Distributional National Accounts: Methods and Estimates for the United States since 1913

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There is a large disconnect today between the study of inequality and macro

Macro: use national accounts, with no info on distribution

Inequality: use survey & tax data, inconsistent with macro totals

Ex: Piketty-Saez only capture 60% of US national income

This gap makes it hard to know how growth is distributed:

How does growth of bottom 90% compare to total growth?

What fraction of growth accrues to top 1%?

Do tax data provide reliable picture of income inequality?

We need answers to these questions to better understand interplay between growth, inequality, and gov. intervention
DINAs are a new tool to connect inequality and macro

While today’s national accounts are spreadsheets with aggregates only, tomorrow they could be **micro databases where**:

- Each observation is a synthetic individual
- Distributions of income, wealth, taxes, transfers... are consistent with what survey/tax data show
- Totals match macro aggregates

**Creating DINAs involves:**

- Defining a clear common conceptual framework
- Incorporating results from economic theory
- Developing statistical techniques to optimally use information from available micro sources
This paper

Goal: construct micro database of income, taxes and transfers consistent with NIPA totals in the United States

By combining tax, survey, and national accounts data in a consistent manner

Today’s talk: only pre-tax income

⇒ First estimates of income inequality covering 100% of national income

⇒ First decompositions of growth by groups consistent with growth used in macro

Complementary with ongoing work by Fixler et al. (2015) constructing distribution of NIPA personal income using CPS
1. The limits of current estimates of US income inequality

2. US DINA methodology: general principles

3. Methodology to capture 100% of pre-tax capital and labor income

4. The distribution of pre-tax national income since 1913

5. The interplay between income and wealth inequality
The limits of current estimates of US income inequality
Goal: allocate total US national income $Y = Y_K + Y_L$ to the adult pop.

Composition of national income in the United States since 1913

- Labor income
- Capital income

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Most capital income is missed by tax data

From tax-reported to total capital income

- Dividends, interest, rents & profits reported on tax returns
- Imputed rents
- Income paid to pensions & insurance
- Retained earnings
- Corporate income tax
- Non-filers & unreported sole prop. profits

% of factor-price national income

Most capital income is missed by tax data.

From tax-reported to total capital income:
- Dividends, interest, rents & profits reported on tax returns
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2/3 missed by tax data.
A growing fraction of labor income is missed by tax data

From taxable to total employee compensation

- Reported taxable wages
- Health benefits
- Employer payroll taxes
- Pension contributions
- Other
A growing fraction of labor income is missed by tax data.

From taxable to total employee compensation:

- Reported taxable wages
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- Other
- Pension contributions

1/4 missed by tax data.
US DINA methodology: General principles
Income concept and unit of observation

**Income concept: US (pre-tax) national income:**

Only adjustment: remove investment income of nonprofits ($\approx 2\%$ of national income)

**Unit of observation:**

Adult [individual over 20]

Preferable to family (fewer marriage $\rightarrow$ less growth) and individual (higher fertility $\rightarrow$ less growth)

**Deflator:**

National income deflator

Preferable to CPI (overstates inf.) and PCE deflator (too narrow)
Reconciling growth in tax data and national accounts

Average real income: national accounts vs. tax data (1946 = 100)

Source: Appendix Tables XX.
How we allocate taxes

We follow standard tax incidence results:

Labor taxes fall on labor; capital taxes on capital (and corporate tax on all capital assets: Harberger 1962)

Reasonable if \( Y = F(K, L) \) has elasticity of substitution \( \sigma >> \) labor supply elasticity \( e_L \) and capital supply elasticity \( e_K \)

Cross-country and time-series evolution of \( \alpha = rK/Y \) and \( \beta = K/Y \) broadly consistent with view that \( \sigma > 1 \) and \( e_L \) and \( e_K \) relatively small in the long run

But this is uncertain \( \rightarrow \) will revisit if needed
Methodology:
Distributing pre-tax capital and labor income
How we construct micro-measures of capital income matching macro totals

1. **Construct micro-measures of wealth**

   Follow Saez and Zucman 2014: category by category, pragmatic approach

   Delivers micro-measures of family wealth matching macro totals

   Split capital 50/50 among spouses

2. **Derive micro-measures of pre-tax capital income**

   Compute aggregate pre-tax rates of return for each asset class that reconcile NIPA income flows with Flow of Funds wealth

   Apply these rates of return to individual assets
How we construct distributional estimates of national labor income

1. Start from reported wages; split income of spouses using W2 forms

2. **Employer payroll taxes:** apply schedule, e.g., in 2015:
   - Medicare: 1.45%
   - Social Security: 7.2% capped at $118,500
   - Unemployment insurance: vary by state

3. **Pension and health insurance** contributions:
   - Available on W2 forms since 1999 for pensions, since 2012 for health
   - Before, assume same distribution
The distribution of pre-tax income since 1913
National income is more concentrated than tax income

This figure displays the share of total pre-tax national income earned by top 10% adult income earners and the share of total IRS market income earned by top 10% family tax units. Source: Appendix Tables XX.
This figure displays the share of total pre-tax national income earned by top 1% adult income earners and the share of total IRS market income earned by top 1% tax units. Source: Appendix Tables XX.
Until late 1990s, rise in the top 1% driven by an upsurge in top wages

![Graph showing the percentage of national income contributed by labor income of top 1% adult income earners and compensation of employees compared to labor income in noncorporate businesses over time from 1913 to 2008. The graph highlights a significant increase in the top 1% labor income percentage starting from the late 1990s.]
... But since late 1990s, top 1% rises because of capital income

Capital income of top 1% adult income earners

- Housing rents
- Noncorporate profits
- Net interest
- Corporate profits
- Profits & interest paid to pensions
DINAs make it possible to compute growth rates consistent with macro totals.

Real average national income:
Full adult population vs. bottom 90%

Average income in constant 2012 dollars

Real values are obtained by using the national income deflator and expressed in 2012 dollars. Source: Appendix Tables XX.
The top 10% has grown three times faster than the bottom 90% since 1980.

Real average national income of bottom 90% and top 10% adults

Top 10% real average national income

Bottom 90% real average national income

Real values are obtained by using the national income deflator and expressed in 2012 dollars. Source: Appendix Tables XX.
Top 1% vs. bottom 90%: from a factor of 20 to a factor of 40

Real average national income of bottom 90% and top 1% adults

Real values are obtained by using the national income deflator and expressed in 2012 dollars. Source: Appendix Tables XX.
The distribution of economic growth in the US since 1946

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<thead>
<tr>
<th>All</th>
<th>Bottom 90%</th>
<th>Bottom 99%</th>
<th>Top 10%</th>
<th>Top 1%</th>
<th>Top 0.1%</th>
<th>Top 0.01%</th>
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<td>1946-2012</td>
<td>1.7%</td>
<td>1.4%</td>
<td>1.6%</td>
<td>2.1%</td>
<td>2.4%</td>
<td>3.0%</td>
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<td>1946-1980</td>
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<td>2.0%</td>
<td>2.1%</td>
<td>1.9%</td>
<td>1.4%</td>
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<tr>
<td>1980-2012</td>
<td>1.4%</td>
<td>0.7%</td>
<td>1.0%</td>
<td>2.3%</td>
<td>3.5%</td>
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<tr>
<td>2009-2012</td>
<td>2.0%</td>
<td>0.1%</td>
<td>0.8%</td>
<td>3.9%</td>
<td>7.0%</td>
<td>9.1%</td>
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Average yearly growth rates of real national income per adult

<table>
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<tr>
<th>All</th>
<th>Bottom 90%</th>
<th>Bottom 99%</th>
<th>Top 10%</th>
<th>Top 1%</th>
<th>Top 0.1%</th>
<th>Top 0.01%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946-2012</td>
<td>100%</td>
<td>43%</td>
<td>76%</td>
<td>57%</td>
<td>24%</td>
<td>12%</td>
</tr>
<tr>
<td>1946-1980</td>
<td>100%</td>
<td>62%</td>
<td>92%</td>
<td>38%</td>
<td>8%</td>
<td>3%</td>
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<tr>
<td>1980-2012</td>
<td>100%</td>
<td>27%</td>
<td>62%</td>
<td>73%</td>
<td>38%</td>
<td>20%</td>
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<tr>
<td>2009-2012</td>
<td>100%</td>
<td>1%</td>
<td>32%</td>
<td>99%</td>
<td>68%</td>
<td>38%</td>
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Fraction of national income growth accruing to each groups
The interplay between income and wealth inequality
Synthetic saving rates by fractile

How we compute saving rates by fractile:

1. Start from individual $i$ wealth accumulation equation:

   \[ W_{t+1}^i = (1 + q_t^i) \cdot (W_t^i + s_t^i \cdot Y_t^i) \]

   where $W_t^i$ is wealth, $Y_t^i$ is income, $s_t^i$ is net savings rate, $1 + q_t^i$ is pure price effect on assets in year $t$

2. Consider similar equation for fractile $p$ (e.g., top 1%):

   \[ W_{t+1}^p = (1 + q_t^p) \cdot (W_t^p + s_t^p \cdot Y_t^p) \]

3. Combining information on composition of $p$’s wealth and economy-wide price effects by asset class, we can compute $1 + q_t^p$

4. So we can infer from (2) the synthetic saving rate $s_t^p$ of fractile $p$, i.e., the flow of saving that reconciles $p$’s change in wealth btw $t$ and $t + 1$ given change in price of assets held by $p$
The average private (household + corporate) saving rate has been 11.4% over 1913-2013, but the rich save more as a fraction of their income, except in the 1930s when there was large dis-saving through corporations. Source: Appendix Table B33.
Combination of rising income and saving rate inequality is fueling wealth inequality.

Real average wealth of bottom 90% and top 1% families

Real values are obtained by using the GDP deflator, 2010 dollars. Source: Appendix Tables B3.
Capital accumulated out of surging labor income generates a sizable return.

Yield and total return on U.S. private wealth

Pure yield = capital income (including retained earnings) / wealth

Total return = pure yield + asset price effect
The labor income share of top wealth holders has grown but is stabilizing.

This figure shows the share of total pre-tax national income and pre-tax labor income earned by top 0.1% wealth-holders. Labor income includes employee compensation and the labor component of business income. Source: Appendix Tables B25 and B28.
Conclusion
The national accounts of the future

The DINA agenda:

Construct new series on the distribution of wealth, income, saving... fully consistent with macro aggregates

Key tool: a new micro-dataset of synthetic observations coherent with distributional data and matching macro totals

Preliminary, exploratory and uncertain, but conceptually the right way to go

First US DINA results:

Large rise in top national income shares

Rise in income inequality since late 1990s due to capital, not labor
DINAs for policymakers

We will make our prototype DINAs publicly available on dedicated websites → everybody able to conduct own distributional analysis

**Useful for policy-makers:**

- Simulate reforms of tax and transfer policies
- Monitor financial stability (e.g., distribution of saving rates)

**Useful for the public debate:**

- Big demand for decompositions of growth by social groups
- Not possible today