Accounting for the Distribution of Income in the U.S. National Accounts

Dennis Fixler
Bureau of Economic Analysis

David S Johnson
US Census Bureau

Prepared for BEA Advisory Committee Meeting
16 November 2012
Has income increased or not?

Real Median Household Income

Real Per capita GDP
Issue is that CPS income tracks National Accounts Personal Income until recently.
GDP and Distribution Information

- Long recognized that in gauging economic performance GDP cannot stand alone; distribution information needed
- Is there a positive or negative correlation between income distribution and economic growth?
- Kuznets curve—upside down U
Evaluating the income distribution and its relationship to National accounts is not new

- CRIW volume 1943 - *Income Size Distributions in the United States, Part I.*
Recent Emphasis on Distribution

- Stigliz et al: information on distribution serves as an important complement to GDP
- 2012 Economic Report of the President: distributional aspects of fiscal policy
Purpose of Research

- BEA FY11 budget proposal, which included producing “a decomposition of personal income that presents median as well as mean income…”
- Because survey data suffer from under-reporting, determine how to deal with measurement error in income.
- Demonstrate that one can use NIPA data to adjust survey data to obtain alternative distributions and measures of inequality.
  - Provide examples of the usefulness of the distribution measures on expenditure multipliers and social welfare measures.
The Measurement of Income

- Use the Haig-Simons definition of income, \( Y = C + \Delta W \).
  - Most studies do not implement this definition
- Census Money income is different (conceptually and empirically) than BEA Personal Income
- Issue is that there is underreporting of income in household surveys
- Key is that a common, consistent and accurate measure of income is important for understanding the distribution.
<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Haig/ Simons</th>
<th>Census</th>
<th>PI (BEA)</th>
<th>CBO</th>
<th>SOI (AGI)</th>
<th>Canberra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment income</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Employer contribution to Soc Sec</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Employer-provided benefits</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Investment income</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Imputed investment income</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Government cash transfers</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (taxable)</td>
<td>Yes</td>
</tr>
<tr>
<td>Employee contribution to Soc Sec</td>
<td>Yes</td>
<td>Yes</td>
<td>No (subtract)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Retirement income</td>
<td>Yes</td>
<td>Yes</td>
<td>No (only int.)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cash assistance from others</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Realized capital gains</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lump sum (IRA disbursements)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Taxable</td>
<td>Yes</td>
</tr>
<tr>
<td>In-kind government transfers*</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No**</td>
</tr>
<tr>
<td>Other In-kind transfers*</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No**</td>
</tr>
<tr>
<td>Home production</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>In concept</td>
</tr>
<tr>
<td>Imputed rent*</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Unrealized capital gains</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Savings withdrawals</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Data and Methods

- Begin with Household Income from Current Population Survey, 1999-2010
- Obtain total income and components -- wages, business income, property income, retirement income, government transfers, other
- Use Adjusted Personal income (from Katz (2012)) to ratio adjust CPS income
- Adjust measures to 2010($) using PCE deflator
- Calculate Adjusted Gross Income
- Use SOI tables to ratio adjust the distribution of income
## Adjustments to Personal Income, Selected Years

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2007</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Income</td>
<td>10,030</td>
<td>12,546</td>
<td>12,374</td>
</tr>
<tr>
<td>Employer health benefits</td>
<td>(450)</td>
<td>(637)</td>
<td>(620)</td>
</tr>
<tr>
<td>Employer pensions benefits</td>
<td>(267)</td>
<td>(396)</td>
<td>(470)</td>
</tr>
<tr>
<td>Imputed interest</td>
<td>(433)</td>
<td>(480)</td>
<td>(457)</td>
</tr>
<tr>
<td>Imputed rent for homeowners</td>
<td>(187)</td>
<td>(68)</td>
<td>(236)</td>
</tr>
<tr>
<td>Government transfers in-kind</td>
<td>(575)</td>
<td>(919)</td>
<td>(1,132)</td>
</tr>
<tr>
<td>Adjustment for social security contributions</td>
<td>428</td>
<td>526</td>
<td>514</td>
</tr>
<tr>
<td>Adjustments for pension treatment</td>
<td>(148)</td>
<td>123</td>
<td>257</td>
</tr>
<tr>
<td>Other adjustments</td>
<td>(100)</td>
<td>(92)</td>
<td>(167)</td>
</tr>
<tr>
<td>Total adjustments</td>
<td>(1,731)</td>
<td>(1,943)</td>
<td>(2,311)</td>
</tr>
<tr>
<td>Adjusted Personal Income</td>
<td>8,299</td>
<td>10,603</td>
<td>10,062</td>
</tr>
<tr>
<td>Census Money Income</td>
<td>7,387</td>
<td>8,316</td>
<td>8,015</td>
</tr>
</tbody>
</table>
Ratio adjusting CPS income

- Ratio adjust CPS to NIPA totals by source
- This procedure increases each household’s income by source, and then the new data is used to obtain distribution measures (the procedure yields a mean for each source that matches the NIPA totals).
- Because higher income households have more property income and business income, their income is adjusted higher.
Adjusting CPS to Personal Income

CPS Income
- Wages,…
- Business,…
- Property,…
- Retirement,…
- Government transfers,…
- Other,….

Adjustment factors (i j)
- Wij (+ supplements)
- Bij
- Pij (+ imputed int)
- Rij
- Gij (+ health benefits)
- Oij

NIPA income
- Adj Wage
- Adj Bus.
- Adj Prop
- Adj Retire
- Adj Gov’t
- Adj Other
Adjustment Factors

- Wages
- Business
- Property
- Retirement
- Government
- Total

Graph showing the trend of adjustment factors from 1999 to 2010.
Income shares

- Retirement Income
- Government transfers
- Property Income
- Business Income
- Wages
Ratio adjusting CPS distribution of income using SOI table

- Ratio adjust CPS distribution by the SOI totals by source and income level
- This procedure increases each household’s income by source and by income level, and then the new data is used to obtain distribution measures (the procedure yields a mean for each source that matches the NIPA totals).

\[ y_i = \frac{\text{NIPA}wages}{\text{CPS}wages} \times \frac{\text{SOI}wages_{\text{income group } k}}{\sum_k \text{CPS}wages_{\text{income group } k}} \times \text{wages}_{\text{CPS},i} \]

- Because higher income households have higher underreporting, their income is adjusted higher while middle income households are adjusted lower.
SOI Factors used to adjust CPS income (ratio of aggregate income by source for level of AGI), 2009
Summary of Results between 1999 and 2010

- Real mean household income fell 5.7 percent, while per capita personal income increased 11.1 percent.
- Using a more comparable definition of income, the mean adjusted real personal income per household increased 5.3 percent.
- Taking into account differences in the price index, accounting for underreporting and incorporating distributional information from both the CPS and SOI data, we obtain an increase of 5.7 percent (between 1999 and 2009).
- Hence, difference of 17 percentage points falls to 0.4 percentage points.
- In addition, there are larger increases in the median, yielding larger increases in inequality and Gini index increases more.
- However, including health benefits: employer provided health, Medicaid and Medicare increases means, but decreases the level of and change in inequality.
Mean NIPA-adjusted income increases more than mean Household income

Mean (NIPA adjusted with health benefits)
Mean - SOI dist adj
Mean - NIPA adjusted
Household Mean

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

9.6%
5.7%
5.4%
-2.3%
Median NIPA-adjusted income increases more than median Household income, but less than Mean NIPA-adjusted.
Levels and Trends in Inequality

Gini Coefficient

- Household Income
- NIPA- Adjusted Income
- SOI Adjusted Income
- NIPA adj, with health, retirement and imputed interest

Years: 1999 to 2010

Gini Coefficient Values:
- 1999: 0.42
- 2000: 0.43
- 2001: 0.44
- 2002: 0.45
- 2003: 0.46
- 2004: 0.47
- 2005: 0.48
- 2006: 0.49
- 2007: 0.50
- 2008: 0.51
- 2009: 0.52
- 2010: 0.53
How does the income distribution affect the Keynesian expenditure multiplier?

Economic Report of the President, among others, suggests that because lower income categories have higher MPC, then a redistribution can increase the size of the multiplier.

This is an old concern: Stone and Stone (1938), Goodwin (1949), Chipman (1950) and Conrad (1955)

Consider a simple closed economy in which the autonomous expenditures include all expenditures except consumption.
Calculating an expenditure multiplier

- Use $Y_i = A_i + c_i Y_i$, $dY_i = dA_i + c_i dY_i$
  - Where $Y_i$ denotes income, $A_i$ autonomous expenditure, and $c_i$ the marginal propensity to consume for the $i^{th}$ income class and

\[
\begin{bmatrix}
  dY_1 \\
  \vdots \\
  dY_N
\end{bmatrix} = [I - C]^{-1}
\begin{bmatrix}
  dA_1 \\
  \vdots \\
  dA_N
\end{bmatrix}
\]

- Where $I$ is the identity matrix and $C$ the diagonal matrix of the $c_i$
- Using Dynan (2012) estimate of income elasticity of consumption, $e$, to obtain MPC, i.e., $MPC = e \times APC$
Using the quintile distributions of income and consumption in McCully (2012), we obtain an expenditure multiplier of 5.75. A constant MPC across income categories yields a multiplier of 5.48 (for a .27 difference).
Consider $\mu(1-G)$ as the SWF (as in Sen (1973)); $\mu$ is the mean income and $G$ in the respective Gini coefficient.

Similar to Jorgenson (1990), Jorgenson and Slesnick (2012) and Jones and Klenow (2011)

Larger increases in income yield larger increases in SWF, while larger increases in inequality diminish increases in SWF.
Changes in income, inequality and SWF
Conclusion and Future Work

- Almost 60 years ago, Kuznets (1955) stated: “Today, there is increased concern about the skewed income distribution, and the increase in skewness over time.”

- We constructed two straightforward ways to provide a distribution to NIPA Personal Income

- We show that many subjective decisions are part of the transformation

- Future work involves analysis of the matched household data with the tax records to more completely measure income underreporting.

- Multiplier analysis will be improved by incorporating similar decompositions of PCE and personal income that rely on the distribution of the household survey data (as in McCully (2012))

- The results in this paper may provide a framework for developing measures of median personal income and their distribution that could be produced on a regular basis.