Capital and Labor:
The Factor Income Composition of Top Incomes in the United States, 1962-2006
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Online Appendix

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A.1. Additional results

**Figure A.1.** Decomposition by factor income of the top 5% income share

**Figure A.2.** Decomposition by factor income of the top 0.5% income share
Figure A.3. Decomposition by factor income of top 1% share: Splitting out business income

Panel A uses separate axes: labor on the left, capital and business income on the right axis. Business includes income from Schedule-C (sole- proprietors), partnerships and S-corporations.
**Figure A.4.** Long-run changes in the distribution conditional on top 5%

Excluding capital gains, negative observations and non-filers. Partnership and S-corporation income split between labor (3/4) and capital (1/4). Sole-proprietor income split between labor (2/3) and capital (1/3).

**Figure A.5.** Long-run changes in the distribution conditional on top 0.5%

Excluding capital gains, negative observations and non-filers. Partnership and S-corporation income split between labor (3/4) and capital (1/4). Sole-proprietor income split between labor (2/3) and capital (1/3).
Table A.1. Difference in survival association matrices (in percentage points):
Alternative periods

(a) 2006 compared with 1990

| Labor | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|-------|-------|---------|
| Top 50% | 0.957   | 1.254   | 1.499   | 1.541   | 1.101 | 0.215 | 0.093   |
| Top 40% | 1.050   | 1.396   | 1.566   | 1.560   | 1.073 | 0.219 | 0.097   |
| Top 20% | 0.705   | 1.116   | 1.339   | 1.271   | 0.856 | 0.222 | 0.100   |
| Top 10% | 0.340   | 0.668   | 0.991   | 0.972   | 0.688 | 0.223 | 0.099   |
| Top 5%  | 0.079   | 0.287   | 0.589   | 0.627   | 0.492 | 0.201 | 0.095   |
| Top 1%  | 0.014   | 0.026   | 0.115   | 0.161   | 0.148 | 0.096 | 0.072   |
| Top 0.5%| 0.001   | 0.004   | 0.041   | 0.071   | 0.073 | 0.047 | 0.045   |

(b) 2006 compared with 1992

| Labor | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|-------|-------|---------|
| Top 50% | 0.580   | 0.783   | 1.332   | 1.266   | 0.868 | 0.154 | 0.066   |
| Top 40% | 0.752   | 0.859   | 1.453   | 1.326   | 0.869 | 0.164 | 0.067   |
| Top 20% | 0.560   | 0.825   | 1.208   | 1.068   | 0.689 | 0.159 | 0.062   |
| Top 10% | 0.238   | 0.481   | 0.900   | 0.815   | 0.533 | 0.149 | 0.059   |
| Top 5%  | 0.059   | 0.170   | 0.561   | 0.526   | 0.379 | 0.125 | 0.052   |
| Top 1%  | 0.008   | 0.016   | 0.102   | 0.133   | 0.120 | 0.078 | 0.047   |
| Top 0.5%| 0.007   | 0.009   | 0.040   | 0.065   | 0.067 | 0.048 | 0.040   |
A.2. Derivation of first-order dominance test

Association matrices $A$ and $A^*$ are defined as

$$A = \begin{pmatrix}
    
    \ldots & j-1 & j \\
    \ldots & \ldots & \ldots \\
    \ldots & p_{i-1,j-1} & p_{i-1,j} \\
    \ldots & \ldots & \ldots \\
    \ldots & p_{i,j-1} & p_{i,j} \\
    \ldots & \ldots & \ldots \\
    \end{pmatrix} \hat{B} \begin{pmatrix}
    i-1 \\
    i \\
    \end{pmatrix} ; \\
A^* = \begin{pmatrix}
    
    \ldots & j-1 & j \\
    \ldots & \ldots & \ldots \\
    \ldots & p_{i-1,j-1} + \gamma & p_{i-1,j} - \gamma \\
    \ldots & \ldots & \ldots \\
    \ldots & p_{i,j-1} - \gamma & p_{i,j} + \gamma \\
    \ldots & \ldots & \ldots \\
    \end{pmatrix} \hat{B} \begin{pmatrix}
    i-1 \\
    i \\
    \end{pmatrix}
$$

where $i$ and $j$ are particular quantile groups (of labor and capital), $p_{i,j}$ is the frequency in the association matrix, and $\gamma > 0$. $A^*$ is obtained from $A$ by a correlation-increasing switch, which raises the weight on the diagonal without changing the marginal distributions. Hence $A^*$ exhibits stronger association between labor and capital. The survival association matrix of $A$ is defined as

$$\alpha = \begin{pmatrix}
    \ldots & \geq j-1 & \cdots \\
    \ldots & \alpha_{i-1,j} + \alpha_{i,j} - \alpha_{i,j} + p_{i-1,j-1} \\
    \ldots & \alpha_{i,j} + \alpha_{i+1,j-1} - \alpha_{i+1,j} + p_{i,j-1} \\
    \ldots & \alpha_{i+1,j-1} \\
    \end{pmatrix} \hat{B} \begin{pmatrix}
    \geq j-1 \\
    \geq j \\
    \geq j+1 \\
    \end{pmatrix}$$

$$\alpha^* = \begin{pmatrix}
    \ldots & \geq j-1 & \cdots \\
    \ldots & \alpha_{i-1,j} + \alpha_{i,j} - (\alpha_{i,j} + \gamma) + p_{i-1,j-1} + \gamma \\
    \ldots & (\alpha_{i,j} + \gamma) + \alpha_{i+1,j-1} - \alpha_{i+1,j} + p_{i,j-1} - \gamma \\
    \ldots & \alpha_{i+1,j-1} \\
    \end{pmatrix} \hat{B} \begin{pmatrix}
    \geq j-1 \\
    \geq j \\
    \geq j+1 \\
    \end{pmatrix}$$

where $\alpha_{i,j} = \Pr(l > l_i \cap k > k_j)$. We have used the fact that $\alpha_{i,j} = \alpha_{i,j+1} + \alpha_{i+1,j} - \alpha_{i+1,j+1} + p_{i,j}$: the diagonal element $\alpha_{i+1,j+1}$ needs to be subtracted because adding the adjacent elements $\alpha_{i,j+1}$ and $\alpha_{i+1,j}$ double-counts these cells. All other cells follow from the same formula. Similarly, the survival association matrix of $A^*$ is denoted by

$$\alpha^* = \begin{pmatrix}
    \ldots & \geq j-1 & \cdots \\
    \ldots & \alpha_{i-1,j} + \alpha_{i,j} - (\alpha_{i,j} + \gamma) + p_{i-1,j-1} + \gamma \\
    \ldots & (\alpha_{i,j} + \gamma) + \alpha_{i+1,j-1} - \alpha_{i+1,j} + p_{i,j-1} - \gamma \\
    \ldots & \alpha_{i+1,j-1} \\
    \end{pmatrix} \hat{B} \begin{pmatrix}
    \geq j-1 \\
    \geq j \\
    \geq j+1 \\
    \end{pmatrix}$$

where we used the following results: $\alpha_{i,j}^* = \alpha_{i,j} + \gamma; \alpha_{i,j-1}^* = \alpha_{i,j-1}$ and $\alpha_{i-1,j}^* = \alpha_{i-1,j}$ because $\gamma$ cancels out. After canceling out $\gamma$, it is clear that the only difference between $\alpha$ and $\alpha^*$ is $\alpha_{i,j}^*$.
such that $\alpha_{i,j}^{*} = \alpha_{i,j} + \gamma$. Therefore, taking the difference between $\alpha^{*}$ and $\alpha$ yields the following result (also see Equation 4 in the main text)

$$
\alpha^{*} - \alpha = \begin{pmatrix}
\cdots & \cdots & \cdots & \cdots & \cdots \\
\cdots & 0 & 0 & 0 & \cdots \\
\cdots & 0 & \gamma & 0 & \cdots \\
\cdots & 0 & 0 & 0 & \cdots \\
\cdots & \cdots & \cdots & \cdots & \cdots
\end{pmatrix}_{\geq i - 1} \begin{pmatrix}
\geq i - 1 & \geq j & \geq j + 1 \\
\geq i & \geq i & \geq i + 1
\end{pmatrix}
$$

Another way to explain the first-order dominance result is to illustrate it with an example. The association matrix for 2006 is given in Table 2 in the main text (with the survival association matrix in Table 3). The association matrix in Table A.2 is the same except for a correlation-increasing switch affecting the P60-P80 and P80-P90 groups ($\gamma = 0.5\%$). Table A.3 shows the corresponding survival association matrix. Finally, the difference between the two survival association matrices (Table 3 and Table A.3) is given in Table A.4, which is everywhere zero, except for a positive value around the correlation-increasing switch.
Table A.2. Association matrix in 2006 with correlation-increasing switch (frequencies in %)

| Labor   | ≤P50 | P50-P60 | P60-P80 | P80-P90 | P90-P95 | P95-P99 | P99-P99.5 | >P99.5 | Total |
|---------|------|---------|---------|---------|---------|---------|-----------|--------|-------|
| ≤P50    | 30.582 | 2.948 | 7.553 | 5.054 | 2.336 | 1.320 | 0.122 | 0.090 | 50    |
| P50-P60 | 6.233 | 0.874 | 1.537 | 0.651 | 0.435 | 0.245 | 0.016 | 0.012 | 10    |
| P60-P80 | 9.390 | 2.729 | 4.953 | 1.196 | 0.867 | 0.785 | 0.040 | 0.030 | 20    |
| P80-P90 | 2.937 | 1.808 | 2.625 | 1.601 | 0.484 | 0.508 | 0.026 | 0.021 | 10    |
| P90-P95 | 0.829 | 0.876 | 1.820 | 0.651 | 0.359 | 0.396 | 0.039 | 0.020 | 5     |
| P99-P99 | 0.374 | 0.399 | 1.372 | 0.698 | 0.392 | 0.542 | 0.157 | 0.065 | 4     |
| >P99.5  | 0.004 | 0.003 | 0.036 | 0.054 | 0.055 | 0.106 | 0.042 | 0.200 | 0.5   |
| Total   | 50   | 10      | 20      | 10      | 5      | 4      | 0.5      | 0.5    | 100   |

Note: The cells affected by the correlation-increasing switch are in bold. These cells are also shown in the derivation of the first-order dominance test.

Table A.3. Survival association matrix in 2006 with correlation-increasing switch (frequencies in %)

| Labor   | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|---------|---------|---------|---------|---------|-------|-------|----------|
| Top 50% | 30.216  | 23.510  | 11.074  | 6.132  | 3.469 | 0.787 | 0.411    |
| Top 40% | 26.446  | 20.614  | 9.715  | 5.424  | 3.196 | 0.759 | 0.399    |
| Top 20% | 15.846  | 12.743  | 6.797  | 3.702  | 2.341 | 0.689 | 0.369    |
| Top 10% | 8.773   | 7.478  | 4.157  | 2.663  | 1.786 | 0.642 | 0.348    |
| Top 5%  | 4.612   | 4.193  | 2.692  | 1.849  | 1.331 | 0.583 | 0.328    |
| Top 1%  | 0.987   | 0.967  | 0.838  | 0.693  | 0.567 | 0.361 | 0.263    |
| Top 0.5%| 0.496   | 0.493  | 0.457  | 0.403  | 0.348 | 0.242 | 0.200    |

Note: The bold cells are shown in the derivation of the first-order dominance test.

Table A.4. Difference between survival association matrices in 2006 with and without correlation-increasing switch (in percentage points)

| Labor  | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|--------|---------|---------|---------|---------|-------|-------|----------|
| Top 50%| 0.000   | 0.000   | 0.000   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 40%| 0.000   | 0.000   | 0.000   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 20%| 0.000   | 0.000   | 0.500   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 10%| 0.000   | 0.000   | 0.000   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 5% | 0.000   | 0.000   | 0.000   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 1% | 0.000   | 0.000   | 0.000   | 0.000   | 0.000 | 0.000 | 0.000    |
| Top 0.5%| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000    |

Note: The bold cells are shown in the derivation of the first-order dominance test.
A.3. Adjustments made to public use files

The public use files (PUF) are subject to adjustments that try to avoid individual taxpayers being identified. Because public data on executive compensation may be available, salaries reported on tax returns have been blurred (or micro-aggregated) since 1983 by replacing adjacent records by their average. Therefore, an observation in the PUF never contains all the information on a tax return, and may include information from other returns. Before 1996, this only affected salaries at the top (the top 1% or less), so it is unlikely to affect our results substantially.¹ In Table A.5, we show that the dominance result in the main text (for the period 1988-2006) is robust to choosing the period 1988-1995. 1995 is the last year before blurring was applied to salaries throughout the distribution, and before profits from sole-proprietorships were also blurred.

|       | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|--------|--------|----------|
| Labor |         |         |         |         |        |        |          |
| Top 50% | 0.946   | 1.036   | 0.888   | 0.666   | 0.423  | 0.130  | 0.062    |
| Top 40% | 0.878   | 0.987   | 0.814   | 0.666   | 0.452  | 0.140  | 0.063    |
| Top 20% | 0.524   | 0.593   | 0.691   | 0.586   | 0.352  | 0.142  | 0.072    |
| Top 10% | 0.284   | 0.373   | 0.584   | 0.472   | 0.291  | 0.147  | 0.072    |
| Top 5%  | 0.061   | 0.231   | 0.433   | 0.379   | 0.230  | 0.134  | 0.071    |
| Top 1%  | 0.015   | 0.030   | 0.077   | 0.093   | 0.066  | 0.041  | 0.038    |
| Top 0.5% | 0.004   | 0.007   | 0.028   | 0.037   | 0.028  | 0.016  | 0.016    |

¹ Other variables such as alimony payments, real estate deductions or the state of residence were also blurred or removed, but we do not use them in our analysis. Because the PUFs also exclude some records at the very top (between 13 and 191 records during 1996 to 2008, as reported by Piketty et al.), Saez and Zucman (2016) and Piketty et al. (2018) augment the PUF with a synthetic observation to match the totals above $10m. The cut-off for the top 0.5%, which is the smallest group we consider in our analysis, is far lower than that, so this is unlikely to affect our results. Sailer et al. (2001) find that the original and blurred data match well for the top 1%, but they find larger differences for the top 400 taxpayers. For a full description of the PUF construction, see Winglee et al. (2002) and http://users.nber.org/~taxsim/gdb/.
We present two further robustness checks which consider the change in the association between 1982 and 1995. None of the income components we use were blurred in 1982. Since the blurring affects income components, but not total income, one can attempt to recreate the raw salaries from the correctly recorded total income, as we do here for 1995. It will be impossible to reproduce the raw salaries with certainty, since multiple income components have been removed or blurred at the same time, and components have been rounded, but it is nevertheless a useful robustness check. For example, in 1995 alimony paid and received, which is part of total taxable income, was removed for high-income tax units and blurred for low-income tax units. For the low-income observations, for whom salaries were not blurred, our recreated salaries are 5% greater on average than the raw salaries in 1995. The recreated salaries also contain a substantial number of negatives (around 7.5% of the high-income observations), which we set to zero. Our recreated salary variable combines the raw salaries for the low-income observations (approximately the bottom 99%) with the recreated salaries for the high-income observations.

Table A.6a reports the first-order dominance tests between 1982 and 1995 for the baseline income definition used in the main text. Using variables as recorded in the PUF, the association between labor and capital incomes increased over this period (panel a), similar to what we observed between 1988 and 2006 (Table 4b). When we use the recreated salary variable, the results are almost identical (panel b of Table A.6); the differences are all within 0.005pp. Finally, we can compare these results with what the recorded PUF data show between 1982 and 1996, when disclosure avoidance procedures became more stringent.\(^2\) Comparing 1982 to 1996 with 1982 to 1995 may tell us something about the role of these procedures, although we can obviously not control for any

\(^2\) Salaries were blurred also for the low-income observations. Sole-proprietorship profits were now blurred.
other contemporaneous events that may affect the association. The first-order dominance is also confirmed between 1982 and 1996 (panel c).

Table A.6. Difference in survival association matrices (in percentage points)

(a) 1995 compared with 1982: Baseline results

|           | Capital |       |       |       |       |       |       |
|-----------|---------|-------|-------|-------|-------|-------|-------|
|           | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
| Top 50%   |    1.353 |    1.142 |    1.401 |    1.147 |     0.864 |     0.288 |     0.159 |
| Top 40%   |    1.232 |    1.078 |    1.302 |    1.096 |     0.873 |     0.295 |     0.167 |
| Top 20%   |    1.040 |     0.881 |    1.065 |    1.001 |     0.736 |     0.315 |     0.173 |
| Top 10%   |     0.608 |     0.659 |     0.876 |     0.824 |     0.644 |     0.320 |     0.176 |
| Top 5%    |     0.216 |     0.437 |     0.682 |     0.660 |     0.505 |     0.299 |     0.175 |
| Top 1%    |     0.031 |     0.075 |     0.190 |     0.210 |     0.192 |     0.158 |     0.135 |
| Top 0.5%  |     0.013 |     0.027 |     0.100 |     0.114 |     0.113 |     0.096 |     0.089 |

(b) 1995 compared with 1982: Recreated salaries

|           | Capital |       |       |       |       |       |       |
|-----------|---------|-------|-------|-------|-------|-------|-------|
|           | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
| Top 50%   |    1.357 |    1.146 |    1.404 |    1.150 |     0.866 |     0.290 |     0.160 |
| Top 40%   |    1.236 |    1.082 |    1.306 |    1.098 |     0.875 |     0.296 |     0.168 |
| Top 20%   |    1.042 |     0.886 |    1.069 |    1.005 |     0.738 |     0.317 |     0.175 |
| Top 10%   |     0.612 |     0.662 |     0.880 |     0.828 |     0.647 |     0.322 |     0.178 |
| Top 5%    |     0.218 |     0.439 |     0.687 |     0.663 |     0.507 |     0.302 |     0.177 |
| Top 1%    |     0.030 |     0.075 |     0.190 |     0.210 |     0.195 |     0.161 |     0.137 |
| Top 0.5%  |     0.013 |     0.027 |     0.100 |     0.114 |     0.113 |     0.096 |     0.089 |

Note: For 1995, salaries have been recreated from total income.

(c) 1996 compared with 1982

|           | Capital |       |       |       |       |       |       |
|-----------|---------|-------|-------|-------|-------|-------|-------|
|           | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
| Top 50%   |    1.196 |    1.112 |    1.584 |    1.224 |     0.948 |     0.280 |     0.159 |
| Top 40%   |    1.143 |    1.044 |    1.488 |    1.140 |     0.944 |     0.287 |     0.167 |
| Top 20%   |     0.945 |     0.872 |     1.212 |     1.059 |     0.818 |     0.317 |     0.175 |
| Top 10%   |     0.597 |     0.659 |     0.945 |     0.868 |     0.687 |     0.314 |     0.177 |
| Top 5%    |     0.249 |     0.403 |     0.723 |     0.689 |     0.549 |     0.302 |     0.176 |
| Top 1%    |     0.029 |     0.075 |     0.209 |     0.215 |     0.202 |     0.165 |     0.133 |
| Top 0.5%  |     0.011 |     0.024 |     0.100 |     0.115 |     0.113 |     0.098 |     0.090 |
A.4. Comparison with earlier literature

Figure A.6 compares our top 1% income share with the estimates by Piketty and Saez (2007) (taken from Saez, 2019). Our methodology differs from Piketty and Saez in several aspects: (a) Piketty and Saez adjust for non-filing and define top quantiles relative to the entire US population of potential taxpayers, while in the baseline we only consider tax units that file a return. (b) Piketty and Saez use total gross market income reported on the tax return, while we use the sum of income components. We thus exclude some small income sources, such as alimony. The disclosure avoidance procedures, which affect income components but not total income, could also lead to differences (see Appendix A.3). (c) The sample is different because we exclude observations which are negative in either labor, capital, sole-proprietorship or pass-through (partnership and S-corporation) income. (d) The Piketty and Saez estimates rely on tabulated data after 2001, while we use micro data throughout.

Our baseline shares are lower than Piketty and Saez (2007), but they follow a very similar trend. Setting negative observations to zero instead of excluding them (see Appendix A.5), raises the top income share and brings us very close to Piketty and Saez, despite all the methodological differences.\(^3\)

Figure A.6 also shows the top 1% income shares estimated by Piketty et al. (2018) (taken from Piketty et al., 2019), whose income definition follows national accounts. For example, Piketty et al. include employee fringe benefits and impute rents to owner-occupiers, which are relatively

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\(^3\) When we set negatives to zero, we add additional observations relative to the baseline. This additional income is concentrated towards the top, especially after setting the negative components to zero.
widely distributed. They also account for all capital income, including capital income paid to pension funds and earnings retained in corporations. On the other hand, Piketty et al. exclude those short-term capital gains that do not reflect retained earnings. Their top 1% income share exceeds that based on taxable income because the former has a more complete coverage of capital incomes, which are concentrated at the top. While the Piketty et al. top 1% income share is higher than our estimates and increased somewhat slower, the general trend is similar.

**Figure A.6.** Comparison of top 1% share with Piketty and Saez (2007), Piketty et al. (2018)
A.5. Robustness checks for alternative income definitions

We replicate the main results for six alternative income definitions, which are summarized in Table A.7 (also see Section 1 in the main text). The first robustness check sets negatives in labor, capital, sole-proprietorship and pass-through (partnership and S-corporation) income to zero instead of dropping them. Second, capital gains are included with capital income. Capital gains have been adjusted to account for changes in legislation affecting the taxable portion of capital gains. In the third robustness check, we include an estimate for the incomes of the non-filers. The literature typically defines top income shares relative to the entire population of taxpayers, whether filing or not, which requires an estimate of the total number of potential taxpayers, as well as an assumption about their income (Atkinson, 2007). In this paper, we also need an estimate of the capital-labor income split for non-filers. We use the share of non-filers estimated by Piketty et al. (2019) and add a synthetic observation to the data such that the sum of weights adds up to the estimated population of potential taxpayers. Following Piketty and Saez (2003) and Auten and Splinter (2019), non-filers are assumed to have 20% of average filer income. With only limited information available on the income composition of non-filers, we assume all their income comes from labor.4

Fourth, we include two robustness checks that follow a broader definition of capital incomes. In a recent paper, Piketty et al. (2018) distribute the entire national accounts income to households, 

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4 Our assumption is broadly in line with Piketty et al. (2018) who assume that most of non-filer income is wages and pensions. Auten and Splinter (2019) present some estimates of the income composition of non-filers based on third-party reports to the IRS (so-called information returns). According to these estimates, almost all non-filer income is from labor, although non-filers are estimated to have some capital income. We do not use these estimates directly because they are only available from 2000, i.e. only covering the last six years of our analysis, and extrapolating these estimates backwards would have required additional assumptions. Furthermore, the distribution of capital incomes is very skewed with many zero observations. In our baseline sample, on average only 55.4% of observations in capital are positive, ranging from 39.5% to 64.9% across the period of analysis. Therefore, even with only a small positive amount of capital income, non-filers would have higher capital incomes than around half of the tax units (in some years close to 60%) that file an income tax return. This contradicts the intuition that non-filers are at the bottom of the distribution. Our specification essentially assumes that the incomes of the non-filers are returns to their labor, with no physical capital.
highlighting the underestimation of capital incomes in tax data due to undistributed corporate profits. Following Piketty et al., we distribute corporate retained earnings to tax units in proportion to their dividend and capital gains income (using the Piketty et al. (2019) data).\(^5\) Since our baseline income definition is for gross income, we include another robustness check that adds the corporate income tax which we distribute to tax units under the same assumptions as for corporate retained earnings. In the last robustness check, we make an alternative assumption on how to split the incomes of closely-held businesses between capital and labor. Similar to CBO (2012) and Piketty et al. (2018), this specification includes S-corporation profits with capital, which is one way to address the shift of corporate income to the personal sector following TRA86. The remaining business income (sole-proprietorship and partnership income) is allocated two-thirds to labor and one-third to capital, which is similar to weights used in the earlier literature (see Section 1 in the main text). For example, Piketty et al. (2018) allocate 70% of this income to labor. This income definition was used as the baseline in an earlier version of the paper (Atkinson and Lakner, 2017).

Table A.7. Overview of income definitions used in robustness checks

| (1) Baseline | Labor | Definition of Capital | Treatment of negative obs. | Treatment of non-filers |
|-------------|-------|-----------------------|---------------------------|-------------------------|
| W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S) | Dropped | Dropped |
| (2) Negatives as zero | W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S) | Set to zero | Dropped |
| (3) Capital gains | W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S)+Kgains | Dropped | Dropped |
| (4) Non-filers | W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S) | Dropped | Included |
| (5) Distribute RE | W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S)+RE | Dropped | Dropped |
| (6) Distribute RE + CIT | W+2/3*C+3/4*(P+S) | K+1/3*C+1/4*(P+S)+RE+RE | Dropped | Dropped |
| (7) Alt. split of business | W+2/3*(C+P) | K+1/3*(C+P)+S | Dropped | Dropped |

where W=wages+pensions; C=Schedule-C; P=partnership; S=S-corporation; K=dividends+interest+rents+estate income+royalties; RE=corporate retained earnings; CIT=corporate income tax

Figure A.7 shows the decomposition of the top 1% income share by factor income. The baseline results reported in the figure are identical to the estimates in the main text (Figure 2). Including

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\(^5\) Smith et al. (2019) estimate that only between 25% and 75% of capital gains reflect the sale of corporate stocks, whereas Piketty et al. use 100% of capital gains (and dividends) to allocate corporate retained earnings. Our results are robust to using only 25% or 75% of capital gains.
capital gains increases the share of total income accruing to the top 1%, and makes the series more volatile (panel A). Including retained earnings increases the top 1% share of total income (panel A) and reduces the labor share (panel B). This is because retained earnings are allocated to capital incomes, which accrue disproportionately to the top. In terms of the marginal distributions, the trend in the top share of the earnings distribution (panel C) is very similar across the different robustness checks. The U-shape in the top capital share (panel D) becomes even more pronounced when retained earnings are included. The increase in the labor alignment coefficient (panel E) is stronger when capital gains or retained earnings are included, suggesting an increasing association between labor and total income. The U-shape pattern that was observed for the capital alignment coefficient (panel F) in the baseline is considerably weaker when capital gains and retained earnings (and particularly, the corporate income tax) are included.6

Figure A.8 reproduces the long-run changes in the conditional distribution (similar to Figure 3), which are very similar across the different robustness checks. Including capital gains or retained earnings weakens the association in the earlier half of the period, but the increase in the second half of the period is robust across the different specifications and across the different parts of the distribution. Using the first-order dominance test, the rise in the association between capital and labor income between 1988 and 2006 is confirmed for all income definitions (Tables A.8 to A.13). With the exception of the alternative split of closely-held business income (Table A.13), as well as a small negative difference when negatives are set to zero (Table A.8) we find first-order dominance also over the entire period from 1966 to 2006 (Tables A.9 to A.12). However, as noted in the main text, the results are difficult to interpret over that period, since it spans TRA86.

6 However, when ignoring some of the spikes in capital gains realizations before TRA86, the U-shape is also evident in the scenario with capital gains.
Figure A.7. Decomposition by factor income of top 1% share: Alternative income definitions
Figure A.8. Long-run changes in the conditional distribution: Alternative income definitions
### Table A.8. Difference in survival association matrices (in percentage points): Negatives as zero

(a) 1985 compared with 1966

|       | Labor | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|-------|---------|---------|---------|---------|---------|-------|-------|----------|
| Top 50% | 0.859 | -1.488  | -0.831  | -0.867  | -0.931  | -0.199  | -0.066 |
| Top 40% | 1.130 | -1.081  | -0.754  | -0.747  | -0.923  | -0.219  | -0.073 |
| Top 20% | 0.455 | -0.774  | -0.744  | -0.656  | -0.713  | -0.235  | -0.080 |
| Top 10% | -0.053 | -0.574  | -0.679  | -0.630  | -0.598  | -0.228  | -0.078 |
| Top 5%  | -0.182 | -0.404  | -0.571  | -0.524  | -0.506  | -0.217  | -0.077 |
| Top 1%  | -0.140 | -0.168  | -0.233  | -0.254  | -0.237  | -0.139  | -0.068 |
| Top 0.5% | -0.073 | -0.082  | -0.120  | -0.141  | -0.133  | -0.086  | -0.056 |

(b) 2006 compared with 1988

|       | Labor | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|-------|---------|---------|---------|---------|---------|-------|-------|----------|
| Top 50% | 1.556 | 1.638   | 1.861   | 1.513   | 0.980   | 0.178   | 0.079 |
| Top 40% | 1.570 | 1.670   | 1.896   | 1.494   | 0.958   | 0.184   | 0.085 |
| Top 20% | 0.977 | 1.163   | 1.453   | 1.180   | 0.721   | 0.181   | 0.087 |
| Top 10% | 0.494 | 0.651   | 1.019   | 0.873   | 0.574   | 0.184   | 0.086 |
| Top 5%  | 0.268 | 0.404   | 0.622   | 0.569   | 0.424   | 0.168   | 0.082 |
| Top 1%  | 0.065 | 0.072   | 0.124   | 0.155   | 0.139   | 0.091   | 0.068 |
| Top 0.5% | 0.029 | 0.032   | 0.056   | 0.078   | 0.075   | 0.060   | 0.051 |

(c) 2006 compared with 1966

|       | Labor | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|-------|---------|---------|---------|---------|---------|-------|-------|----------|
| Top 50% | 2.758 | 0.703   | 1.716   | 1.255   | 0.466   | 0.117   | 0.079 |
| Top 40% | 3.116 | 1.083   | 1.801   | 1.289   | 0.446   | 0.111   | 0.083 |
| Top 20% | 1.926 | 0.877   | 1.231   | 0.894   | 0.363   | 0.094   | 0.079 |
| Top 10% | 0.733 | 0.407   | 0.702   | 0.544   | 0.247   | 0.094   | 0.081 |
| Top 5%  | 0.256 | 0.191   | 0.345   | 0.288   | 0.155   | 0.086   | 0.084 |
| Top 1%  | 0.000 | -0.003  | 0.023   | 0.026   | 0.013   | 0.034   | 0.063 |
| Top 0.5% | 0.003 | 0.005   | 0.010   | 0.013   | 0.009   | 0.027   | 0.042 |
**Table A.9.** Difference in survival association matrices (in percentage points):
Including capital gains

(a) 1985 compared with 1966

|       | Labor | Capital |
|-------|-------|---------|
| Top 50% | 1.043 | -1.493 |
| Top 40% | 1.399 | -1.095 |
| Top 20% | 0.885 | -0.704 |
| Top 10% | 0.442 | -0.394 |
| Top 5%  | 0.133 | -0.263 |
| Top 1%  | -0.004 | -0.022 |
| Top 0.5% | -0.006 | -0.096 |

(b) 2006 compared with 1988

|       | Labor | Capital |
|-------|-------|---------|
| Top 50% | 1.443 | 1.591 |
| Top 40% | 1.513 | 1.671 |
| Top 20% | 0.895 | 1.247 |
| Top 10% | 0.460 | 0.740 |
| Top 5%  | 0.100 | 0.337 |
| Top 1%  | 0.024 | 0.044 |
| Top 0.5% | 0.006 | 0.013 |

(c) 2006 compared with 1966

|       | Labor | Capital |
|-------|-------|---------|
| Top 50% | 2.890 | 0.637 |
| Top 40% | 3.364 | 1.134 |
| Top 20% | 2.279 | 1.091 |
| Top 10% | 1.060 | 0.653 |
| Top 5%  | 0.387 | 0.319 |
| Top 1%  | 0.024 | 0.022 |
| Top 0.5% | 0.007 | 0.009 |
Table A.10. Difference in survival association matrices (in percentage points):
Including non-filers

(a) 1985 compared with 1966

| Labor | Top 50%  | Top 40%  | Top 20%  | Top 10%  | Top 5%   | Top 1%   | Top 0.5% |
|-------|----------|----------|----------|----------|---------|---------|----------|
|       | Capital  |          |          |          |         |         |          |
| Top 50%| 3.250    | -1.624   | -1.260   | -1.036   | -1.005  | -0.232  | -0.102   |
| Top 40%| 3.272    | -1.029   | -1.115   | -0.897   | -1.005  | -0.253  | -0.111   |
| Top 20%| 1.825    | -0.614   | -1.020   | -0.773   | -0.774  | -0.288  | -0.129   |
| Top 10%| 0.794    | -0.301   | -0.921   | -0.737   | -0.681  | -0.292  | -0.135   |
| Top 5% | 0.273    | -0.190   | -0.703   | -0.606   | -0.567  | -0.266  | -0.116   |
| Top 1% | -0.004   | -0.052   | -0.254   | -0.282   | -0.265  | -0.168  | -0.097   |
| Top 0.5%| -0.005  | -0.018   | -0.119   | -0.156   | -0.158  | -0.101  | -0.069   |

(b) 2006 compared with 1988

| Labor | Top 50%  | Top 40%  | Top 20%  | Top 10%  | Top 5%   | Top 1%   | Top 0.5% |
|-------|----------|----------|----------|----------|---------|---------|----------|
|       | Capital  |          |          |          |         |         |          |
| Top 50%| 0.626    | 1.903    | 1.986    | 1.676    | 1.150   | 0.241   | 0.118    |
| Top 40%| 0.847    | 2.005    | 2.057    | 1.670    | 1.125   | 0.242   | 0.116    |
| Top 20%| 0.615    | 1.429    | 1.716    | 1.413    | 0.901   | 0.241   | 0.122    |
| Top 10%| 0.353    | 0.838    | 1.246    | 1.048    | 0.703   | 0.242   | 0.117    |
| Top 5% | 0.067    | 0.361    | 0.760    | 0.707    | 0.509   | 0.220   | 0.112    |
| Top 1% | 0.019    | 0.038    | 0.152    | 0.198    | 0.169   | 0.111   | 0.083    |
| Top 0.5%| 0.005   | 0.010    | 0.055    | 0.092    | 0.085   | 0.063   | 0.057    |

(c) 2006 compared with 1966

| Labor | Top 50%  | Top 40%  | Top 20%  | Top 10%  | Top 5%   | Top 1%   | Top 0.5% |
|-------|----------|----------|----------|----------|---------|---------|----------|
|       | Capital  |          |          |          |         |         |          |
| Top 50%| 3.624    | 0.283    | 1.264    | 1.132    | 0.510   | 0.138   | 0.089    |
| Top 40%| 3.871    | 0.956    | 1.441    | 1.245    | 0.519   | 0.128   | 0.089    |
| Top 20%| 2.624    | 1.035    | 1.127    | 0.994    | 0.471   | 0.115   | 0.085    |
| Top 10%| 1.177    | 0.632    | 0.589    | 0.613    | 0.324   | 0.103   | 0.078    |
| Top 5% | 0.415    | 0.273    | 0.334    | 0.341    | 0.192   | 0.100   | 0.089    |
| Top 1% | 0.022    | 0.014    | 0.035    | 0.050    | 0.030   | 0.047   | 0.068    |
| Top 0.5%| 0.007   | 0.007    | 0.013    | 0.016    | 0.010   | 0.030   | 0.048    |
Table A.11. Difference in survival association matrices (in percentage points):
Distribute corporate retained earnings

(a) 1985 compared with 1966

|       | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|--------|--------|----------|
| Labor |         |         |         |         |        |        |          |
| Capital |        |         |         |         |        |        |          |
| Top 50% |  0.742 | -1.647 | -1.238  | -1.159  | -0.750 | -0.116 | -0.041   |
| Top 40% |  1.154 | -1.190 | -1.135  | -1.048  | -0.772 | -0.120 | -0.047   |
| Top 20% |  0.716 | -0.823 | -1.047  | -0.939  | -0.784 | -0.139 | -0.052   |
| Top 10% |  0.338 | -0.458 | -0.895  | -0.840  | -0.710 | -0.147 | -0.056   |
| Top 5%  |  0.090 | -0.309 | -0.717  | -0.686  | -0.602 | -0.128 | -0.050   |
| Top 1%  | -0.012 | -0.061 | -0.229  | -0.281  | -0.287 | -0.082 | -0.033   |
| Top 0.5%| -0.005 | -0.019 | -0.109  | -0.154  | -0.161 | -0.058 | -0.020   |

(b) 2006 compared with 1988

|       | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|--------|--------|----------|
| Labor |         |         |         |         |        |        |          |
| Capital |        |         |         |         |        |        |          |
| Top 50% |  1.372 | 1.527   | 1.913   | 1.738   | 1.009  | 0.215  | 0.118    |
| Top 40% |  1.481 | 1.593   | 1.976   | 1.751   | 1.010  | 0.216  | 0.120    |
| Top 20% |  0.850 | 1.159   | 1.626   | 1.419   | 0.850  | 0.210  | 0.111    |
| Top 10% |  0.416 | 0.688   | 1.239   | 1.119   | 0.700  | 0.204  | 0.107    |
| Top 5%  |  0.086 | 0.331   | 0.766   | 0.743   | 0.518  | 0.185  | 0.100    |
| Top 1%  |  0.019 | 0.035   | 0.153   | 0.201   | 0.170  | 0.106  | 0.072    |
| Top 0.5%|  0.005 | 0.008   | 0.052   | 0.091   | 0.086  | 0.063  | 0.052    |

(c) 2006 compared with 1966

|       | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|-------|---------|---------|---------|---------|--------|--------|----------|
| Labor |         |         |         |         |        |        |          |
| Capital |        |         |         |         |        |        |          |
| Top 50% |  2.499 | 0.442   | 1.386   | 1.108   | 0.617  | 0.207  | 0.119    |
| Top 40% |  3.050 | 0.932   | 1.549   | 1.166   | 0.600  | 0.204  | 0.118    |
| Top 20% |  2.090 | 0.900   | 1.111   | 0.808   | 0.386  | 0.192  | 0.117    |
| Top 10% |  0.951 | 0.520   | 0.649   | 0.548   | 0.254  | 0.180  | 0.116    |
| Top 5%  |  0.340 | 0.242   | 0.338   | 0.279   | 0.148  | 0.183  | 0.120    |
| Top 1%  |  0.020 | 0.013   | 0.044   | 0.041   | 0.014  | 0.127  | 0.105    |
| Top 0.5%|  0.006 | 0.008   | 0.011   | 0.009   | 0.001  | 0.075  | 0.088    |
Table A.12. Difference in survival association matrices (in percentage points):
Distribute retained earnings and corporate income tax
(a) 1985 compared with 1966

| Labor       | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5%  | Top 1%  | Top 0.5% |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top 50%     | 0.730   | -1.628  | -1.293  | -1.268  | -0.641  | -0.070  | -0.024  |
| Top 40%     | 1.147   | -1.152  | -1.199  | -1.121  | -0.664  | -0.077  | -0.029  |
| Top 20%     | 0.707   | -0.785  | -1.081  | -0.997  | -0.690  | -0.098  | -0.037  |
| Top 10%     | 0.334   | -0.448  | -0.938  | -0.881  | -0.671  | -0.108  | -0.043  |
| Top 5%      | 0.092   | -0.304  | -0.726  | -0.702  | -0.574  | -0.089  | -0.035  |
| Top 1%      | -0.011  | -0.062  | -0.224  | -0.281  | -0.274  | -0.053  | -0.017  |
| Top 0.5%    | -0.005  | -0.019  | -0.107  | -0.155  | -0.153  | -0.034  | -0.010  |

(b) 2006 compared with 1988

| Labor       | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5%  | Top 1%  | Top 0.5% |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top 50%     | 1.378   | 1.522   | 1.994   | 1.784   | 0.967   | 0.201   | 0.115   |
| Top 40%     | 1.489   | 1.581   | 2.056   | 1.788   | 0.964   | 0.201   | 0.113   |
| Top 20%     | 0.838   | 1.113   | 1.676   | 1.460   | 0.815   | 0.192   | 0.106   |
| Top 10%     | 0.408   | 0.657   | 1.234   | 1.150   | 0.692   | 0.182   | 0.096   |
| Top 5%      | 0.086   | 0.314   | 0.748   | 0.754   | 0.509   | 0.158   | 0.088   |
| Top 1%      | 0.019   | 0.038   | 0.148   | 0.198   | 0.173   | 0.094   | 0.059   |
| Top 0.5%    | 0.005   | 0.009   | 0.052   | 0.089   | 0.086   | 0.064   | 0.046   |

(c) 2006 compared with 1966

| Labor       | Capital | Top 50% | Top 40% | Top 20% | Top 10% | Top 5%  | Top 1%  | Top 0.5% |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top 50%     | 2.552   | 0.454   | 1.391   | 1.043   | 0.638   | 0.220   | 0.117   |
| Top 40%     | 3.095   | 0.957   | 1.541   | 1.122   | 0.620   | 0.215   | 0.114   |
| Top 20%     | 2.115   | 0.906   | 1.089   | 0.787   | 0.418   | 0.194   | 0.111   |
| Top 10%     | 0.959   | 0.513   | 0.614   | 0.545   | 0.257   | 0.175   | 0.103   |
| Top 5%      | 0.340   | 0.243   | 0.316   | 0.275   | 0.150   | 0.178   | 0.109   |
| Top 1%      | 0.020   | 0.013   | 0.044   | 0.040   | 0.021   | 0.134   | 0.094   |
| Top 0.5%    | 0.006   | 0.008   | 0.011   | 0.008   | 0.002   | 0.095   | 0.081   |
Table A.13. Difference in survival association matrices (in percentage points):
Alternative split of business income
(a) 1985 compared with 1966

| Labor  | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|--------|---------|---------|---------|---------|--------|--------|----------|
| Capital | 0.802   | -1.593  | -1.135  | -0.979  | -1.121 | -0.257 | -0.104   |
| Top 50% | 1.190   | -1.182  | -1.039  | -0.911  | -1.081 | -0.273 | -0.108   |
| Top 40% | 0.746   | -0.766  | -1.007  | -0.789  | -0.804 | -0.294 | -0.122   |
| Top 20% | 0.366   | -0.421  | -0.858  | -0.728  | -0.680 | -0.285 | -0.120   |
| Top 10% | 0.105   | -0.282  | -0.695  | -0.604  | -0.555 | -0.272 | -0.113   |
| Top 5%  | -0.010  | -0.060  | -0.262  | -0.278  | -0.257 | -0.177 | -0.091   |
| Top 1%  | -0.007  | -0.022  | -0.121  | -0.146  | -0.140 | -0.094 | -0.070   |
| Top 0.5%| -0.005  | -0.008  | 0.010   | 0.000   | -0.015 | -0.025 | -0.012   |

(b) 2006 compared with 1988

| Labor  | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|--------|---------|---------|---------|---------|--------|--------|----------|
| Capital | 1.113   | 1.473   | 1.815   | 1.547   | 1.038  | 0.233  | 0.120    |
| Top 50% | 1.243   | 1.580   | 1.822   | 1.546   | 0.996  | 0.241  | 0.121    |
| Top 40% | 0.724   | 1.094   | 1.431   | 1.200   | 0.742  | 0.211  | 0.109    |
| Top 20% | 0.371   | 0.633   | 1.060   | 0.896   | 0.555  | 0.180  | 0.092    |
| Top 10% | 0.043   | 0.260   | 0.645   | 0.599   | 0.382  | 0.139  | 0.071    |
| Top 5%  | 0.017   | 0.037   | 0.141   | 0.163   | 0.114  | 0.043  | 0.028    |
| Top 1%  | 0.003   | 0.009   | 0.053   | 0.078   | 0.057  | 0.013  | 0.010    |
| Top 0.5%| 0.005   | 0.008   | 0.010   | 0.000   | -0.015 | -0.025 | -0.012   |

(c) 2006 compared with 1966

| Labor  | Top 50% | Top 40% | Top 20% | Top 10% | Top 5% | Top 1% | Top 0.5% |
|--------|---------|---------|---------|---------|--------|--------|----------|
| Capital | 2.363   | 0.458   | 1.423   | 1.107   | 0.364  | 0.126  | 0.088    |
| Top 50% | 2.900   | 0.957   | 1.520   | 1.165   | 0.369  | 0.124  | 0.092    |
| Top 40% | 1.980   | 0.872   | 1.022   | 0.792   | 0.301  | 0.083  | 0.077    |
| Top 20% | 0.910   | 0.511   | 0.554   | 0.448   | 0.155  | 0.049  | 0.061    |
| Top 10% | 0.310   | 0.213   | 0.272   | 0.218   | 0.059  | 0.014  | 0.048    |
| Top 5%  | 0.019   | 0.010   | 0.022   | 0.005   | -0.029 | -0.040 | 0.010    |
| Top 1%  | 0.005   | 0.008   | 0.010   | 0.000   | -0.015 | -0.025 | -0.012   |
| Top 0.5%| -0.002  | 0.000   | 0.010   | 0.000   | -0.005 | -0.020 | -0.012   |
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