Household Income, Demand, and Saving: Deriving Macro Data with Micro Data Concepts

Barry Cynamon

Frontiers of Measuring Household Economic Behavior

Federal Reserve Bank of Boston, April 27, 2015
Acknowledgements

Multi-year research project linking household finances and economic growth
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Multi-year research project linking household finances and economic growth

- Joint work with Steve Fazzari
- Generous support from INET
- Opinions are mine and not those of the Fed
This Session

Reconciling macro and micro estimates of U.S. household income and expenditures
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Reconciling macro and micro estimates of U.S. household income and expenditures

- Understand how the aggregate measures are distributed
- Validate survey measures comparing to trusted aggregate measures
- Learn from aggregates consistent with micro data concepts
Motivation for Measurement

INEQUALITY AND CONSUMPTION

“Inequality, the Great Recession, and Slow Recovery”
Forthcoming in the Cambridge Journal of Economics
The Original Goal

Investigate relationship between income inequality and Great Recession
The Original Goal

Investigate relationship between income inequality and Great Recession

- Rich have lower propensity to consume
  - (Maki and Palumbo 2001)

- Increasing share of income flowing toward rich
  - (Piketty and Saez, 2003; CBO, 2013; Johnson and Smeeding, 2014)

- Downward pressure on aggregate consumption?
Increasing share of income flowing toward rich

Income share of the top 5% of US households

Source: The World Top Incomes Database
Consumption Drove Economic Growth

Consumption share of GDP

Source: BEA National Income and Product Accounts
Households Doubled their Leverage

Debt to income ratio of US households

Source: FRB Financial Accounts of the United States
Initial Plan

Find a micro data set with income and consumption expenditure
Initial Plan

Find a micro data set with income and consumption expenditure

- SCF: oversamples wealthy, but no consumption data
- CPS: annual and large sample, but no consumption
- CE: fails to match aggregate data in level or trend
  - Under-reporting especially among higher income households (Sabelhaus, Johnson, Ash, Swanson, Garner, Greenlees, Henderson, 2013)
Revised Plan

Use a mix of aggregate and micro data to generate results at “group” level
Revised Plan

Use a mix of aggregate and micro data to generate results at “group” level

• SCF: for distribution of balance sheet accounts

• CPS: for distribution of income

• National accounts: for authoritative time series
Maki and Palumbo (2001)

<table>
<thead>
<tr>
<th></th>
<th>Assets and Liabilities</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stocks</td>
<td>Flows</td>
</tr>
<tr>
<td>Aggregate</td>
<td>FAOTUS</td>
<td>FAOTUS</td>
</tr>
<tr>
<td>Micro</td>
<td>SCF</td>
<td>*identification</td>
</tr>
<tr>
<td></td>
<td>shares interpolated linearly between waves</td>
<td>assume flows proportional to holdings</td>
</tr>
</tbody>
</table>

- Numbers add up to net worth and saving for the personal sector published in the FAOTUS
- Distribution matches the SCF in every survey year
Revised Plan ii

M&P for group-level saving numbers and then back out consumption numbers
Revised Plan ii

M&P for group-level *saving* numbers and then back out consumption numbers

- Mark Zandi provided us with saving rate information derived using the M&P approach
- First, we adjusted those FAOTUS saving numbers to match NIPA saving numbers
- Then we allocated NIPA transfers and interest between our groups so we could back out “group” consumption
Revised Plan ii

M&P for group-level *saving* numbers and then back out consumption numbers

\[
\text{Disposable Income} - \text{Saving} = \text{Outlays}
\]

\[
\text{Outlays} = \text{Consumption} + \text{Transfers} + \text{Interest}
\]

\[
\text{Consumption} = \text{Disposable Income} - \text{Saving} - \text{Transfers} - \text{Interest}
\]
The Story

Non-rich took on debt to maintain consumption, which delayed the effect of rising inequality.
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Before Great Recession:

• Debt to income ratio of non-rich grew before GR
• Consumption rate of non-rich stable or rising
The Story

Non-rich took on debt to maintain consumption, which delayed the effect of rising inequality

Before Great Recession:
• Debt to income ratio of non-rich grew before GR
• Consumption rate of non-rich stable or rising

After Great Recession:
• Consumption of rich only has recovered
• Per capita, real GDP far below trend after Great Recession
Debt to income ratio of non-rich increased

Bottom 95%
Top 5%

Source: FRB Survey of Consumer Finances, data provided by Romain Ranciere
Consumption rate of non-rich stable or rising

Source: Cynamon and Fazzari (2015)
Consumption of rich has recovered; that of non-rich has not

Index of Real Consumption, Bottom 95% and Top 5% (1989=100)

Source: Data from Cynamon and Fazzari (2015)
GDP well below trend after Great Recession

Per capita, real GDP, chained dollars (exponential trend)

Source: BEA National Product Accounts
Measurement Exercise

MEASURING DEMAND

“Household Income, Demand, and Saving: Deriving Macro Data with Micro Data Concepts”
Forthcoming in the Review of Income and Wealth
Motivation

Reconcile macro and micro estimates of U.S. household income and expenditures
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Reconcile macro and micro estimates of U.S. household income and expenditures

- Maki and Palumbo (2001) reliant on consistent concepts
  - CPS income distribution applied to NIPA disposable personal income
  - SCF net worth distribution applied to FAOTUS balance sheet

- But there are inconsistencies between micro and macro data
  - Not just sampling error; important conceptual differences

- Previous efforts to match NIPA and survey income
  - Katz (2012), Bosworth et al. (2007)
Comparisons to Survey Data

Pre-tax income data from surveys well below 100% of NIPA personal income
Motivation ii

Reconcile macro and micro estimates of U.S. household income and expenditures

• Might learn from macro measures adjusted to match micro concepts
  – PCE vs. what households actually spend
  – Different definitions of saving may tell different stories
Objective

Measure the flows of purchasing power under the control of the household

• Eliminate imputed value of services in consumption
  – Example: Imputed rent

• Eliminate spending not controlled by households
  – Example: Medicare
Objective

Measure the flows of purchasing power under the control of the household

- Household financial flows the way households actually see these flows
- Concept likely to correspond better with flows households report on surveys
Key Identity

• Accounting identity maintained before and after adjustments:

\[
\text{Disposable Income} = \text{Consumption} + \text{Investment} + \text{Interest} + \text{Saving}
\]

• Identity holds in NIPA
  – Household investment not distinguished from financial saving

• Adjustments to consumption or income require balancing change elsewhere
### Housing Example (2013 $billions)

<table>
<thead>
<tr>
<th></th>
<th>Disp. Income</th>
<th>Cons.</th>
<th>HH Invest.</th>
<th>Trans. &amp; Int.</th>
<th>Fin. Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implicit Rent</td>
<td>- 1326</td>
<td>- 1326</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate Inputs</td>
<td>+ 152</td>
<td>+ 152</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortgage Interest</td>
<td>+ 334</td>
<td></td>
<td>+ 334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>+ 312</td>
<td></td>
<td></td>
<td>+ 312</td>
<td></td>
</tr>
<tr>
<td>New Construction</td>
<td></td>
<td></td>
<td>+ 426</td>
<td>- 426</td>
<td></td>
</tr>
<tr>
<td>Single-Family Homes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broker commissions</td>
<td>+ 105</td>
<td>- 105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>- 528</td>
<td>- 1068</td>
<td>+ 321</td>
<td>+ 334</td>
<td>- 115</td>
</tr>
</tbody>
</table>

- Eliminate “rent home to yourself” business
Other Important Adjustments

• About 40 separate adjustments

• Remove non profit institutions that serve households

• Free financial services

• Medical care
  – Employer and government, not households

• Retirement accounting
  – Exclude contributions by employers and government to defined benefit plans
  – Include benefits from DB plans
## Other Important Adjustments

<table>
<thead>
<tr>
<th>Category</th>
<th>Disposable Income</th>
<th>Consumption</th>
<th>Transfers &amp; Interest</th>
<th>Financial Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner-Occupied Housing</td>
<td>-4%</td>
<td>-9%</td>
<td>81%</td>
<td>-19%</td>
</tr>
<tr>
<td>Financial Services</td>
<td>-6%</td>
<td>-2%</td>
<td></td>
<td>-76%</td>
</tr>
<tr>
<td>Defined Benefit Pensions</td>
<td>-1%</td>
<td></td>
<td></td>
<td>-27%</td>
</tr>
<tr>
<td>Third-Party Paid Medical Services</td>
<td>-13%</td>
<td>-14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Profit Sector</td>
<td>-1%</td>
<td>-4%</td>
<td>61%</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>-2%</td>
<td></td>
<td></td>
<td>-30%</td>
</tr>
<tr>
<td><strong>Adjusted Data</strong></td>
<td><strong>73%</strong></td>
<td><strong>70%</strong></td>
<td><strong>242%</strong></td>
<td><strong>-44%</strong></td>
</tr>
</tbody>
</table>

Note: Household investment excluded from table, because it has no clear personal sector counterpart in the NIPA.
Adjusted measures: real, per capita
Comparisons to Survey Data

Note: All measures shown pre-tax; CBO net realized capital gains added to adjusted disposable income to match SCF, which includes realized gains.
Expenditure Shares of Income

Adjusted Consumption
Household Investment
Adjusted Transfers and Interest
Bigger Collapse: Cash Flow Measure

Demand Rates: NIPA Definition and Adjusted

- NIPA PCE / NIPA DPI
- Adj HH Dem / Adj DPI
New saving rate concepts

- NIPA Saving Rate
- Adj. Gross Household Saving Rate
- Adj. Financial Saving Rate
Future Directions

1. Use the Maki and Palumbo procedure with micro-consistent aggregate income and saving series; see if the results change
   – Wondering if anybody at the Board would like to team up with us
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   – Would like to generate quarterly-frequency numbers
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3. Exploit panel structure of PSID to see if story of rising balance sheet fragility among non-rich followed by discrete fall in consumption during GR holds up at household level
   – Joint work with Daniel Cooper