Improving the Measure of the Distribution of Personal Income

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“Well grease my knees and fleece my bees, did you get the rest of the $288 billion in new income created in 2010?”

Disclaimer: The results and opinions are those of the authors and do not reflect the position of the Bureau of Economics Analysis or Department of Commerce.
Distribution is part of GDP – not Beyond it

• Simon Kuznets in report to Congress (1934): “Economic welfare cannot be adequately measured unless the personal distribution of income is known.”

• Stiglitz report: National statistical offices should “give more prominence to the distribution of income, consumption, and wealth.”


• BEA FY11 budget proposal, which included producing “a decomposition of personal income that presents median as well as mean income...”
BEA historically produced a distribution of the national accounts.
Renewed interest in distribution

- Increasing interest in relationship between distribution of growth, based on national accounts and inequality, based on survey data/tax data
  - GDP is increasing: what share of growth accrues to what part of the distribution?
  - Congressional Bill, “Measuring American Growth Act”
  - Efforts to bridge “micro-macro” gap
    - Piketty, Saez and Zucman (PSZ) 2018
    - Auten and Splinter (AS) 2018
    - OECD EG-DNA
Inequality has increased; but how much?
Our Previous Research

  – Presented at CRIW/IARIW, Aug 2012
  – BEA Advisory Committee, Nov 2012.

• Fixler, et al. “A Consistent Data Series to Evaluate Growth and Inequality in the National Accounts,” *Review of Income and Wealth*


• Fixler, Gindelsky, Johnson “Improving the measure of the distribution of Personal Income”
  – IARIW General Conference, 2018
Background

• PSZ (2018): Compute pre-and-post-tax inequality based on national income
  – NI = GDP - capital depreciation + net income received from abroad
  – Unit of observation: “adult individual”
  – Construct micro files consistent with macro aggregates
  – Start with tax data to capture top (add synthetic obs based on CPS)

• Auten and Splinter (2018): re-estimate top shares due to a different treatment of underreported income (esp. business) on tax data
  – Construct estimate of pre-tax/after-transfer income
  – Correct for tax law changes
  – Use equivalized income
  – Find lower income shares than PSZ

• Our paper
  – Construct distribution of household income as major component of personal income
  – Personal income is more intuitive for moving to consumption/PCE
  – Use CPS and supplement with tax data to obtain top tail of distribution
  – Create household dataset to generate distributions, which can be public
  – Can use data to generate distributions by household type (ala OECD)
BEA is a data aggregator using multiple sources of data (lag time)

• Primary Sources:
  – Macro: NIPA Tables (latest revision)

• Supplementary Sources (include):
  – Survey of Consumer Finances (public) (10 mos)
  – Centers for Medicare & Medicaid Services (public) (18 mos)
  – Consumer Expenditure Survey (public) (8 mos)
  – Congressional Budget Office (public) (24-36 mos)
  – 1040 Microdata (internal) (15-18 mos)
Methodology

1. Begin with CPS ASEC households (survey years 2008 and 2013)
   • Adjust top incomes with a Pareto imputation

2. Distribute NIPA totals for components of household income according to relevant CPS variables
   • Use supplemental data sources to provide additional distributional information

3. Aggregate resulting imputations for each component up to PI
   • Construct inequality statistics for equivalized household income for 2007 and 2012
Tail Adjustment

• CPS underrepresents top incomes due to topcoding and “missing” observations
• We explored a “matching” strategy for adjusting the tail
• We found significant differences between the CPS and tax income for the same households, and hence, simply replacing the survey income for the administrative income data is not satisfactory
And Large Differences at Top

- A large share of households showed differences between CPS and tax income for the same households in the top and bottom quintiles
- With tax > CPS at bottom and CPS > tax at top

![Graph showing differences between CPS and tax income across different income brackets. The graph displays bars for Q1 and Q5, with IRS > CPS for Q1 and CPS > IRS for Q5.]
Tail Adjustment

• Given distribution of differences between linked 1040 microdata housed at the Census Bureau and CPS data, the following strategy was used:
  – Using the 1040 microdata, we fit a Pareto distribution for tax units with money incomes \( \geq \$500k \)
  – Using the resulting Pareto coefficient (alpha), imputed a distribution to CPS households with money incomes \( \geq \$500k \)
Methodology - Example

Starting point: A household with $600,000 of pseudo income

1. • Household has $60 of dividend income in CPS (unweighted)
   • Tail adjustment: household receives a new pseudo income of $700,000. Correspondingly, dividend income is proportionally adjusted to $70.

2. • Total dividend income in CPS is summed (with weights) to be $123b
   • NIPA total for dividend income is $808b
   • Household receives imputed dividend income, \((70/123b) \times 808b = 460\)
   • Aggregate weighted household dividend income will be $808b

3. • Other components are scaled as well, such that the household may end up with $900,000 of household income, consistent with NIPA
Results

• Components of personal income
• Distribution of household income by quintile
• Inequality comparison across income definitions and time
### Components of Personal Income

<table>
<thead>
<tr>
<th>2012</th>
<th>Household average</th>
<th>Totals (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudo Income</td>
<td>$87,636</td>
<td>$10,732</td>
</tr>
<tr>
<td>Plus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>$14,998</td>
<td>$1,837</td>
</tr>
<tr>
<td>Health</td>
<td>$16,062</td>
<td>$1,967</td>
</tr>
<tr>
<td>Net Transfers</td>
<td>-$4,359</td>
<td>-$534</td>
</tr>
<tr>
<td>Equals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household Income</td>
<td>$114,336</td>
<td>$14,001.6</td>
</tr>
<tr>
<td>+NPISH</td>
<td>$70</td>
<td>$8.6</td>
</tr>
<tr>
<td>Personal Income</td>
<td>$114,406</td>
<td>$14,010</td>
</tr>
</tbody>
</table>

Pseudo Income = money income – retirement – other comingled factors
It is defined as in Fixler et al. (2017)

PI = Household Income – transfers from NPISH + NPISH income – transfers from households
Distribution of Household Income by Quintile, 2012
## Distribution of Household Income by Quintile
### 2012, NIPA Table 2.9

<table>
<thead>
<tr>
<th>Household income</th>
<th>Total ($B)</th>
<th>% Q1</th>
<th>% Q2</th>
<th>% Q3</th>
<th>% Q4</th>
<th>% Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation of employees</td>
<td>8567</td>
<td>4%</td>
<td>7%</td>
<td>14%</td>
<td>24%</td>
<td>51%</td>
</tr>
<tr>
<td>Proprietors' income with inventory valuation and capital consumption adj.</td>
<td>1347</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>11%</td>
<td>83%</td>
</tr>
<tr>
<td>Rental income of households with capital consumption adj.</td>
<td>509</td>
<td>5%</td>
<td>10%</td>
<td>14%</td>
<td>20%</td>
<td>52%</td>
</tr>
<tr>
<td>Household income receipts</td>
<td>2119</td>
<td>1%</td>
<td>3%</td>
<td>7%</td>
<td>13%</td>
<td>75%</td>
</tr>
<tr>
<td>Household interest income</td>
<td>1311</td>
<td>2%</td>
<td>4%</td>
<td>9%</td>
<td>17%</td>
<td>67%</td>
</tr>
<tr>
<td>Household income</td>
<td>808</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
<td>7%</td>
<td>89%</td>
</tr>
<tr>
<td>Household current transfer receipts</td>
<td>2410</td>
<td>16%</td>
<td>25%</td>
<td>25%</td>
<td>18%</td>
<td>16%</td>
</tr>
<tr>
<td>Government social benefits</td>
<td>2300</td>
<td>16%</td>
<td>26%</td>
<td>26%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>From business (net)</td>
<td>24</td>
<td>1%</td>
<td>4%</td>
<td>11%</td>
<td>24%</td>
<td>60%</td>
</tr>
<tr>
<td>From nonprofit institutions</td>
<td>86</td>
<td>5%</td>
<td>8%</td>
<td>14%</td>
<td>26%</td>
<td>47%</td>
</tr>
<tr>
<td>Less: Contrib. for government social insurance, domestic</td>
<td>950</td>
<td>4%</td>
<td>10%</td>
<td>17%</td>
<td>26%</td>
<td>43%</td>
</tr>
<tr>
<td>Household Income</td>
<td>14002</td>
<td>5%</td>
<td>9%</td>
<td>14%</td>
<td>20%</td>
<td>52%</td>
</tr>
</tbody>
</table>
## Inequality Comparison

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Gini</th>
<th>90/50</th>
<th>90/10</th>
<th>Top 5% Share</th>
<th>Top 1% share</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2012</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. HH Money Income</td>
<td>$46,587</td>
<td>0.456</td>
<td>2.64</td>
<td>9.54</td>
<td>22.2%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Eq. HH Pseudo Income</td>
<td>$57,166</td>
<td>0.524</td>
<td>3.04</td>
<td>10.91</td>
<td>29.7%</td>
<td>14.1%</td>
</tr>
<tr>
<td></td>
<td>$74,407</td>
<td>0.463</td>
<td>2.72</td>
<td>6.33</td>
<td>27.1%</td>
<td>13.3%</td>
</tr>
<tr>
<td><strong>2007 (in 2012 dollars)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. HH Money Income</td>
<td>$48,279</td>
<td>0.441</td>
<td>2.59</td>
<td>9.05</td>
<td>21.6%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Eq. HH Pseudo Income</td>
<td>$46,848</td>
<td>0.502</td>
<td>2.86</td>
<td>9.91</td>
<td>28.2%</td>
<td>12.9%</td>
</tr>
<tr>
<td></td>
<td>$73,022</td>
<td>0.453</td>
<td>2.65</td>
<td>6.25</td>
<td>26.5%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

Eq. HH Income = HH Income/sqrt(# in hh)
## Inequality Comparison

<table>
<thead>
<tr>
<th>Definition</th>
<th>2007</th>
<th>2012</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top 1% Share</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. HH income</td>
<td>12.5%</td>
<td>13.3%</td>
<td>FGJ 2018</td>
</tr>
<tr>
<td>Pre-tax/Post-transfer</td>
<td>13.1%</td>
<td>13.3%</td>
<td>Auten &amp; Splinter 2018</td>
</tr>
<tr>
<td>Pre-tax National Inc. (equal split indiv)</td>
<td>19.9%</td>
<td>20.8%</td>
<td>PSZ 2018</td>
</tr>
<tr>
<td>HH inc. Pre-tax/Post-transfer w/o CapG</td>
<td>13.8%</td>
<td>14.6%</td>
<td>CBO</td>
</tr>
<tr>
<td><strong>Gini</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. HH income</td>
<td>0.453</td>
<td>0.463</td>
<td>FGJ 2018</td>
</tr>
<tr>
<td>HH inc. Pre-tax/Post-transfer</td>
<td>0.491</td>
<td>0.487</td>
<td>CBO</td>
</tr>
<tr>
<td>Eq. HH Money Income</td>
<td>0.444</td>
<td>0.463</td>
<td>Census Bureau</td>
</tr>
</tbody>
</table>
Next Steps

• Extend annual distribution 2007 to 2012, 2013 to 2016 this year
• Extend distribution to 2017 (or 2018) in 2020
• Extend to regional distributions (ala SCB article)
• Extend to Personal Income and National Income (what about GDP)
Do we need a distribution of GDP?

$17,582 \textbf{Personal income}
Less: Personal current transfer receipts
Less: Personal income receipts on assets
Plus
  Current surplus of government enterprises
  Business current transfer payments (net)
  Net interest and miscellaneous payments on assets
  Contributions for government social insurance, domestic
  Taxes on production and imports less subsidies
  Corporate profits with inventory valuation and CC adj

$17,544 \textbf{Equals: National Income}
Plus: Consumption of Fixed Capital

$20,818 \textbf{Equals: Gross National Income}
Plus: Income payments to the rest of the world
Less: Income receipts from the rest of the world

$20,557 \textbf{Equals: Gross Domestic Income}
Less: Statistical Discrepancy

$20,494 \textbf{Gross domestic product (GDP)}
Next Steps

• Extend annual distribution 2007 to 2012, 2013 to 2016 this year
• Extend distribution to 2017 (or 2018) in 2020
• Extend to regional distributions (ala SCB article)
• Extend to Personal Income and National Income (what about GDP)
• Develop distributional measures for PCE (following OECD working group)
• Examine alternative data for transfers, such as CID
• Compare to Distribution of Financial Accounts
• Participate in OECD groups, EG-DNA and EG-ICW (Joint distribution of Income, Consumption and Wealth)
• Evaluate savings, APC and fiscal multiplier