Is the Consumer Expenditure Survey Representative by Income?

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Motivation

- BLS tables show CE is missing about one-third of comparable NIPA PCE spending totals
- Ratio got worse in 90s, but stable since 2003
- Assuming PCE correct, two sources of error:
  1. Higher income consumer units (who presumably spend more) under-represented in CE sample
  2. Under-reporting of total spending by at least some CE respondents
Contributions of this Paper

• New test of survey response rates by income
  – Link sampled CE units to their zip-code level adjusted gross incomes (AGI) from public-use IRS data
  – Response rates are lower at highest AGI percentiles
  – Ratio of mean CE income to AGI falls with AGI

• But, differential non-response by income may possibly explain half of the aggregate shortfall
  – Some respondents under-reporting total spending
  – Implications for inequality, saving, consumption taxes
Background: CE to PCE Ratios

- Need to adjust data sets for comparability of populations and spending concepts
- Observe persistent differentials by types of spending (especially owned housing services)
- Some decline in CE/PCE during 1990s, but
- Ratios relatively stable since 2003
Ratio of CE to Comparable PCE, Garner et al (2009)

Bar chart showing the ratio of CE to Comparable PCE for different categories of goods and services over the years 1992, 2002, and 2007. The categories include All Goods, Durable Goods, Non-Durable Goods, Owned Housing, and Other Services.
Ratio of CE to Comparable PCE, Latest BLS Published

- 2003
- 2007
- 2009

Categories:
- All Goods
- Durable Goods
- Non-Durable Goods
- Owned Housing
- Other Services
CE Income Distribution

• Compare CE income distribution (units and dollars) to CPS, SCF, and SOI data in 2006
  – CPS is most like the CE in terms of coverage and questions, but focused on income, not expenditures
  – SCF over-samples wealthiest households, but otherwise income concepts similar to CE and CPS
  – SOI is administrative data, but concepts diverge

• Compare counts and dollars; can’t distinguish between missing very high income and under-reporting of income for those households
Missing Income in the CE

- Numbers of units ($50k<, $50-100k, $100k+) similar across the four data sets
  - CPS/SCF slightly more units $100k+, SOI fewer
  - SOI is tax units, includes dependent filers

- Dollars of income much more divergent
  - Overall $0.5 (CPS) to $1.7 (SCF) trillion missing
  - Most income missing $100k+; offset slightly by higher CE aggregate incomes below $100k
  - SOI shows $1.0 trillion missing $100K+, even though non-taxable incomes missing
Response Rates by Income

• Data set begins with 104,830 sampled CE units for 2007 and 2008
  – Exclude benchmark interviews, sample is 83,366
  – 61,456 respondents; 74 percent response rate

• Link all sampled units to 5 digit zip-code level average AGI from IRS public-use data
  – Sort all sampled units by zip-code average AGI
  – We are NOT testing sampling rates by AGI
  – Analyze response rates within AGI percentiles
Using Zip-Code Level AGI

• AGI is less than or equal to household income
  – AGI excludes non-taxable transfers, interest (bias)
  – Dependent filers are separate units (bias)
  – Excludes non-filers (possible bias)

• Is 5 digit zip-code homogeneous enough?
  – We find significant differences in mean AGI across percentiles of AGI, especially top zip-codes
  – We also compare means within percentiles

• In any case, zip-code AGI good for ranking
Figure 1. Consumer Expenditure Survey (CE) Response Rates by Zip-Code Level Adjusted Gross Income (AGI) Percentile

Note: Fitted curves are 5th order polynomials
BLS Post-Stratification

• Unit non-response at higher incomes affects final sample if other controls uncorrelated
  – BLS non-interview adjustment by region, tenure, CU size, race (64 cells) creates STAGE1WT
  – Final calibration for age, race, tenure, region, and rural/urban (24 cells) creates FINALWT21

• The two sets of adjustments shift response by AGI line up, but tails are same
  – *Relative* response rate 90 percent for top vingtile
Figure 1. Consumer Expenditure Survey (CE) Response Rates by Zip-Code Level Adjusted Gross Income (AGI) Percentile

Note: Fitted curves are 5th order polynomials
Comparing Means

• Second step is comparing AGI for all sampled units to CE household income for respondents

• Conceptual issues about AGI more of a factor
  – Overall, CE household income 20 percent higher
  – CE income 40 percent higher at bottom, falls steadily, plummets to 75 percent lower at top

• Outstanding question is whether “wedge” between AGI and household incomes varies with percentiles of AGI
Figure 2. Ratio of Mean Consumer Expenditure Survey (CE) Income to Adjusted Gross Income (AGI) by Zip-Code Level AGI Percentile

Note: Fitted curve is a 5th order polynomial
Unit Non-Response and Income

• Even if zip-code level AGI is just a good sorting variable, clear evidence that response is lower for very highest income families

• Visual evidence confirmed by probit estimates with existing post-stratification variables; AGI is a significant predictor of response

• Using this for alternative survey non-response adjustment will require reconciling AGI and household income
Implications of Differential Non-Response

• Back of the envelope calculation
  – SCF: CE might be missing $1.7 trillion $100k+
  – CE ratio of spending to income 61 percent $100k+
  – Implies $1.0 trillion “missing” consumption

• Total CE spending is $5.8 trillion, so “missing” consumption is at most 17% of CE total

• Thus, if wealthiest families included in CE, could resolve at most half the CE/PCE shortfall
Respondent Under-Reporting

• Published BLS tables show aggregate spending to after-tax income was 83 percent in 2006

• Problems with BLS tables
  – Not a saving concept, taxes poorly measured
  – Adjustments might explain several percentage points of gap, real ratio may be 90 percent
  – But, ratio should be 100 percent or more

• Ratio of spending to after-tax income was 84 percent in 2003, 89 percent in 1972-73
Figure 3. Expenditure to After-Tax Income Ratios in Published CE data

Ratio of Total Spending to After-Disposable Income (2010 Dollars)

Disposable Income (2010 Dollars)
Spending to Income Ratios

• In all years, seems like spending to income ratios too high at bottom, too low at top

• Implies income under-reporting for some, sorted to bottom of distribution tables

• Also implies under-reporting of spending for at least some households, probably at top

• Simple adjustments to spending (proportional scaling) probably inappropriate
Research Implications

• If CE just under-represents the very top
  – CPI biased only if their spending basket different
  – Measures of resource distribution will not be complete, but unbiased for relevant incomes

• But more complex under-reporting of both income and spending raises questions about
  – Saving rates across groups
  – Distributional burden of consumption taxes
  – Consumption versus income inequality
BLS/Census To-Do List

• Create more comparable expenditure and after-tax income concepts for published tables; use model-based income taxes instead of reported

• Reconcile CE income and AGI concepts, re-do both parts of the new experiment

• Extend analysis back in time to see if very high incomes less represented now. How does that correlate with CE/PCE patterns over time?

• Extend to other data sets like CPS