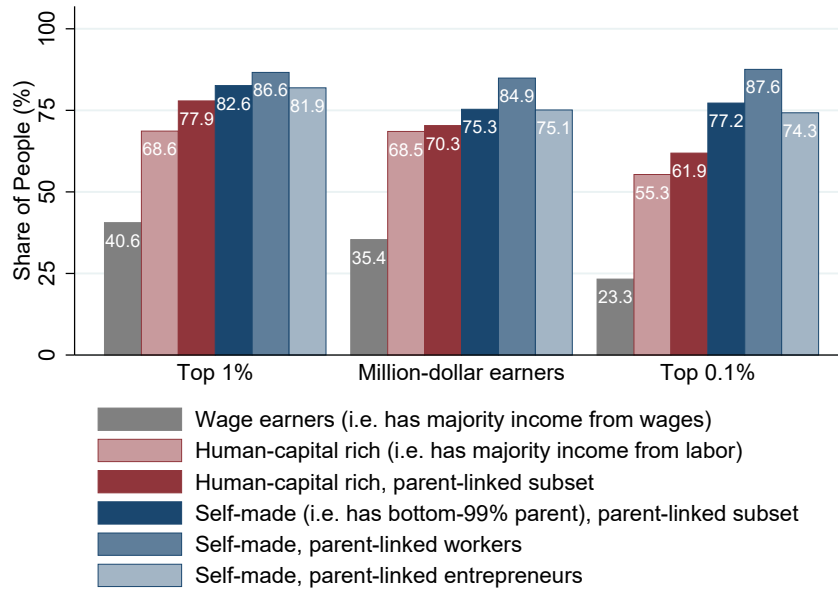
Notes: This figure replicates Figure 7 except that it does not classify 75% of pass-through income as labor income. Instead, the top 1% bars classify 59.6% of pass-through income as labor income, the million-dollar-earner bars classify 81.6%, and the top 0.1% bars classify 71.7%. See Section H.2 and the notes to Figure 7 for details.

Figure I.8: How Do Million-Dollar Earners Earn Their Income? Conservative Labor Share

A. Top Labor and Capital Income (FI)
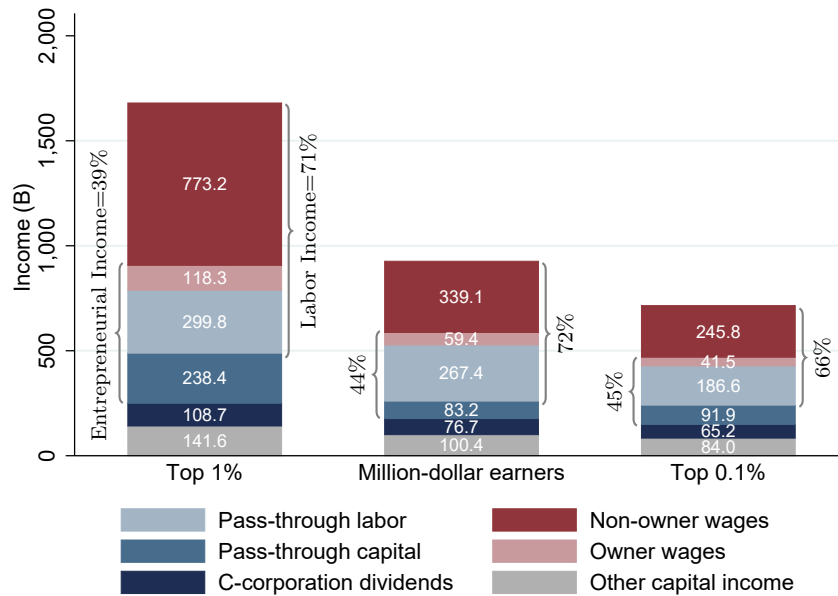
B. Top Labor and Capital Income (INI)
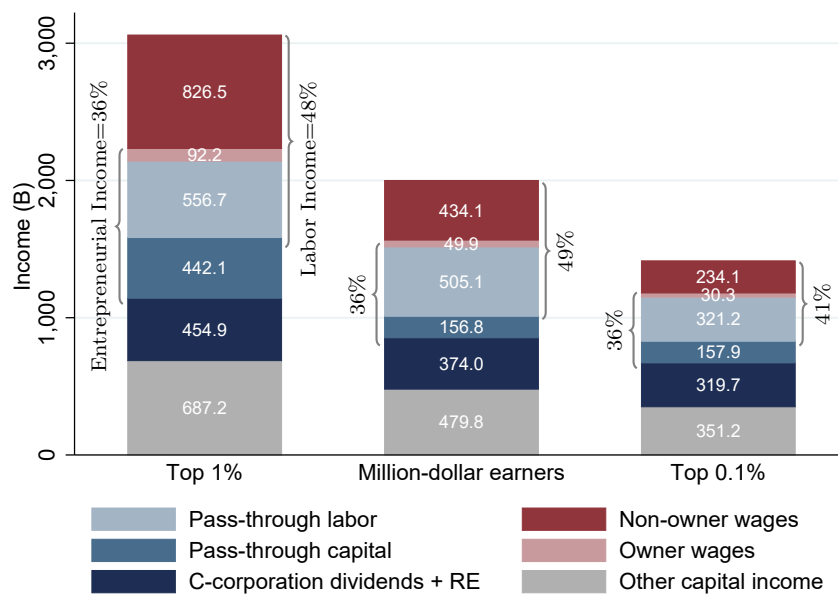
Notes: This figure replicates Figure 8 except that it does not classify 75% of pass-through income as labor income. Instead, the top 1% bars classify 59.6% of pass-through income as labor income, the million-dollar-earner bars classify 81.6%, and the top 0.1% bars classify 71.7%. See Section H.2 and the notes to Figure 8 for details.

Figure I.9: Are Top Earners Human-Capital Rich? Reclassified C-Corp Wages

A. Human-Capital Rich and Self-Made Shares of Top Earners (FI)
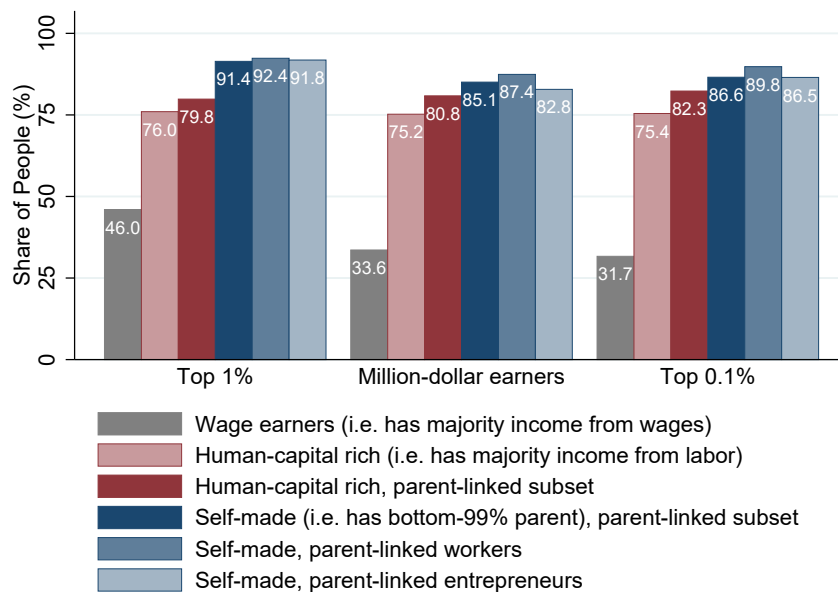
B. Human-Capital Rich and Self-Made Shares of Top Earners (INI)
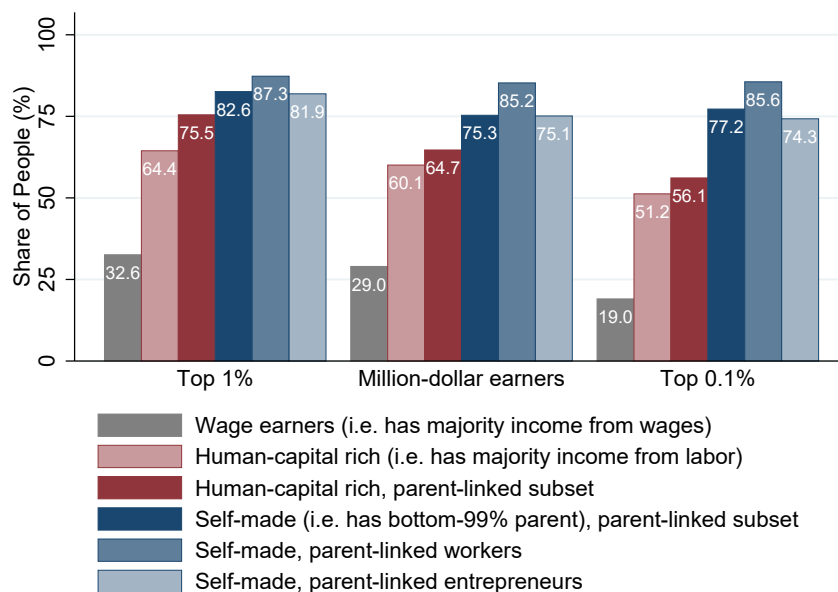
Notes: This figure replicates Figure 7 except it classifies as capital income all wages of individuals whose highest-W2-payer was a private C-corporation. In the case of married tax units, we classify as capital income all wages of the tax unit if either spouse's highest-W2-payer was a private C-corporation. See Section H.2 and the notes to Figure 7 for details.

Figure I.10: How Do Million-Dollar Earners Earn Their Income? Reclassified C-Corp Wages

A. Top Labor and Capital Income (FI)
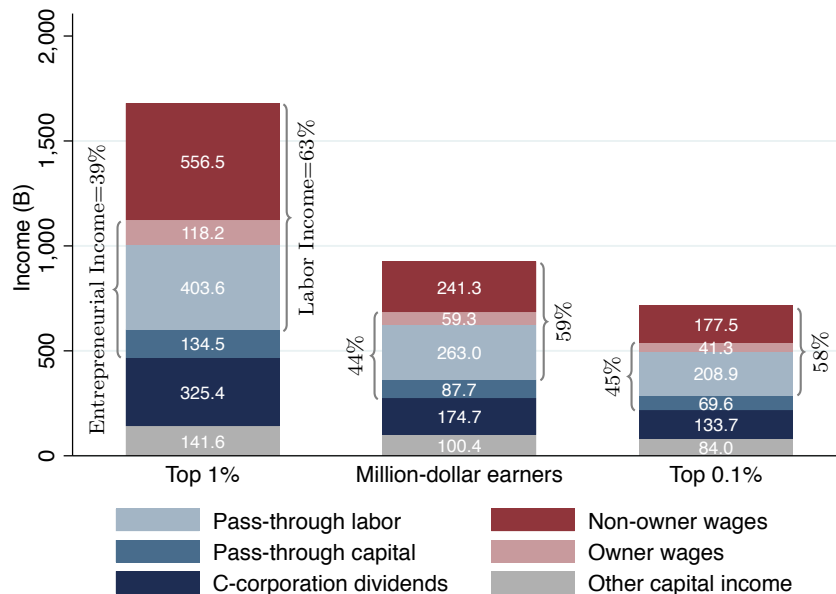
B. Top Labor and Capital Income (INI)
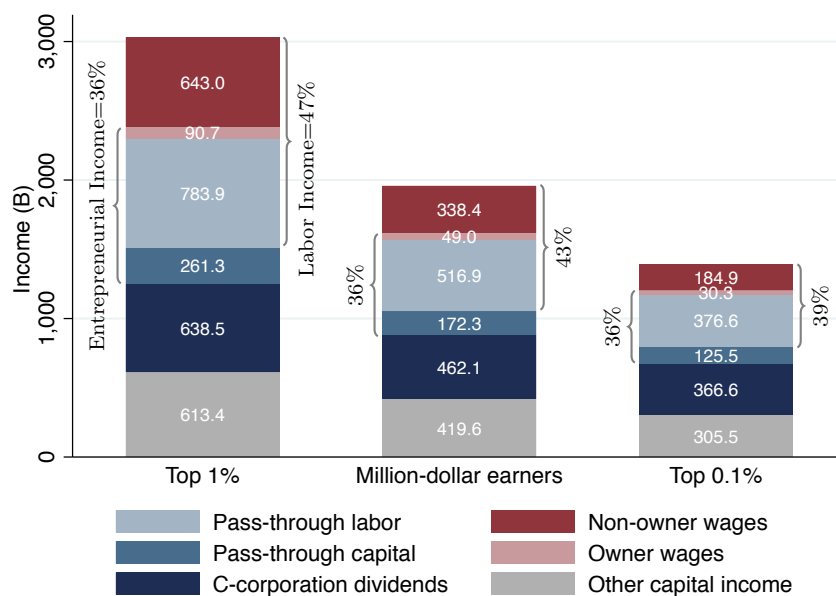
Notes: This figure replicates Figure 8 except it classifies as capital income all wages of individuals whose highest-W2-payer was a private C-corporation. In the case of married tax units, we classify as capital income all wages of the tax unit if either spouse's highest-W2-payer was a private C-corporation. See Section H.2 and the notes to Figure 7 for details.

Figure I.11: Growth in Pass-through Profits Accounting for Organizational Form Changes

A. Pass-through Share of Activity

B. Number of Pass-Throughs

C. Total Pass-through Profits
Adjusted for Org. Form Changes

D. Top-0.1% Pass-through Profit Growth
Adjusted for Org. Form Changes
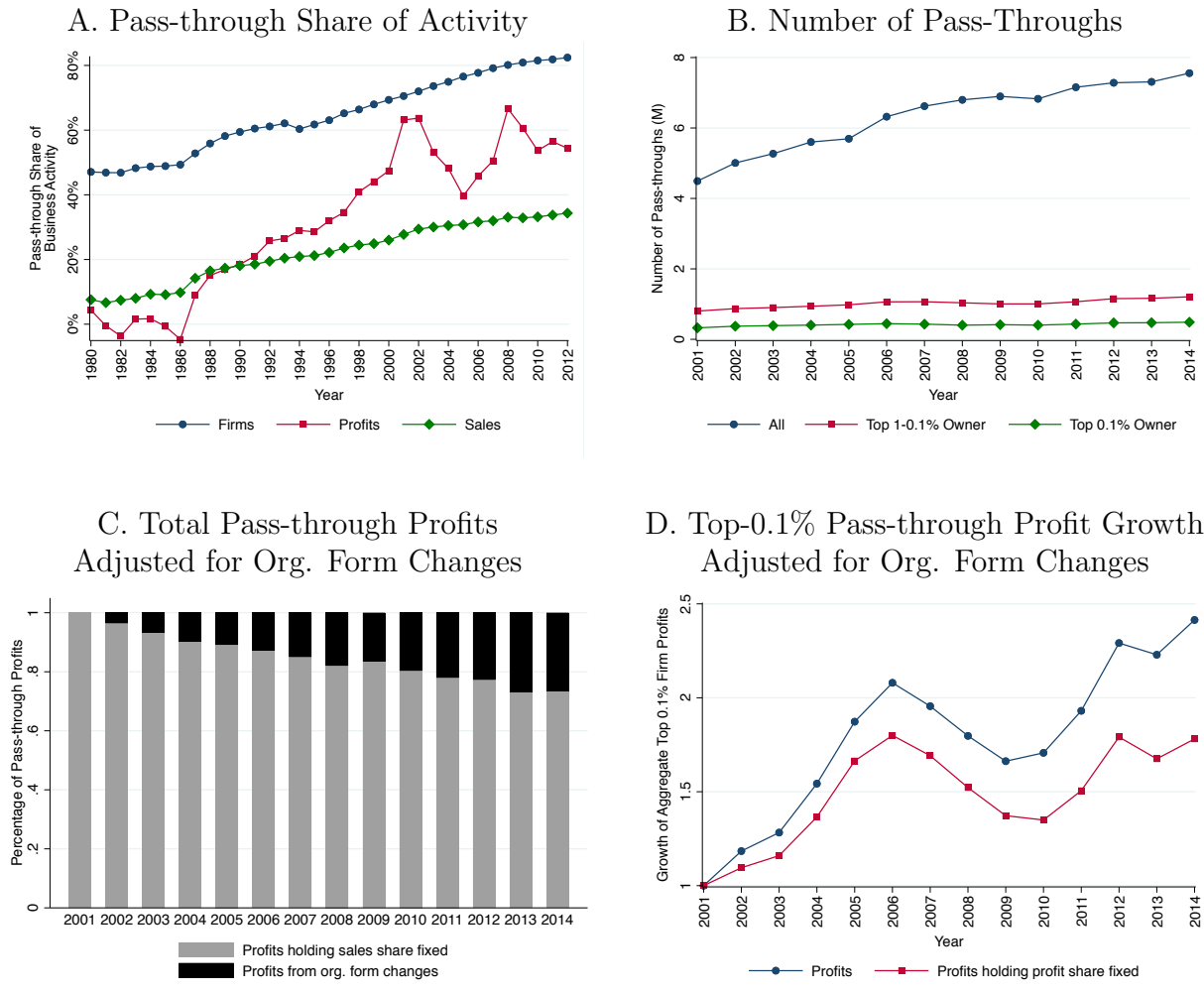
Notes: Panel A uses the SOI C-corporate, S-corporate, and Partnership study files to show the pass-through (S-corporation plus partnership) shares of total business activity since 1980 (measured as the sum of C-corporations, S-corporations, and partnerships). Panel B uses our linked-firm-owner data to show the number of pass-throughs by owner income group since 2001, which is the period for which the US Treasury tax files enable us to link firms and owners. Panel C uses our linked-firm-owner data along with the SOI files to decompose the level of pass-through profits between 2001 and 2014 into actual pass-through profits and the share attributed to organizational form changes. The decomposition assumes the level of pass-through sales is a constant share of total business (i.e., S-corporation plus C-corporation plus partnership) sales. The top bars represent the share of pass-through profits that are attributed to pass-throughs having a higher share of total business sales relative to 2001. Panel D uses our linked-firm-owner data along with the SOI files to apply the same transformation to decompose the growth in pass-through profits among those with top 0.1% owners. The first series shows how actual pass-through profits increased since 2001. The second series shows a counterfactual series, which assumes that pass-through sales are a constant share of total business sector activity equal to the initial psss-through share in 2001.

Figure I.12: Robustness of Value Added Decomposition

A. Decomposing Entrepreneurial Income Growth (Without Adjustment for Org. Form Changes)
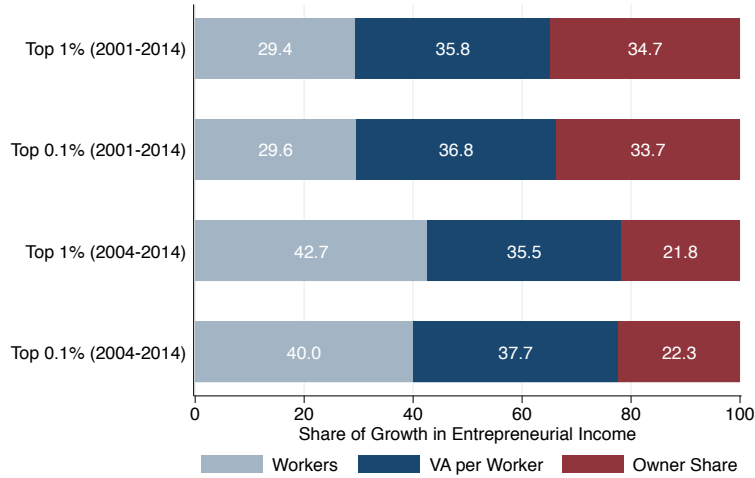
B. Falling Wages and Rising Entrepreneurial Income Since 2004
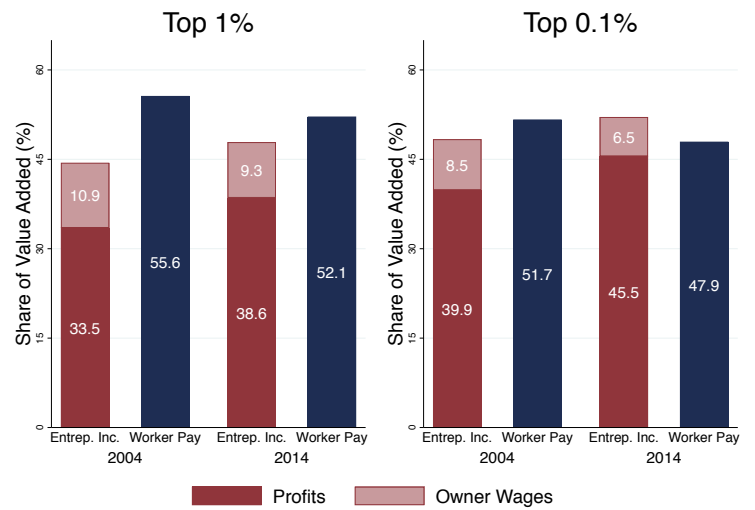
Notes: Panel A replicates Figure 10C without adjusting for organizational form changes. Not accounting for changes in organizational form overstates the role of growth in scale in explaining the rise in entrepreneurial income in our analysis sample. Panel B replicates Figure 10D using 2004 as the baseline year. This figure suggests that our findings are robust to our baseline year of choice.

Figure I.13: Risk Decreases with Owner Income Rank
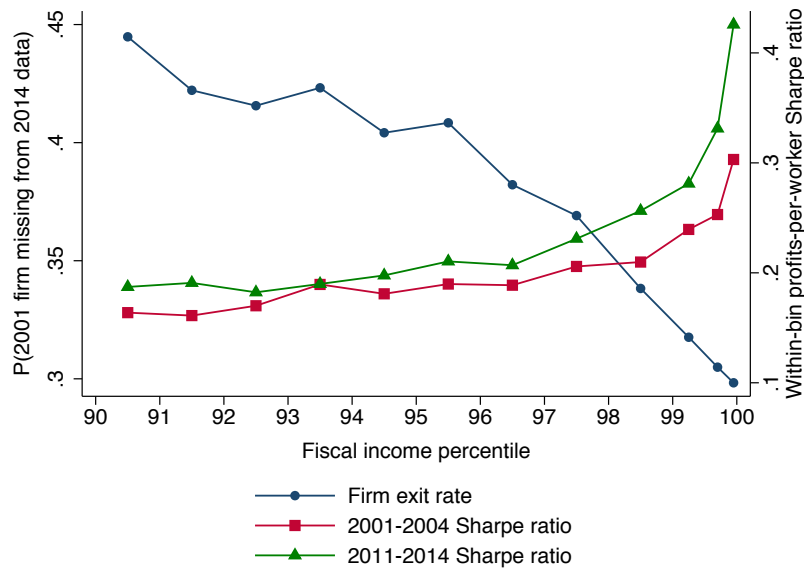
Notes: This figure plots measures of risk in the linked-firm-owner data by owner fiscal income percentile. The circles plot the share of 2001 pass-throughs within each fiscal income bin that had exited the sample by 2014, weighting by the firm's 2001 number of employees. The squares and triangles plot a measure of the mean Sharpe ratio across firms. Our Sharpe ratio is defined as the average profits per worker at firms owned by individuals within the fiscal income bin divided by the standard deviation of profits per worker at those firms, weighting firms by their number of workers and then averaging ratios across the listed years.

Figure I.14: Pass-Through Income in Top 1% Imputed National Income (PSZ, 2018)

A. PSZ Appendix Figure S.34

B. Isolating mixed income

C. Pass-through income
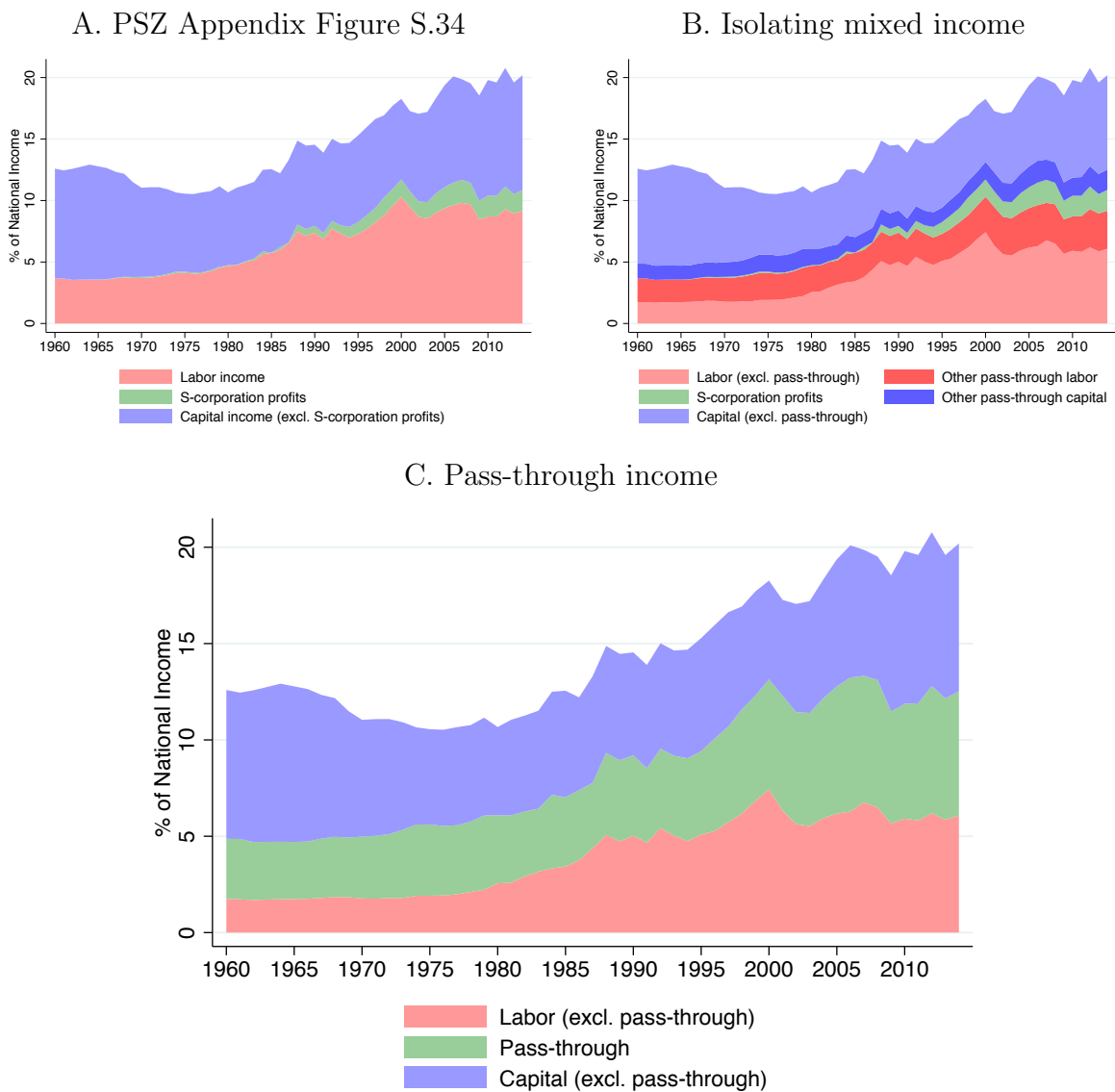
Notes: This figure plots components of top income from imputed national income. Panel A replicates Appendix Figure S.34 from Piketty, Saez and Zucman (2018). Panel B modifies Panel A by applying shading to the components of labor and capital income that reflect allocations from mixed income. Panel C applies the same shading to S-corporation profits and the labor and capital components of PSZ. See Appendix C for further discussion.

Figure I.15: Effect of Updating Financial Accounts Wealth on Imputed Equity Income
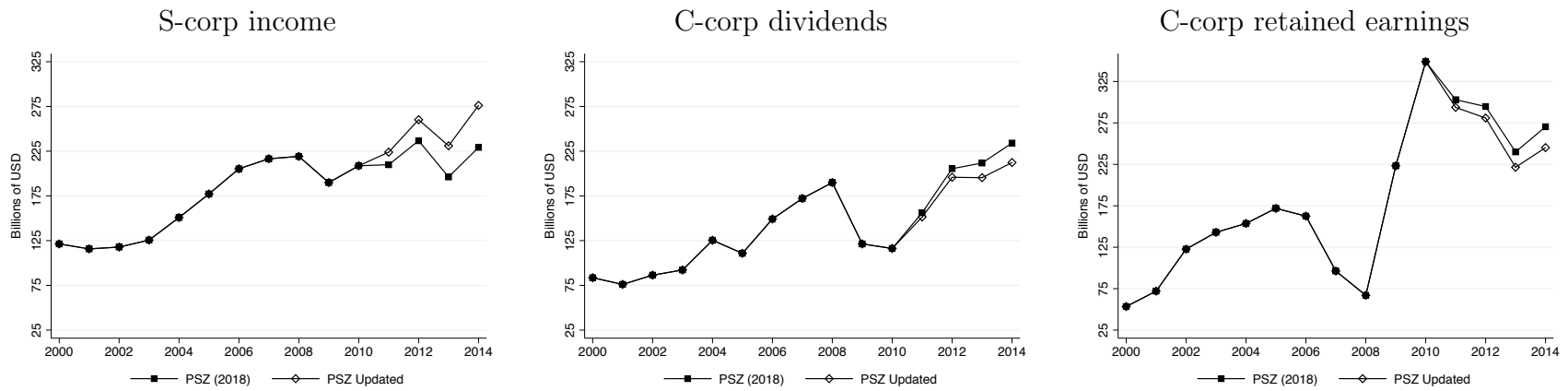
Notes: This figure shows the effect of updating the equity income components in imputed national income to reflect actual aggregate wealth estimates for 2011–2014. See Appendix D for more detail.

Figure I.16: Effect of Updating Financial Accounts Wealth on the Composition of Business Income Growth

A. Contributions to business income growth (1990–2014)
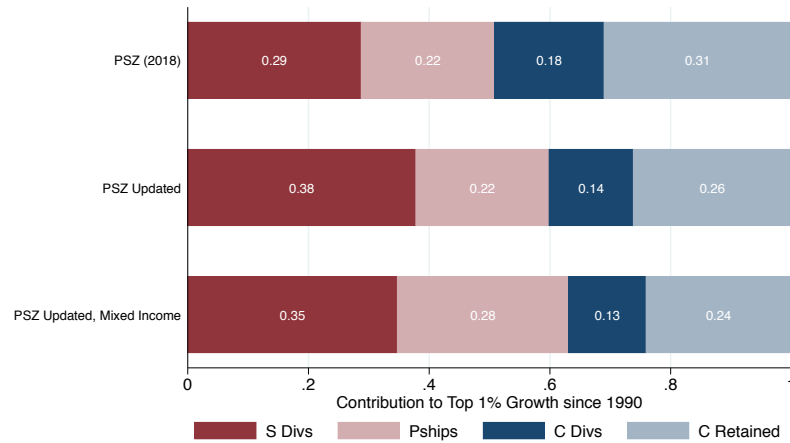
B. Contributions to business income growth (2000–2014)
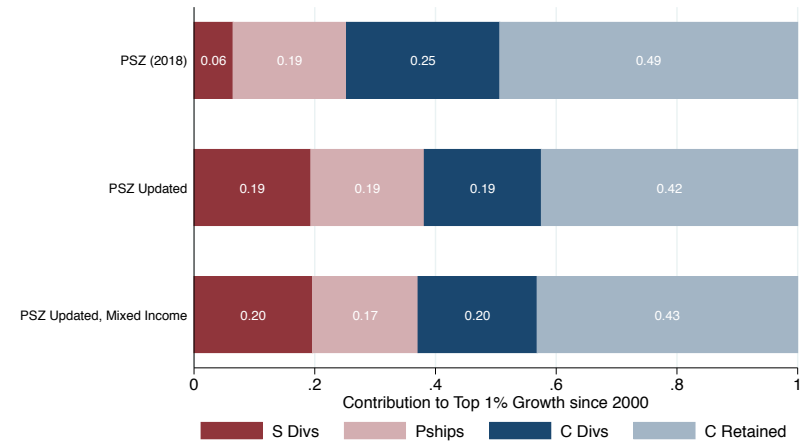
Notes: This figure shows the effect of updating the equity income components in imputed national income to reflect actual aggregate wealth estimates for 2011–2014. Panels A and B quantify the relative contributions from S-corporation income, C-corporation income, and partnerships to overall business income growth over the periods 1990–2014 and 2000–2014, respectively. "PSZ Updated, Mixed Income" defines partnership income as total labor and capital mixed income, instead of fiscal partnership income. For each scenario, we compute the contribution of business income to top income growth (e.g., business income increased by 2.8% of national income from 1990 to 2014) and divide this amount into contributions from each source (e.g., S-corporation income increased by 1.1% of national income from 1990 to 2014, or 40% of the business income increase). See Appendix D for more detail.

Figure I.17: Realized Capital Gains, C-Corporation Stock, and Retained Earnings

A. Realized Capital Gains Composition
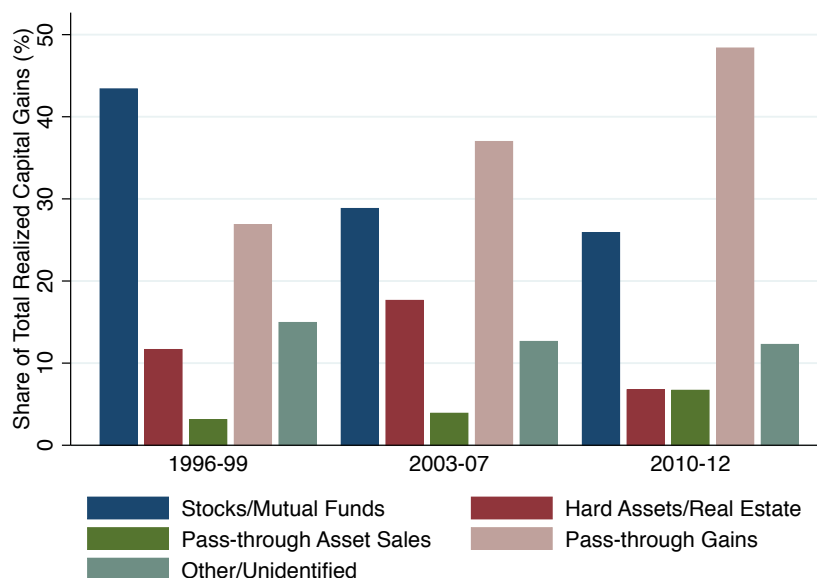
B. Realized Capital Gains vs. Retained Earnings
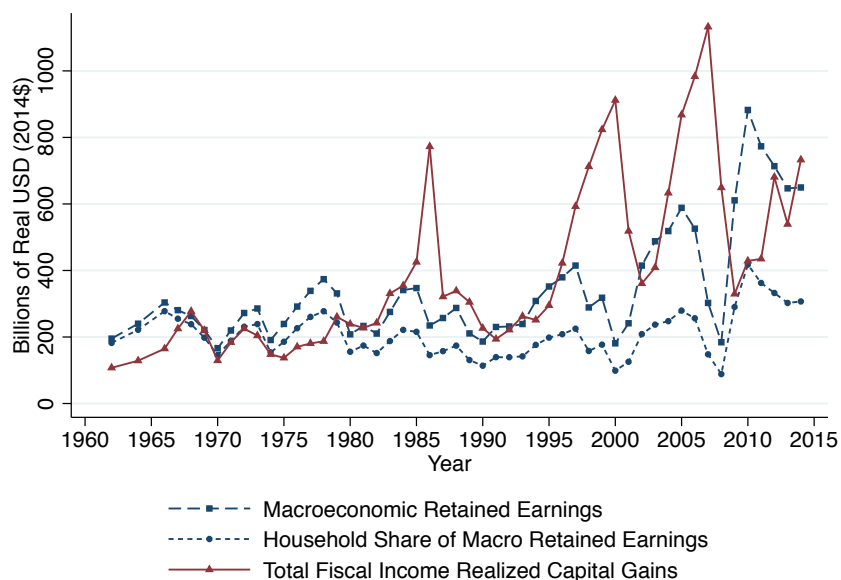
Notes: Panel A plots the share of total realized capital gains accrued to stocks/mutual funds, hard assets, pass-through asset sales, pass-through gains, and other assets in 1996–1999, 2003–2007, and 2010–2012. Hard assets includes net gains/losses for depreciable business personal property, depreciable business real property, farmland and other land, livestock, timber, residential rental property, and all residences. The graph focuses on non-recession years, as the cyclicality of realized gains can cause components of net gains to turn negative during downturns. Data comes from the Statistics of Income (SOI) Tax Stats table "Sales of Capital Assets Reported on Individual Tax Returns." Panel B plots macroeconomic retained earnings, the household sector's share of macroeconomic retained earnings (defined using C-corporation wealth estimates in the US Financial Accounts), and total fiscal realized capital gains over 1962–2014 (all in 2014 dollars). See Appendix E for more detail.

Figure I.18: Replication of Imputed National Income Equity Income Components

A. S-corp income

B. C-corp dividends

C. C-corp retained earnings
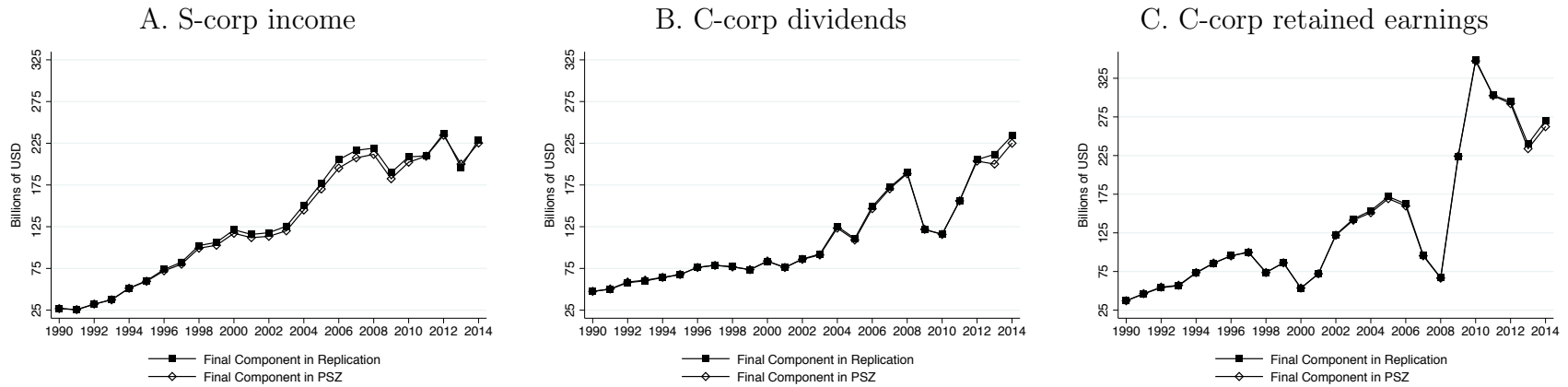
Notes: This figure implements the formulas in Appendix F.1 and compares the replication of the final imputed income estimates to those in PSZ's appendix spreadsheet, converted to dollars to aid comparison of alternative scenarios.

Figure I.19: Effect of Alternative Capital Gains Assumptions on Imputed Equity Income
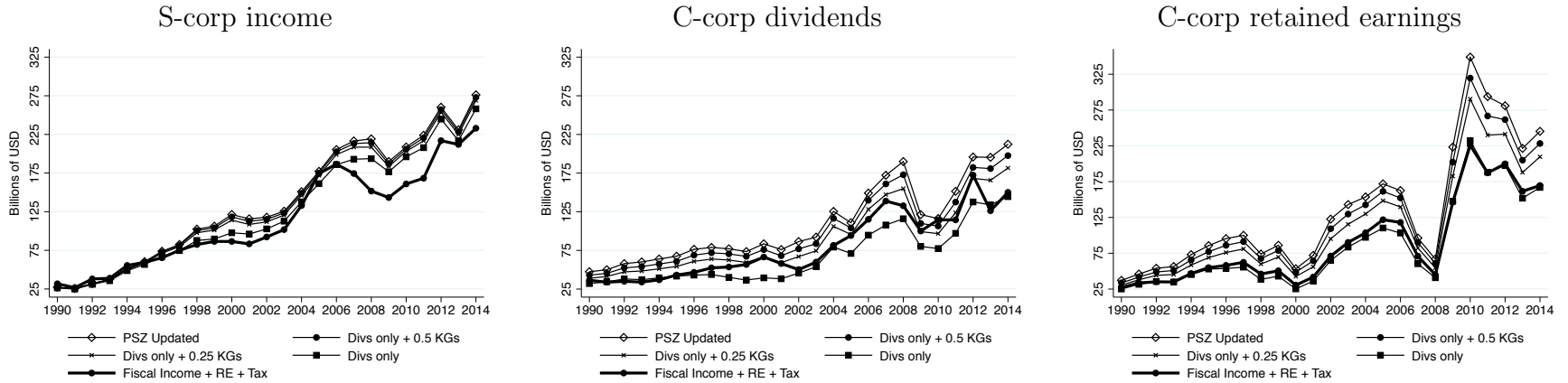
Notes: This figure graphs S-corporation income, C-corporation dividends and retained earnings under alternative assumptions for using realized capital gains to impute equity income. These alternative assumptions reflect the possibility some realized capital gains are not due to the sale of C-corporation stock and thus should not be used to estimate the ownership of C-corporation stock. **PSZ Updated** updates the original PSZ series to reflect actual aggregate wealth estimates. **Divs only**, **Divs only + 0.25 KGs** and **Divs only + 0.5 KGs** respectively graph a dividends-only method, and scenarios that use dividends plus 25% or 50% of realized capital gains. We make these adjustments for wealth estimates used in both the allocation and total equity income components of the imputed national income (INI) formulas. **Fiscal Income + RE + Tax** uses INI ranks and household definitions to identify the top 1 percent, then uses fiscal income data for S-corporation dividends, partnership income, and C-corporation dividends. For C-corporation retained earnings, this scenario allocates a share of macroeconomic retained earnings in proportion to C-corporation dividends only. It then allocates corporate tax to each component in proportion to these pre-tax figures. See Appendix F.2 for discussion.

Figure I.20: Top 1% Business Income Sources under Alternative Imputation Assumptions

A. Pass-through income

B. C-corporation income
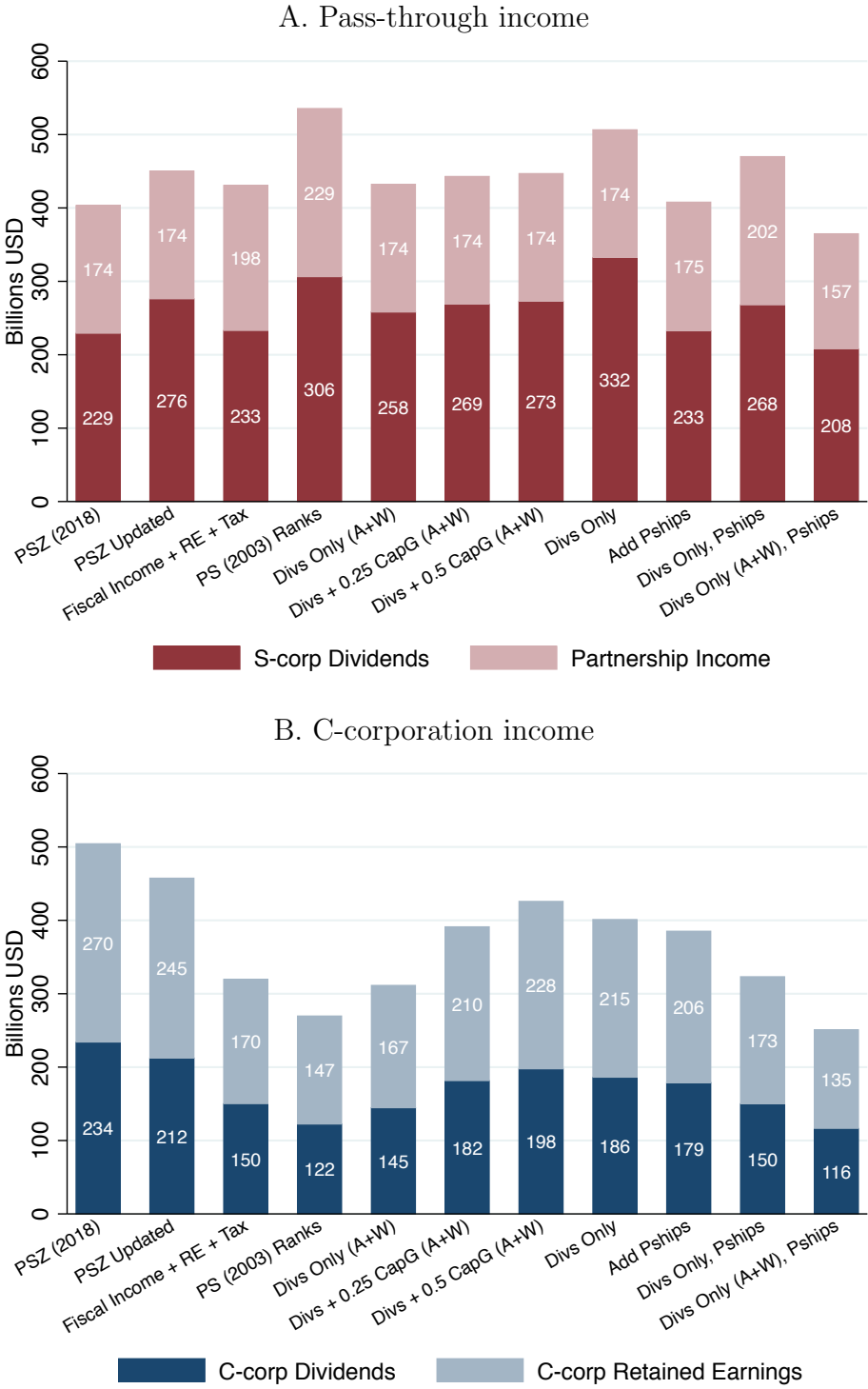
Notes to Figure I.20: This figure plots business income sources in 2014 under alternative assumptions for imputing national income. We consider the following scenarios: 1. **PSZ (2018)**. Original imputed national income (INI) numbers from PSZ. 2. **PSZ Updated**. For the years from 2011 through 2014, PSZ extrapolate top 1 S-corporation and C-corporation wealth: they start with the 2010 values and then grow them using the growth rate of aggregate household equity wealth. This scenario updates the INI series from PSZ to reflect actual aggregate wealth estimates. 3. **Fiscal Income + RE + Tax**. Use imputed national income ranks and household defintions from PSZ to identify the top 1%. Then use fiscal income data for S-corporation dividends, partnership income, and C-corporation dividends. For C-corporation retained earnings, allocate a share of macroeconomic retained earnings in proportion to C-corporation dividends. Then allocate corporate tax to each component in proportion to these pre-tax figures. 4. **PS (2003) Ranks**. Use the Raw Data + Tax method for fiscal income data for top 1 percent households identified using the Piketty and Saez (2003) method of sorting households by fiscal income excluding capital gains. 5. **Divs Only (A+W)** ("A" for Allocation, "W" for Wealth). Use only fiscal C-corporation dividends (not capital gains) to compute C-corporation dividend and C-corporation retained earnings allocation factors and in the computation of top 1% equity income. 6. **Divs Only + 0.25 CapG (A+W)**. Use fiscal C-corporation dividends plus 25% of realized capital gains to compute C-corporation dividend and C-corporation retained earnings allocation factors and in the computation of top 1 equity income. 7. **Divs Only + 0.5 CapG (A+W)**. As above, but uses fiscal C-corporation dividends plus 50% of realized capital gains. 8. **Divs Only**. Use fiscal C-corporation dividends only to compute C-corporation dividend and C-corporation retained earnings allocation factors, but leave top 1% equity income unchanged. 9. **Add Pships**. Add fiscal partnership income as a fourth allocation component and to top 1% equity income. 10. **Divs Only, Pships**. Use both the Divs Only method for allocation and the Add Pships method to include partnership income. 11. **Divs Only (A+W), Pships**. Use the Divs Only method for both allocation and the computation of top 1% equity income and the Add Pships method to include partnership income. Scenarios 5–11 all apply the extrapolation fix in scenario 2. Scenarios 1, 2, and 5–8 use raw partnership income without a corporate tax imputation. Appendix F.3 provides additional discussion of this analysis.

Figure I.21: Top 1% Business Income Growth under Alternative Imputation Assumptions

A. S-corp income

B. C-corp dividends

C. C-corp retained earnings

D. Contributions to business income growth (1990–2014)

E. Contributions to business income growth (2000–2014)
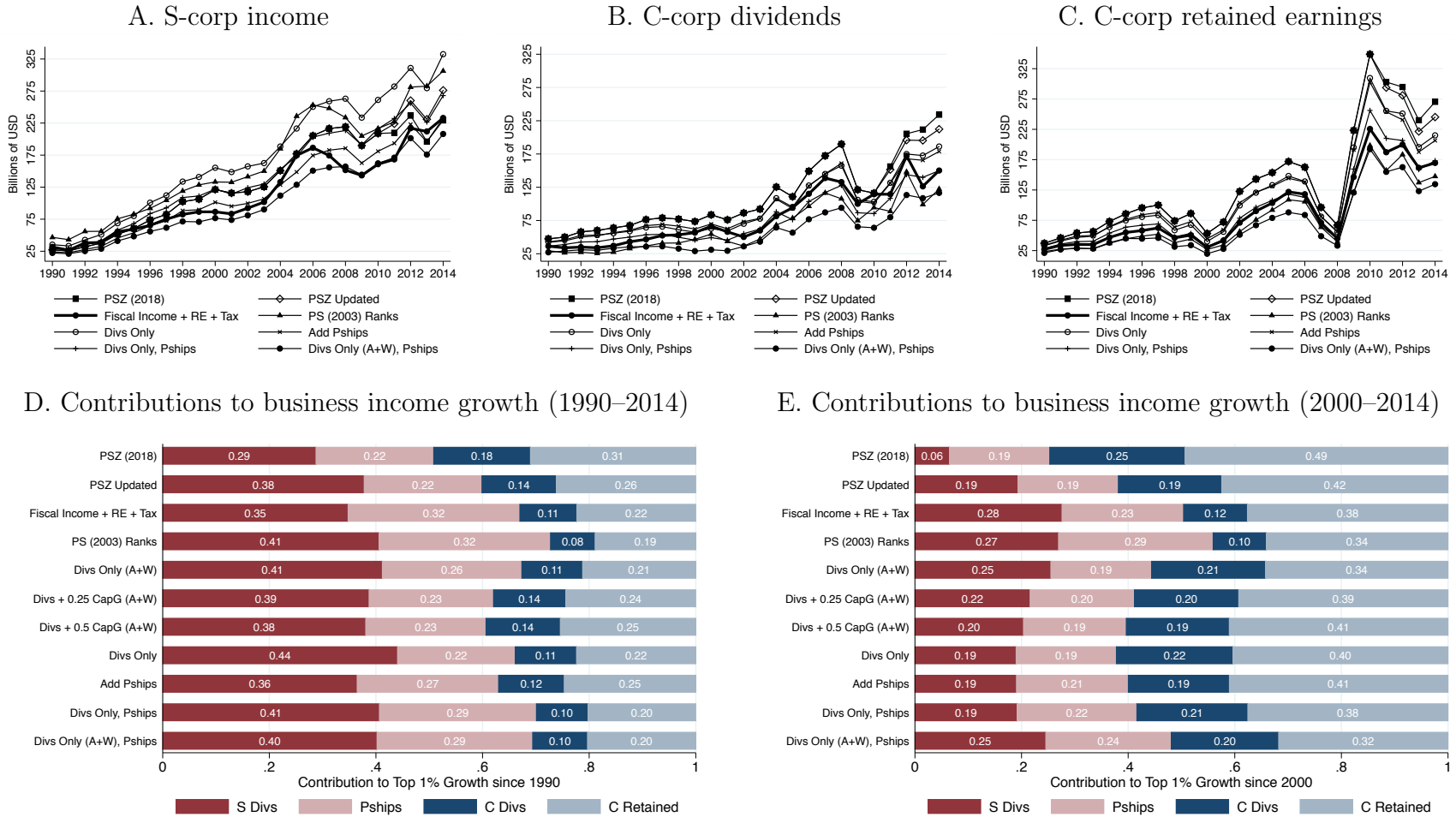
Notes: This figure plots the growth of business income sources under alternative assumptions for imputing national income. For detail on these assumptions, see the note to Figure I.20 and the discussion in Section F.3. Panels A–C plot the time series of S-corporation income, C-corporation dividends, and C-corporation retained earnings from 1990 to 2014. Panels D and E quantify the relative contributions from S-corporation income, C-corporation income, and partnerships to overall business income growth over the periods 1990–2014 and 2000–2014, respectively. For each imputation scenario, we compute the contribution of business income to top income growth (e.g., business income increased by 2.8% of national income from 1990 to 2014) and divide this amount into contributions from each source (e.g., S-corporation income increased by 1.1% of national income from 1990 to 2014, or 40% of the business income increase). See Appendix F.4 for discussion.

J   Appendix Tables

Table J.1: Summary Statistics on S-Corporations and Their Owners

A. Firm Summary Statistics

	A. All Firms				B. Firms with Top 1-0.1% Owner				C. Firms with Top 0.1% Owner			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Sales	1,824	21	264	2,639	4,267	56	1,256	9,937	22,520	61	3,581	49,917
Profits	93	-27	14	183	234	-26	125	691	1,597	-80	283	3,681
Profit margin	0.05	-0.19	0.05	0.40	0.11	-0.03	0.08	0.43	0.12	-0.02	0.08	0.45
Assets	919	0	54	922	1,878	12	311	3,742	14,163	40	1,427	22,068
Employees	13.9	0.0	2.0	25.3	32.8	0.0	7.0	70.6	103.0	0.0	10.6	190.5
Employees | Employees > 0	20.4	1.0	5.0	37.1	43.0	1.2	12.8	89.4	150.8	2.3	34.9	267.4
Entrepreneurial income	147	-14	38	311	400	-9	294	.	.	-47	467	.
Number of owners	1.6	1.0	1.0	2.4	2.2	1.0	1.2	4.0	3.4	1.0	2.0	6.1
Sales per worker	195.1	22.7	88.3	362.2	323.5	31.3	139.8	647.0	865.2	29.4	190.9	1,241.0
Profits per worker	18.4	-5.5	4.2	47.6	39.7	-2.0	10.6	111.7	139.9	-4.8	11.8	186.9
Profits per worker, employees-weighted	5.5	-1.7	1.0	16.0	6.3	-0.4	1.5	17.6	12.3	-0.0	2.7	28.4
Profits per owner	57.3	-18.9	10.6	132.9	153.7	-14.3	74.0	465.0	827.4	-37.8	127.5	2,071.0
Entrep. income per owner	92.2	-10.3	28.1	219.6	249.5	-4.8	180.0	652.4	959.3	-22.1	206.8	2,426.0
Entrep. income per worker	36.1	-1.2	13.5	85.0	72.8	0.4	25.3	208.8	190.6	-1.7	20.1	302.4
Entrep. income / profit	1.69	0.31	1	4.08	2.05	0.93	1.14	4.24	1.57	0.77	1	2.25
Entrep. income / sales	0.13	-0.19	0.13	0.61	0.20	-0.05	0.17	0.70	0.16	-0.12	0.11	0.79
Number of firm-years	43,898,440				4,933,977				1,367,487			

B. Owner Summary Statistics

	A. All Owners				B. Top 1-0.1% Owners				C. Top 0.1% Owners			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Income	213	15	98	423	646	391	560	1,076	4,511	1,549	2,391	7,486
Age	50.0	34.7	49.8	66.3	52.1	38.8	51.5	66.9	54.9	40.9	54.4	70.9
Number of firms owned	1.1	1.0	1.0	1.7	1.3	1.0	1.0	2.0	1.8	1.0	1.0	3.1
Wage income	71	0	31	157	205	0	148	489	743	0	249	1,749
S-corporation income	60.04	-15.78	8.85	132.37	198.26	-4.34	127.40	548.25	1536	-4.70	749.34	3358
Entrepreneurial income	100	-8	27	229	322	0	285	760	.	0	.	.
S-corp income / entrep. income	0.68	0.03	1	1	0.72	0.12	0.86	1	0.82	0.34	1	1
Wage income / income	0.64	0	0.29	0.95	0.33	0	0.25	0.82	0.21	0	0.09	0.70
Entrep. income / income	0.73	-0.08	0.39	1.01	0.50	0	0.51	1	0.48	0	0.49	0.98
Business income / income	0.22	-0.17	0.16	0.84	0.38	0	0.40	0.82	0.53	0	0.64	0.92
Only earns passive income	0.08	0	0	0	0.07	0	0	0	0.05	0	0	0
Number of owner-years	61,764,812				5,966,540				1,103,585			

Notes: This table replicates Table 1, restricting to S-corporation observations only. Dollar values are in thousands of 2014 dollars. The main sample comprises firm-owner-year observations with positive sales and non-zero profits. Panel A pools distinct firm-year observations. Panel B pools distinct owner-year observations. All statistics are unweighted, unless otherwise specified.

Table J.2: Summary Statistics on Partnerships and Their Owners

A. Firm Summary Statistics

	A. All Firms				B. Firms with Top 1-0.1% Owner				C. Firms with Top 0.1% Owner			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Sales	1,767	4	136	2,040	2,434	5	366	4,895	11,233	8	634	14,468
Profits	-152	-45	6	240	244	-74	24	796	1,609	-244	40	2,608
Profit margin	0.06	-0.77	0.05	0.80	0.13	-0.56	0.10	0.91	0.15	-0.52	0.11	0.93
Employees	10.2	0.0	0.0	17.9	17.5	0.0	0.0	38.4	38.5	0.0	0.0	74.0
Employees | Employees > 0	30.3	1.3	7.7	58.4	44.4	2.0	13.6	92.9	112.9	2.8	28.6	208.1
Entrepreneurial income	135	-35	6	217	212	-54	22	712	.	-161	28	.
Number of owners	4.4	1.0	2.0	4.0	4.0	1.0	2.0	7.1	27.8	1.0	3.0	21.2
Sales per worker	202.2	12.5	72.0	370.0	277.0	16.5	109.6	523.8	504.0	15.1	98.5	781.2
Profits per worker	2.5	-11.7	2.1	60.4	38.7	-11.3	5.8	117.8	77.5	-34.9	2.7	157.6
Profits per worker, employees-weighted	-22.1	-3.8	0.7	30.7	9.2	-2.4	1.1	32.3	24.6	-2.6	2.1	79.5
Profits per owner	-275.5	-20.6	2.6	106.5	87.6	-26.7	8.5	324.4	362.1	-61.2	8.5	798.9
Entrep. income per owner	34.9	-16.1	2.8	95.3	70.0	-19.6	7.6	292.7	229.0	-40.1	5.8	587.6
Entrep. income per worker	20.6	-8.5	3.1	61.7	39.0	-7.5	6.7	116.9	68.1	-21.8	2.5	145.4
Entrep. income / profit	0.95	0.50	1	1	0.93	0.41	1	1	0.82	0.23	0.99	1
Entrep. income / sales	0.06	-0.82	0.06	0.81	0.14	-0.67	0.10	0.94	0.13	-0.82	0.09	0.95
Number of firm-years	15,035,028				2,445,622				1,097,116			

B. Owner Summary Statistics

	A. All Owners				B. Top 1-0.1% Owners				C. Top 0.1% Owners			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Income	263	10	97	548	664	396	581	1,102	4,845	1,569	2,466	8,247
Age	52.6	33.6	52.3	73.6	52.7	39.1	52.0	68.0	54.0	40.4	53.3	69.9
Number of firms owned	1.4	1.0	1.0	2.0	1.7	1.0	1.0	3.0	2.6	1.0	1.4	5.5
Wage income	83	0	1	177	201	0	71	587	1,102	0	178	2,745
Partnership income	39.98	-8.16	0.34	76.69	132.41	-6.81	7.50	508.35	658.49	-22.16	11.02	1962
Entrepreneurial income	43	-8	0	87	138	-6	8	522	670	-22	12	.
Pship income / entrep. income	0.98	1	1	1	0.98	1	1	1	0.99	1	1	1
Wage income / income	0.63	0	0	0.95	0.31	0	0.12	0.93	0.26	0	0.06	0.94
Entrep. income / income	3.85	-0.08	0.01	0.79	0.21	-0.01	0.01	0.90	0.18	-0.01	0	0.87
Business income / income	0.22	-0.09	0.02	0.97	0.36	-0.01	0.25	0.97	0.42	-0.01	0.45	0.96
Only earns passive income	0.16	0	0	1	0.14	0	0	1	0.09	0	0	0.30
Number of owner-years	46,810,812				5,826,709				1,225,439			

Notes: This table replicates Table 1, restricting to partnership observations only. Dollar values are in thousands of 2014 dollars. The main sample comprises firm-owner-year observations with positive sales and non-zero profits. Panel A pools distinct firm-year observations. Panel B pools distinct owner-year observations. All statistics are unweighted, unless otherwise specified.

Table J.3: Firm and Owner Counts by Industry for S-Corporations and Partnerships

	Top 0.1% Owners					Top 1-0.1% Owners			
Industry (NAICS)	S Firms	S Owners	P Firms	P Owners	Industry (NAICS)	S Firms	S Owners	P Firms	P Owners
Lessors of real estate (5311)	12573	18150	115664	200328	Offices of physicians (6211)	41975	63386	7463	36957
Activities related to real estate (5313)	10911	14973	47793	92785	Lessors of real estate (5311)	33466	56383	277828	684343
Automobile dealers (4411)	5236	7927	1418	2287	Activities related to real estate (5313)	25314	39844	96502	258321
Offices of physicians (6211)	4711	5817	1333	2440	Other professional/technical svc (5419)	22841	32287	13018	32316
Restaurants (7225)	4471	6133	5978	10986	Offices of dentists (6212)	18413	21199	2120	3737
Other professional/technical svc (5419)	4291	5672	4443	8179	Restaurants (7225)	16300	26823	10520	29476
Other financial investment actvty (5239)	4030	6215	61477	349033	Legal svc (5411)	13240	16808	8987	52849
Management/techncl consulting svc (5416)	2785	3684	3114	5657	Management/techncl consulting svc (5416)	11746	16754	8525	22143
Indie artists, writers, performers (7115)	1992	2251	787	1235	Offices of other health practitioners (6213)	9978	13583	3186	10286
Other specialty trade cntrctr (2389)	1968	2688	663	952	Insurance agencies/brokerages (5242)	9753	14568	3172	7382
Legal svc (5411)	1929	2241	1615	9871	Other specialty trade cntrctr (2389)	9737	14483	2265	3936
Insurance agencies/brokerages (5242)	1832	2434	951	1531	Computer sys design/related svc (5415)	9607	14422	4502	10605
Computer sys design/related svc (5415)	1760	2444	1431	2403	Other financial investment actvty (5239)	9022	15163	60593	578995
Misc. durable goods merch whlsl (4239)	1697	2402	849	1318	Architectural/engineering svc (5413)	7516	11811	1900	3851
Residential building constr (2361)	1566	2231	2840	4467	Other personal svc (8129)	6599	9188	5269	10472
Traveler acmdtn (7211)	1552	2602	4227	7848	Offices of real estate agents/brokers (5312)	6397	8230	2797	5595
Other personal svc (8129)	1483	1873	1592	2521	Residential building constr (2361)	6256	8736	6390	12037
Oil/gas extraction (2111)	1394	2045	7003	43202	Building equipment cntrctr (2382)	5601	8697	745	1395
Other miscellaneous mfg. (3399)	1341	1999	777	1376	Misc. durable goods merch whlsl (4239)	5389	8584	2198	4452
Nonresidential building constr (2362)	1210	1813	709	1134	Accounting/bookkeeping svc (5412)	4968	7101	2953	14982
Other fabricated metal prod mfg. (3329)	1171	1821	212	379	Health/personal care stores (4461)	4758	7120	1560	3780
Nondepository credit intrmd (5222)	1163	1667	1743	3700	Automobile dealers (4411)	4504	9005	1278	2759
Health/personal care stores (4461)	1110	1509	490	805	Nonresidential building constr (2362)	4371	7178	2022	4129
Offices of other health practitioners (6213)	1088	1294	721	1166	Traveler acmdtn (7211)	4207	8964	6645	22047
Architectural/engineering svc (5413)	1085	1581	435	743	Indie artists, writers, performers (7115)	4162	4886	1517	3131
Building equipment cntrctr (2382)	1076	1509	209	287	Other miscellaneous store retailers (4539)	3968	5910	1734	2985
Misc. nondrbl gds merch whlsl (4249)	1040	1567	563	981	Advertising, pr,/related svc (5418)	3922	5529	2162	4488
Machinery/equipment rental and leasing (5324)	1031	1453	2092	3834	Other miscellaneous mfg. (3399)	3569	6448	1705	4830
Other amusement/recreation indies (7139)	1007	1363	2285	4306	Auto repair/mntnce (8111)	3544	4937	1363	2507
Other miscellaneous store retailers (4539)	991	1363	609	891	Gasoline stations (4471)	3439	4889	886	1561

Notes: This table presents counts of the number of firms and owners by 4-digit industry, ranked by the level of S-corporation profits for firms owned by the top 0.1% and the top 1-0.1% respectively. The first column shows the number of S-corporations in 2014. The second column shows the number of S-corporation owners in 2014. The third and fourth columns show the same statistics, but for partnerships. We exclude firms in the residual category NAICS 5511 (Management of Companies and Enterprises), as in Section 2.1.

Table J.4: Industry-Level Correlates of Top Pass-through and C-corporation Profits

Panel A. Top 1-0.1% Profits by Corporate Form

	Pass-through	C-corp	Pass-through	C-corp	Pass-through	C-corp	Pass-through	C-corp
Skill Share of Workers	0.57	0.22	0.67	0.33	0.67	0.33	0.50	0.33
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.11)	(0.08)
Average Wages	0.35	0.27	0.43	0.25	0.43	0.25	0.26	0.29
	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)	(0.07)	(0.08)
Officer Share of Wages	0.60	-0.21	0.75	-0.19	0.75	-0.19	0.80	-0.03
	(0.05)	(0.06)	(0.04)	(0.07)	(0.04)	(0.07)	(0.06)	(0.09)
Share Using a Computer	0.36	0.33	0.41	0.39	0.41	0.39	0.20	0.60
	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.11)	(0.09)
Capital per Worker	-0.20	0.76	-0.26	0.78	-0.26	0.78	-0.20	0.79
	(0.06)	(0.04)	(0.06)	(0.04)	(0.07)	(0.05)	(0.06)	(0.05)
R&D	-0.08	0.08	-0.16	0.17	-0.16	0.17	-0.11	0.00
	(0.06)	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Concentration	-0.21	0.17	-0.27	0.05	-0.27	0.05	-0.24	0.02
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)
Weight by Sales	Yes	Yes						
Weight by Profits			Yes	Yes	Yes	Yes	Yes	Yes
Size >100M					Yes	Yes	Yes	Yes
Control for 1-D NAICS							Yes	Yes

Panel B. Top 0.1% Profits by Corporate Form

	Pass-through	C-corp	Pass-through	C-corp	Pass-through	C-corp	Pass-through	C-corp
Skill Share of Workers	0.27	0.22	0.41	0.33	0.41	0.33	0.35	0.33
	(0.04)	(0.07)	(0.05)	(0.07)	(0.05)	(0.08)	(0.08)	(0.08)
Average Wages	0.68	0.27	0.66	0.25	0.66	0.25	0.55	0.29
	(0.05)	(0.06)	(0.05)	(0.07)	(0.05)	(0.07)	(0.05)	(0.08)
Officer Share of Wages	0.43	-0.21	0.58	-0.19	0.58	-0.19	0.59	-0.03
	(0.06)	(0.06)	(0.05)	(0.07)	(0.06)	(0.07)	(0.07)	(0.09)
Share Using a Computer	0.50	0.33	0.54	0.39	0.54	0.39	0.37	0.60
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.10)	(0.09)
Capital per Worker	0.02	0.76	0.05	0.78	0.05	0.78	0.08	0.79
	(0.06)	(0.04)	(0.07)	(0.04)	(0.07)	(0.05)	(0.06)	(0.05)
R&D	-0.07	0.08	-0.14	0.17	-0.14	0.17	-0.11	0.00
	(0.06)	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Concentration	-0.09	0.17	-0.10	0.05	-0.09	0.05	-0.08	0.02
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)
Weight by Sales	Yes	Yes						
Weight by Profits			Yes	Yes	Yes	Yes	Yes	Yes
Size >100M					Yes	Yes	Yes	Yes
Control for 1-D NAICS							Yes	Yes

Notes: This table presents correlations among top owned firms. Panel A shows correlations for top-1-0.1%-owned pass-through businesses and all C-corporations. Panel B shows correlations for top-0.1%-owned pass-through businesses and C-corporations. The industry-level correlates are the following: **Total profits** are the 2000-2014 average level of profits in 2014 dollars. **Top profits** are total profits among firms with top 1-0.1% and top 0.1% owners. **Skill share** is the 2000-2014 average share of workers in a 4-digit industry who have at least some college in the CPS. **Average wages** is the 2014 top pass-through and C-corporation wages divided by the number of employees at top-owned firms and total C-corporation employees, respectively. Aggregate employee counts and payroll for C-corporations are taken from the County Business Patterns produced by the Census Bureau. **Officer share** is the share of labor compensation (the sum of salaries and wages paid to employees, employee benefit programs such as health insurance, and contributions to pension and profit-sharing plans) that accrues to officers. Specifically, on Form 1120 and 1120S it is line 7 divided by the sum of lines 7, 8, 17, and 18. We use the S-corporation officer share for partnerships, as Form 1065 does not divide officer compensation and labor compensation. **Share using a computer** is the share of 2000–2014 average share of workers who use a computer as part of their role, following Autor, Levy and Murnane (2003). **Capital per worker** is total book value of depreciable assets less accumulated depreciation divided by aggregate W-2 payees. Capital is measured as the average for all S-corporations and C-corporations respectively in the IRS SOI corporate sample between 2000 and 2014, weighted to represent the population. Aggregate W-2 payees is measured directly for the population of S-corporations. **R&D** is the industry's average share of total R&D expenditure in Compustat between 2000 and 2014. **Concentration** is the sum of the sales shares of the four largest S and C corporations relative to total S + C industry sales, averaged over the years 2000-2014. Weight by Sales denotes that total sales by corporate form are used to weigh the correlation regression. Weight by Profits denotes that total profits by corporate form are used to weigh the correlation regression. Size > 100M restricts the sample to industries with at least $100M in total profits, with the restriction applied separately for each corporate form.

Table J.5: Construction of the Owner Deaths Analysis Sample

Step	Sample Size at End of Step
Distinct firms 2005-2010	9,489,180
Restrict to firms with one owner death 2005-2010	349,039
Restrict to dying owners in the top 1%	64,589
Restrict to dying owners under age 65	18,933
Restrict to firms with $t-1$ sales >\$100K and positive sales in $[t-4, t-1]$	4,676
Restrict to firms with at least one pre-period worker	3,273
Restrict to firms with dying owner's ownership share $\geq 20\%$	2,496
Match to at least one counterfactual firm	2,436

Notes: This table lists the sample sizes at each of eight steps in the construction of the top-1% owner deaths analysis sample, detailed in Section 3.1. The analysis sample of million-dollar-earner deaths is a subset of the top-1% sample. The sample construction begins with all distinct pass-throughs in the 2005-2010 subset of our linked-firm-owner data. The second step restricts to "owner-death" firms: those with one firm-owner-year observation in our main sample 2001-2014 in which the owner died in the year of or immediately following the observation, as well as to firms in which that one firm-owner-year observation lies in a year $t \in 2005 - 2010$. The third step restricts to firms with dying owners in the top 1% of the $t-1$ U.S. fiscal income distribution. The fourth step restricts to dying owners aged under 65 on December 31 of year t. The fifth step further restricts to firms with at least \$100,000 in sales in 2014 dollars in $t-1$ and positive sales in all years $[t-4, t-1]$. The sixth step restricts to firms with positive employment in some year $[t-4, t-1]$. The seventh step restricts to firms in which the dying owner had an ownership share of at least 20%. The eighth step restricts attention to owner-death firms with at least one match to a "counterfactual" firm that met the same $[t-4, t-1]$ firm requirements, match the owner-death firm on organizational form (S-corporation or partnership), three-digit industry, and $t-1$ sales decile, and have a year-t owner who matches the dying owner on $t-1$ income bin and five-year age bin.

Table J.6: Construction of the Inferred Owner Retirement Analysis Sample

Step	Sample Size at End of Step
Distinct firms 2005-2010	9,489,180
Restrict to firms with an inferred retirement	191,656
Restrict to firms with top 1% owner in $t-1$	21,616
Restrict to firms with $t-1$ sales >\$100K and positive sales in $[t-4, t-1]$	18,115
Restrict to firms with at least one pre-period worker	18,115
Restrict to firms with working owner's ownership share $\geq 20\%$	16,827
Match to at least one counterfactual firm	16,548

Notes: This table lists the sample sizes at each of eight steps in the construction of the top-1% owner retirements analysis sample, detailed in Section 3.2. The analysis sample of million-dollar-earner retirements is a subset of the top-1% sample. The sample construction begins with all distinct pass-throughs in the 2005-2010 subset of our linked-firm-owner data. The second step restricts to "owner-retirement" firms: those with at least one owner receiving a W-2 $[t-4, t-1]$ and no owner receiving a W-2 $[t, t+1]$ while still have positive sales, with t in $[2005, 2010]$. The third step restricts to firms with retiring owners in the top 1% of the $t-1$ U.S. fiscal income distribution. The fourth step further restricts to firms with at least \$100,000 in sales in 2014 dollars in $t-1$ and positive sales in all years $[t-4, t-1]$. The fifth step restricts to firms with positive employment in some year $[t-4, t-1]$. The sixth step restricts to firms in which the dying owner had an ownership share of at least 20%. The seventh step restricts attention to owner-retirement firms with at least one match to a "counterfactual" firm that met the same $[t-4, t-1]$ firm requirements, match the owner-retirement firm on organizational form (S-corporation or partnership), three-digit industry, and $t-1$ sales decile, and have a highest-earning year-t owner in the same $t-1$ income bin as the highest-earning year-t owner who received a W-2 in the retirement firm and also in the same five-year age bin. There is no age restriction in the owner retirements sample. The restriction on pre-period workers does not reduce the sample size by construction.

Table J.7: Impact of Owner Death on Firm Outcomes

	Profits per pre-period worker ($/worker) (1)	Firm survival (pp) (2)	Profits per pre-period worker ($/worker)				
			(3)	(4)	(5)	(6)	(7)
A. Top 1% Owner Death							
Impact	-12,920	-0.182	-7,001	-9,667	-15,572	3,011	-12,087
	(1,831)	(0.009)	(2,108)	(2,373)	(2,702)	(2,112)	(1,961)
Surviving firms only			X				
Minority owner				X			
Majority owner					X		
Death before 65	X	X	X	X	X		X
Death after 75						X	
S-corporations only							X
Observations	2,609,973	2,609,973	958,158	910,899	1,699,074	114,021	2,358,207
Owner deaths	2,436	2,436	1,305	1,094	1,342	1,601	2,093
R^2	0.004	0.064	0.001	0.001	0.006	0.000	0.003
Mean of counterfactual firms	27,258	0.889	28,290	26,162	28,151	14,911	25,287
Dying owners ownership %	65.0%	65.0%	56.7%	39.7%	85.7%	58.5%	67.9%
Preferred percentage impact	-72.9%	-31.6%	-43.7%	-93.1%	-64.6%	34.5%	-70.4%
B. Top 0.1% Owner Death							
Impact	-29,543	-0.205	-16,625	-11,761	-43,206	8,506	-32,584
	(10,582)	(0.023)	(12,916)	(11,698)	(16,382)	(5,662)	(12,597)
Surviving firms only			X				
Minority owner				X			
Majority owner					X		
Death before 65	X	X	X	X	X		X
Death after 75						X	
S-corporations only							X
Observations	194,787	194,787	84,717	72,990	121,797	41,661	180,153
Owner deaths	435	435	213	189	246	496	378
R^2	0.005	0.071	0.001	0.001	0.010	0.001	0.005
Mean of counterfactual firms	48,221	0.878	53,194	41,948	53,040	19,273	50,955
Dying owners ownership %	66.4%	66.4%	58.9%	40.1%	86.6%	60.2%	68.7%
Preferred percentage impact	-92.3%	-35.1%	-53.1%	-69.9%	-94.1%	73.4%	-93.1%

Notes: This table repeats Table 4A for the (fiscal-income) top 1% and top 0.1%. See the notes to that table for details.

Table J.8: Impact of Inferred Owner Retirements on Firm Outcomes

	Profits per pre-period worker ($/worker) (1)	Firm survival (pp) (2)	Profits per pre-period worker ($/worker)			
			(3)	(4)	(5)	(6)
A. Inferred Top 1% Owner Retirement						
Impact	-17,150	-0.283	-9,280	-11,799	-19,088	-17,806
	(1,027)	(0.004)	(1,329)	(1,849)	(1,228)	(1,052)
Surviving firms only			X			
Minority owner				X		
Majority owner					X	
S-corporations only						X
Observations	1,432,179	1,432,179	693,306	371,043	1,061,136	1,361,682
Owner retirements	16,548	16,548	9,150	4,400	12,148	15,485
R^2	0.005	0.122	0.002	0.003	0.006	0.006
Mean of counterfactual firms	37,780	0.930	40,878	33,808	39,219	38,498
Retiring owners ownership %	76.2%	76.2%	76.5%	41.0%	88.9%	77.6%
Preferred percentage impact	-59.6%	-40.0%	-29.7%	-85.2%	-54.7%	-59.6%
B. Inferred Top 0.1% Owner Retirement						
Impact	-45,861	-0.265	-24,104	-37,020	-49,112	-48,288
	(7,286)	(0.009)	(8,845)	(13,993)	(8,535)	(7,334)
Surviving firms only			X			
Minority owner				X		
Majority owner					X	
S-corporations only						X
Observations	255,897	255,897	122,715	65,682	190,215	246,024
Owner retirements	3,176	3,176	1,763	854	2,322	2,988
R^2	0.003	0.106	0.002	0.002	0.004	0.004
Mean of counterfactual firms	84,573	0.921	95,282	74,282	88,359	84,478
Retiring owners ownership %	75.6%	75.6%	76.5%	40.2%	88.6%	76.8%
Preferred percentage impact	-71.7%	-38.0%	-33.0%	-123.9%	-62.7%	-74.5%

Notes: This table repeats Table 4B for the (fiscal-income) top 1% and top 0.1%. See the notes to that table for details.

Table J.9: Dollar-Weighted Impact of Owner Deaths and Retirements on Firm Profits

	Equal weight	log pre-profits weight	Pre-period profit weighted		
			Full Sample	<50M in pre-period profits	<10M in pre-period profits
	(1)	(2)	(3)	(4)	(5)
A. Owner Deaths					
Impact	-12,920.0	-18,247.3	-35,421.1	-31,033.8	-22,033.3
	(1,831.2)	(2,198.0)	(8,166.8)	(7,338.7)	(4,930.7)
Mean of counterfactual firms	27,068.4	33,465.5	64,188.2	62,418.5	50,092.9
Dying owners ownership %	65.0%	64.8%	57.4%	57.1%	60.1%
Percentage impact in sample	-73.4%	-84.2%	-96.1%	-87.1%	-73.2%
Scenarios to bound effects for large firms					
Low impact (% impact = 0)				-62.4%	-38.1%
Medium impact (% impact = .5)				-76.6%	-62.1%
High impact (% impact = 1)				-90.8%	-86.1%
B. Owner Retirements					
Impact	-17,150.3	-26,525.9	-83,798.2	-74,484.4	-52,499.9
	(1,027.0)	(1,288.2)	(11,761.0)	(9,467.5)	(4,124.1)
Mean of counterfactual firms	36,642.6	50,120.7	102,842.2	96,658.6	86,082.5
Retiring owners ownership %	76.2%	75.9%	69.3%	69.3%	70.2%
Percentage impact in sample	-61.5%	-69.8%	-117.7%	-111.1%	-86.9%
Scenarios to bound effects for large firms					
Low impact (% impact = 0)				-79.6%	-45.2%
Medium impact (% impact = .5)				-93.8%	-69.2%
High impact (% impact = 1)				-108.0%	-93.2%

Notes: This table estimates the effects of owner deaths and retirements under alternative weighting specifications. Panel A and B use the owner death and retirement samples, repectively. Column 1 replicates the equal-weighted result from Column 8 of Table 4. Column 2 weighs all owner death pairs in our analysis sample by the log of their mean pre-period profits (i.e., mean profits from $t-4$ to $t-1$). Column 3 uses the level of mean pre-period profits as weights. Columns 4 and 5 also dollar-weight using pre-period profits, but restrict the sample to firms with average pre-period profit below $50M and $10M, respectively. The mean of counterfactual firms is the pre-period profit weighted mean four years after owner death, scaled by the ratio of average pre-period profits of the counterfactual firm to average pre-period profits of firms whose owner died. The ownership share of dying owners is measured in the year before owner death and is also the pre-period profit weighted mean.

Table J.10: CEO and Entrepreneurial Income, Own Firm Size, and Reference Firm Size

	ln (Total compensation)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Top 1000			Top 500		

Panel A. Gabaix and Landier (2008)

ln(Firm size)	0.21***	.37***	.37***	.26***	.38***	.32***	.23***
	(0.01)	(0.02)	(0.02)	(0.06)	(0.04)	(0.04)	(0.07)
ln(Firm size of #250)		.72***	.66***	.78***	.73***	.73***	.84***
		(0.053)	(0.054)	(0.052)	(0.084)	(0.085)	(0.080)
Observations	9,777	7,936	7,936	7,936	4,156	4,156	4,156
R^2	.439	.23	.29	.6	.2	.29	.63
Year fixed effects	✓						
Industry fixed effects	✓		✓			✓	
Firm fixed effects				✓			✓

Panel B. Estimates in Smith, Yagan, Zidar and Zwick (2018) sample

ln(Firm size)	0.80***	0.78***	0.79***	0.82***	0.62***	0.72***	0.78***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
ln(Firm size of #250)		0.27***	0.30***	0.23***	0.42***	0.34***	0.31***
		(0.05)	(0.04)	(0.04)	(0.08)	(0.06)	(0.05)
Observations	13,445	13,445	13,445	13,445	6,654	6,654	6,654
R^2	0.558	0.124	0.477	0.875	0.091	0.468	0.872
Year fixed effects	✓						
Industry fixed effects	✓		✓			✓	
Firm fixed effects				✓			✓

Notes: This table replicates Table I and Table II in Gabaix and Landier (2008) using the full population of S-corporations and partnerships. Panel A reproduces the results from Gabaix and Landier (2008) for the sake of comparability. We regress the log of entrepreneurial income (i.e., pass-through income plus wages from their firm) in year t on the log of the firm size in year $t-1$, and the log of the 250th firm size in year $t-1$. Gabaix and Landier use a different measure of firm size. Their baseline measure of firm size uses total market value (debt plus equity), which we present in Columns 2-7, but their Table I shows similar results using sales as a measure of firm size. Since we cannot measure total market value for pass-throughs, we measure firm size using total sales across all specifications. Firm size information is defined in year $t-1$. Following Gabaix and Landier, we select each year the top $n \in \{500, 1000\}$ largest firms. All nominal quantities are converted into 2014 dollars. Industries are defined at the 4-digit NAICS level. Section 1 describes our data. Robust standard errors reported in parentheses (***$p < 0.01$,** $p < 0.05$,** $p < 0.1$).

Table J.11: Entrepreneurial Income, Own Firm Size, and Reference Firm Size

	ln (Total compensation)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Top 1000			Top 500		

Panel A. S-corporations in Smith, Yagan, Zidar and Zwick (2018) sample

ln(Firm size)	0.88***	0.83***	0.87***	0.95***	0.81***	0.87***	0.86***
ln(Firm size of #250)		0.32***	0.29***	0.21***	0.38***	0.25***	0.26***
		(0.05)	(0.04)	(0.04)	(0.07)	(0.06)	(0.06)
Observations	13,859	13,859	13,859	13,859	6,892	6,892	6,892
R^2	0.490	0.157	0.396	0.833	0.147	0.422	0.848
Year fixed effects	✓						
Industry fixed effects	✓		✓			✓	
Firm fixed effects				✓			✓

Panel B. Partnerships in Smith, Yagan, Zidar and Zwick (2018) sample

ln(Firm size)	0.77***	0.91***	0.76***	0.88***	0.72***	0.67***	0.75***
ln(Firm size of #250)		-0.05	0.26***	0.11***	-0.00	0.37***	0.20***
		(0.05)	(0.04)	(0.03)	(0.07)	(0.05)	(0.04)
Observations	12,395	12,395	12,395	12,395	6,233	6,233	6,233
R^2	0.655	0.168	0.585	0.900	0.103	0.573	0.899
Year fixed effects	✓						
Industry fixed effects	✓		✓			✓	
Firm fixed effects				✓			✓

Notes: This table replicates Table J.10 for the full population of S-corporations and partnerships separately. See the notes of Table J.10 for details.

Table J.12: Changes in Entrepreneurial Income and Reference Firm Size

	Gabaix and Landier (2008)	Smith, Yagan, Zidar, and Zwick (2018)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		S-corporations				Partnerships			
		Top 1000		Top 500		Top 1000		Top 500	
D.ln(Firm size)	1.14***								
	(0.28)								
D.5 ln(Firm size of #250)		1.04***		1.23***		0.81***		0.83***	
		(0.08)		(0.13)		(0.11)		(0.15)	
D.10 ln(Firm size of #250)			0.16		-0.18		0.20		-0.19
			(0.21)		(0.29)		(0.26)		(0.30)
Observations	34	6,283	2,367	3,087	1,169	4,388	1,460	2,377	837
R^2	.29	0.031	0.000	0.040	0.000	0.011	0.000	0.011	0.000

Notes: This table estimates the effect of lagged firm size changes on log entrepreneurial income for the full population of S-corporations and partnerships. Column 1 reproduces analogous results for log CEO pay, which are estimated in Table IIII of Gabaix and Landier (2008). Gabaix and Landier use a different measure of firm size. Their baseline measure of firm size uses total market value (debt plus equity), which we present in Column 1, but their Table 1 shows similar results using sales as a measure of firm size. Since we cannot measure total market value for pass-throughs, we measure firm size using total sales across all specifications. Firm size information is defined in year $t-1$. Following Gabaix and Landier, we select each year the top $n \in \{500, 1000\}$ largest S-corporations and partnerships. D.5 and D.10 denote five- and ten-year lags, respectively. Section 1 describes our data. Robust standard errors reported in parentheses (***$p < 0.01$,** $p < 0.05$,** $p < 0.1$).