BLS Advances in Expenditure and Consumption Measurement

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\textit{CNSTAT Panel Session:}

\textit{Projects at Federal Agencies to Support Data & Estimates of Income, Consumption, and Wealth Integrated System of Household Income, Consumption, and Wealth Data Event}

May 16, 2022 (edited May 20, 2022)

NOTE: Version without extra slides
Topics

1. Update on CE Data Quality Projects

2. CE-based Research Related to the Distribution of ..... 
   a. Personal Consumption Expenditures (PCE)
   b. Consumption as defined for BLS Comprehensive Consumption Initiative
Topic 1
Update on CE Data Quality Projects
Addressing Weaknesses in CE Data

- Declining response rates
- Lower CE aggregates vs. PCE
- Missed CUs in the upper end of the income distribution
CE Diary Survey Response Rates
CE Interview Survey Response Rates
## CE Data Comparisons

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<td>Prescription drugs</td>
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<td>Medical supplies and non-prescription drugs</td>
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<td>Physician's services</td>
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<td>Dental services</td>
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<tr>
<td>Electricity</td>
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<td>Property taxes</td>
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<tr>
<td>Mortgages</td>
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</table>
## Aggregate Expenditures: CE vs. PCE

### Summary comparison of aggregate Consumer Expenditures (CE) and Personal Consumption Expenditures (PCE)

<table>
<thead>
<tr>
<th>[In millions of dollars]</th>
<th>PCE</th>
<th>CE</th>
<th>CE-to-PCE ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total durables, nondurables, and services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$13,526,689</td>
<td>$8,343,647</td>
<td>.62</td>
</tr>
<tr>
<td>Comparable items</td>
<td>8,650,873</td>
<td>6,280,753</td>
<td>.73</td>
</tr>
<tr>
<td>Ratio of comparable items to total</td>
<td>.64</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td><strong>Durable goods</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total durable goods</td>
<td>1,616,408</td>
<td>938,436</td>
<td>.58</td>
</tr>
<tr>
<td>Comparable durable goods</td>
<td>1,306,577</td>
<td>838,840</td>
<td>.64</td>
</tr>
<tr>
<td>Ratio of comparable durables to total durables</td>
<td>.81</td>
<td>.89</td>
<td></td>
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<tr>
<td><strong>Nondurable goods</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total nondurable goods</td>
<td>3,037,413</td>
<td>1,472,744</td>
<td>.48</td>
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<tr>
<td>Comparable nondurable goods</td>
<td>2,825,314</td>
<td>1,367,465</td>
<td>.48</td>
</tr>
<tr>
<td>Ratio of comparable nondurables to total nondurables</td>
<td>.93</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td><strong>Services - household consumption expenditures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total services (Household consumption expenditures)</td>
<td>8,872,868</td>
<td>5,932,468</td>
<td>.67</td>
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<tr>
<td>Comparable services</td>
<td>4,306,883</td>
<td>3,969,170</td>
<td>.92</td>
</tr>
<tr>
<td>Ratio of comparable services to total services</td>
<td>.49</td>
<td>.67</td>
<td></td>
</tr>
</tbody>
</table>
Update on CE Data Quality Projects

Online diary
- Implementing an online diary to encourage contemporaneous reporting and provide a technological platform for future enhancements (e.g., receipt capture, geolocation features, etc.)

Streamlined questionnaire
- Implementing a streamlined questionnaire to:
  - reduce the number of questions
  - facilitate the use of records
  - cluster questions together more logically from a respondent’s point of view, and
  - eliminate many kinds of follow up questions
Update on CE Data Quality Projects

Data imputation
- Developing programs to impute assets and liabilities data using CE reporters only
  - Retirement accounts, IRA, 401(k), thrift savings plans, checking accounts, savings accounts, money market, CDs, stocks, bonds, whole life insurance, annuities, trusts, and royalties, other assets
  - Student loans, credit cards, other types of loans

Data linking
- Evaluate matched IRS data for potential use in imputation and other production procedures or edits
- Link Interview Survey and HUD addresses to assess potential benefit of using administrative data in CE processing for questions involving housing (not all inclusive; many other rental assistance programs, e.g., USDA)
Topic 2

CE-based Research Related to the Distribution of
- Personal Consumption Expenditures (PCE)
- Consumption (and joint with Income)

Main difference focused on “fit for purpose”
Follow OECD 2013 Framework for Underlying Concepts

- **Consumption expenditure** - value of consumption goods and services used or paid for by a household to directly meet its needs
  - Purchase of select goods and services in the market
  - In-kind transfers from employers (e.g., health insurance)
  - Household’s own production of goods and services consumed
    - Owner-occupied housing
    - Owned vehicles
    - Durables
    - Other (e.g., child/elder care, meals)
  - In-kind transfers from other households and from businesses

- **Actual final consumption** - sum of
  - Consumption expenditure
  - Public in-kind transfers

## Framework Comparison

<table>
<thead>
<tr>
<th>Item</th>
<th>Consumption Exp or Final Consump. (OECD/PCE)</th>
<th>Proposed BLS Consumption</th>
<th>Planned Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition cost of services and non-durable goods</td>
<td>Yes</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Financial services</td>
<td>Yes</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Service flow from housing</td>
<td>Yes</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Service flow from vehicles *</td>
<td>Yes/No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Service flow from other durable goods *</td>
<td>Yes/No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>In-kind receipt of goods and services **</td>
<td>Yes/Partial</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Other home production *</td>
<td>Yes/No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interhousehold transfers (including gifts received) *</td>
<td>Yes/No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Health***</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
</tr>
<tr>
<td>Education</td>
<td>Yes</td>
<td>??</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Yes/no: in OECD, not PCE
** For renters living in housing units that are subsidized (e.g., rent-control, section 8, public housing), PCE includes the rent paid, not flow of services
*** Restricted to health insurance for BLS consumption
## Framework Comparison

<table>
<thead>
<tr>
<th>Item</th>
<th>Consumption Exp or Final Consump. (OECD/PCE)</th>
<th>Proposed BLS Consumption</th>
<th>Planned Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gifts of goods &amp; services given outside household</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Life insurance/other personal insurance</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Purchase price of vehicles **</td>
<td>No/Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Purchase price of other durables **</td>
<td>No/Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

** No/Yes: Not OECD but in PCE
Topic 2a

Distribution of PCE over Households

Researchers: S. Curtin, T. Garner, B. Martin, and B. Matsumoto
Overview of Research

- Goal: to estimate distribution of BEA’s Personal Consumption Expenditures (PCE) by combining data from the PCE and BLS’s Consumer Expenditure (CE) Survey

- Work being done in coordination with BEA
  - Part of a larger project organized by the OECD
  - Similar to BEA’s Distribution of Personal Income product (Fixler, Gindelsky, and Johnson)

- Consumer expenditures organized into PCE “Major Type of Product”
  - Series presented in NIPA Table 2.3.5
  - Excludes final consumption expenditures of non-profits serving households

- Prototype focuses on data for calendar year 2019

- Preliminary results
  - 9.0% of equivalized PCE accounted for by the bottom 20% of population; 37.0% of PCE accounted for by the top quintile (80-100%)
  - Gini: 0.28
Method to Produce PCE-defined Consumption Expenditures

- Time period for CE Interview: November 2018 – February 2020 (collection: 2019Q1-2020Q1)

- Sample
  - Restrict to CUs with 2, 3 or 4 interviews
  - Recalibrate sampling weights to match 2019 counts and average demographic characteristics from CPS

- Use Interview as base (represents ~ 95% of total expenditures)

- Apply statistical matching to impute the remaining 5% from the Diary using procedure based on Hobijn et al. (2009)

- CE expenditures mapped to PCE categories (w/adjustments and imputations)
  - Mapping based on product and definitions (e.g., no household-to-household vehicle sales)
  - Supplement CU reported out-of-pocket healthcare (including insurance) expenditures using
    - Center for Medicare and Medicaid Services (CMS) National Health Expenditure (NHE)
    - Medical Expenditure Panel Survey (MEPS-IC) from the Agency for Healthcare Research and Quality
CE/PCE Ratios After All Adjustments to CU Expenditures, but before “Scaling up” to PCE Totals

Preliminary Estimates 2019

<table>
<thead>
<tr>
<th></th>
<th>CE/PCE research</th>
<th>CE/PCE published</th>
<th>CE/PCE published “comparables”</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCE less final Cons. Exp. of NPISHs</td>
<td>0.73</td>
<td>0.60</td>
<td>0.73</td>
</tr>
<tr>
<td>Durable goods</td>
<td>0.56</td>
<td>0.59</td>
<td>0.65</td>
</tr>
<tr>
<td>Nondurable goods</td>
<td>0.63</td>
<td>0.52</td>
<td>0.53</td>
</tr>
<tr>
<td>Services</td>
<td>0.78</td>
<td>0.63</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Source for published CE/PCE: [https://stats.bls.gov/cex/cecomparison/pce_profile.htm](https://stats.bls.gov/cex/cecomparison/pce_profile.htm)
Method to “CE Scaled-up to PCE” and Produce Distributions

- CE-sourced, PCE-defined expenditures scaled up so that major product totals match published PCE estimates; scaling based on CU share of total CE expenditures, e.g.,
  - 2019 PCE for Healthcare = $2,450,839 million
  - CU “X” had 0.000005% of total PCE-defined CE healthcare spending
  - CU “X” assigned 0.000005%*$2,450,839 million (PCE healthcare total $) as CU “X’s” expenditure

- Apply equivalence scale, square root of CU size, to produce distributional statistics
- Rank consumer units by equivalized “CE scaled-up to PCE” population weighted (by number of consumer units and members within), referred to a “Equivalized PCE”
CE / PCE Ratios with Adjustments & Shares of Households with Medicare and Medicaid Recipients within Deciles

Preliminary Estimates 2019

### CE to PCE Ratios

<table>
<thead>
<tr>
<th>PCE_Title</th>
<th>Diary imputed to Interview</th>
<th>+ Split CE OOP health ins premium</th>
<th>+ With imputations for benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharm. and other medical goods</td>
<td>0.16</td>
<td>0.27</td>
<td>0.68</td>
</tr>
<tr>
<td>Health care ser.</td>
<td>0.05</td>
<td>0.20</td>
<td>0.80</td>
</tr>
<tr>
<td>health insurance prem (net for split)</td>
<td>1.85</td>
<td>0.19</td>
<td>0.79</td>
</tr>
</tbody>
</table>

NOTE: ranking of eq. PCE expenditures after scaling up

Decile of Population based on Rank of Eq. PCE

NOTE: ranking of eq. PCE expenditures after scaling up
Shares of “Equivalized PCE” by Distribution of Population
Preliminary Estimates 2019

For example...
33% of Equivalized PCE accounted for by the population within 80-99th CE-PCE exp. percentile range

NOTE: Shares and rank percentiles based on CExp Scaled up to PCE, referred to a “Equivalized PCE”
For example... 24.6% of PCE, accounted for by households in the bottom quintile, is for Health Care.
Topic 2b

BLS Initiative to Produce a Comprehensive Consumption Measure

Researchers: S. Curtin, T. Garner, B. Matsumoto, and J. Schild
Consumption as a Well-being Outcome: A Function of Resources and Processes

Available Resources
- Income, in-kind transfers
- Asset (financial)
- Asset (non-financial)
- Debt (access and use)
- Time

Processes
- Skills (e.g., education, financial management, efficiency in converting inputs to outcomes)
- Degree of resource allocation (power)
- Circumstances (CU composition, disability)
- Preferences, subjective assessments of well-being

Outcomes (e.g.,)
1. Consumption
2. Health status
3. Material deprivation
4. Life satisfaction
5. Happiness

For other outcomes: https://www.oecdbetterlifeindex.org/
BLS Initiative to Produce a Comprehensive Measure of Consumption

- Measure being designed to reflect how consumer units (CUs) use resources (e.g., income, wealth, time, in-kind benefits) to meet their consumption/material “needs

- Motivation
  - BLS long term interest to produce consumption measure & CE data users
  - Period of COVID-19 with more goods and services produced by household members
  - BLS is the producer of CE and ATUS data
  - ITWG on Evaluating Poverty Measures
  - Commissioner Beach’s support

- Goal
  - Produce components at the micro level that can be used by researchers to produce his/her preferred consumption or consumption expenditure measure definition depending on purpose
  - Publish tables
  - Disseminate public use microdata
Overview of Research Presented Today

- Time period: January 2019-February 2020 (collection: 2019Q2-2020Q1)
- Sample: all consumer units participating in an Interview with 3-month recall for expenditures and 12 for income
- Measures: consumption & consumption expenditures for 3-months; 12-month after tax and transfer (TT) income divided by 4
- Method to produce distributions
  - Apply 3-parameter equivalence scale (same as for Supplemental Poverty Measure)
  - Rank consumer units by equivalized values population weighted (by number of consumer units and members within)
  - Shares and rank percentiles based on equivalized values
- Preliminary results for 2019
  - 9.0% of equivalized consumption accounted for by the bottom 20% of population; 39.0% of equivalized consumption accounted for by the top quintile
  - 5.0% of equivalized after tax and transfer income accounted for by bottom 20% of population; 46% accounted for by the top quintile
  - Gini for equivalized consumption: 0.30
  - Gini for equivalized after tax and transfer income: 0.40
## Comprehensive Measure of Consumption

<table>
<thead>
<tr>
<th>Item</th>
<th>Current</th>
<th>Planned Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition cost of services and non-durable goods</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Service flow from housing</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Service flow from cars and trucks</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>In-kind receipt of goods and services (currently only: NSLP, LIHEAP, WIC, rental assistance)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gifts of goods &amp; services given outside household*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Other home production **</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Interhousehold transfers (including gifts received)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Health***</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Education</td>
<td>No</td>
<td>??</td>
</tr>
</tbody>
</table>

* Future: subtract for within household consumption
** Contract with outside vendor to estimate
***Restricted to health insurance

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## Construction of Comparison Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Base</th>
<th>Not Included</th>
<th>Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption Expenditures</td>
<td>CE Publication Definition of Total Expenditures</td>
<td>Cash contributions; allocations to and purchases of life insurance, endowments, annuities, and other personal insurance; retirement, pensions, and Social Security</td>
<td></td>
</tr>
<tr>
<td>After Tax and Transfer Income</td>
<td>CE Defined After Tax Income</td>
<td></td>
<td>LIHEAP, NSLP, WIC, rental assistance in-kind transfers</td>
</tr>
</tbody>
</table>
Shares of Equivalized Consumption & Equivalized After TT Income by Quintile
Preliminary Estimates 2019

**Consumption**
- 80-100%: 39%
- 60-80%: 22%
- 40-60%: 17%
- 20-40%: 13%
- 0-20%: 9%

**After TT Income**
- 80-100%: 46%
- 60-80%: 22%
- 40-60%: 16%
- 20-40%: 11%
- 0-20%: 5%

**NOTE:** Quintiles based on rank of population by equivalized consumption or after tax and transfer income.
Housing (including Utilities) as Share of Total Consumption by Quintile
Preliminary Estimates 2019

By Consumption Quintile

- 0-20%
  - Housing: 49.2%
  - Other: 50.8%
- 20-40%
  - Housing: 49.7%
  - Other: 50.3%
- 40-60%
  - Housing: 50.5%
  - Other: 49.5%
- 60-80%
  - Housing: 51.5%
  - Other: 48.5%
- 80-100%
  - Housing: 53.7%
  - Other: 46.3%

By After TT Income Quintile

- 0-20%
  - Housing: 52.0%
  - Other: 48.0%
- 20-40%
  - Housing: 50.9%
  - Other: 49.1%
- 40-60%
  - Housing: 50.5%
  - Other: 49.5%
- 60-80%
  - Housing: 51.0%
  - Other: 49.0%
- 80-100%
  - Housing: 53.2%
  - Other: 46.8%
## Joint Distribution of Consumption & After TT Income

**Preliminary Estimates 2019**

<table>
<thead>
<tr>
<th>Rank by Eq. Income</th>
<th>Rank by Eq. Consumption</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>38%</td>
<td>17%</td>
<td>12%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
<td>4%</td>
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<tr>
<td>2</td>
<td>26%</td>
<td>22%</td>
<td>16%</td>
<td>11%</td>
<td>8%</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>16%</td>
<td>21%</td>
<td>18%</td>
<td>13%</td>
<td>11%</td>
<td>8%</td>
<td>5%</td>
<td>4%</td>
<td>2%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>11%</td>
<td>15%</td>
<td>15%</td>
<td>16%</td>
<td>13%</td>
<td>11%</td>
<td>8%</td>
<td>6%</td>
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<tr>
<td>5</td>
<td>5%</td>
<td>10%</td>
<td>14%</td>
<td>17%</td>
<td>14%</td>
<td>12%</td>
<td>10%</td>
<td>8%</td>
<td>6%</td>
<td>3%</td>
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## Joint Distribution of Consumption & Consumption Exp.

### Preliminary Estimates 2019

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Summary

- Research continues to support data quality improvements in CE
- Research continues regarding distributional PCE
  - Refinements to CE allocations and adjustments
  - Update to more recent time periods
- Research continues regarding the development of a comprehensive measure of consumption
  - Accounting for health insurance
  - Accounting for home production
  - Decomposition in inequality and poverty by demographic groups (e.g., education, race)
- Combine research on PCE and CE comprehensive consumption to move closer to OECD definitions of “consumption expenditures” and “final consumption”
- Joint distribution of consumption, income, and net worth
- Progress posted on [https://www.bls.gov/cex/consumption-home.htm](https://www.bls.gov/cex/consumption-home.htm)
Contact

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