Distribution of U.S. Personal Consumption Expenditures Using Consumer Expenditure Survey Data

Preliminary Results for 2019

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14.45 – 15:45 Session 3. Exercise, Country Experiences

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Overview of Research

- ***Problem:*** NIPA Personal Consumption Expenditures (PCE) available only for total population (U.S. "residents" and non-profit institutions serving households); no household characteristics available
- ***Potential solution:*** prototype created to assign 2019 PCE aggregates (excluding NPISHs) to consumer units represented by the Consumer Expenditure Survey (CE) such that distributional analysis possible
- ***Potential drawbacks***
  - Assumptions made regarding scaling up unlikely to reflect reality
  - Assumptions regarding imputations (focus today on those for health care expenditures)
  - Assumption regarding spending for whom (population represented by people living in U.S. households versus U.S. "residents" versus U.S. households)
  - PCE, as currently defined, does not equal "final consumption" as defined in 2013 OECD Framework
- Work being done in coordination with BEA
  - Focus thus far is only PCE with no reference to income
  - Prototype, as currently designed, not comparable to work of other countries
- Results by percentiles and for select demographic groups

Consumer/Consumption Expenditures

Personal Consumption Expenditures (PCE)

- Value of goods and services purchased by and on behalf of U.S. "residents" (persons in households) and by non-profit institutions serving households (NPISHs)
- Classification by type of product
  - Durable goods (4 subcategories)
  - Non-durable goods (4 subcategories)
  - Services (7 subcategories)
- https://apps.bea.gov/iTable/index_nipa.cfm (see Table 2.3.5)
- https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapter-05.pdf

Consumer Expenditure Survey

- Out-of-pocket spending by civilian non-institutionalized population
- Categorized by BLS expenditure use/purpose (not based on COICOP), e.g.,
  - Food
  - Housing
  - Apparel
  - Education
  - Health
  - Transportation
- https://stats.bls.gov/cex/
- https://stats.bls.gov/cex/cecomparison/pce_profile.htm

Reference for comparison: Passero, William, Thesia I. Garner, and Clinton McCully. 2014. "Understanding the Relationship: CE Survey and PCE." In *Improving the Measurement of Consumer Expenditures*, 181-203. University of Chicago Press.

U.S. Consumer Expenditure Survey Design

Interview

- Current design in effect since 1979 (first data 1980)
- Designed to collect large expenditure items and those less frequently purchased
- Personal interview
- Consumer units (CUs) staggered entrance to survey
  - New CUs enter the sample every month
  - While others continue and participate in up to 4 consecutive 3-month periods (or interviews)
  - Reference periods can overlap calendar year
- Quarterly (3-month recall) expenditures
- Each quarterly record of expenditures when weighted represents those for U.S. non-institutionalized population in a calendar year
- Sample size of completed quarterly interviews ~ 5,000 (20,000 for the year)
- With global questions, represents ~ 95% of total spending

Diary

- Current design in effect since late 1979 (first data 1980)
- Designed to collect smaller expenditure items and those frequently purchased
- Diary recordkeeping
- CUs staggered entrance to survey
  - New CUs enter sample every week
  - Participate up to 2 consecutive weeks
  - Reference periods can overlap calendar years
- Weekly expenditures
- Each weekly record of expenditures when weighted represents those for U.S. non-institutionalized population in a calendar year
- Average sample size of completed weekly diaries is 221 (11,500 for the year)

CE Survey is sponsored by the BLS with data collected under contract by the U.S. Census Bureau.

Method to Produce PCE-defined Consumption Expenditures

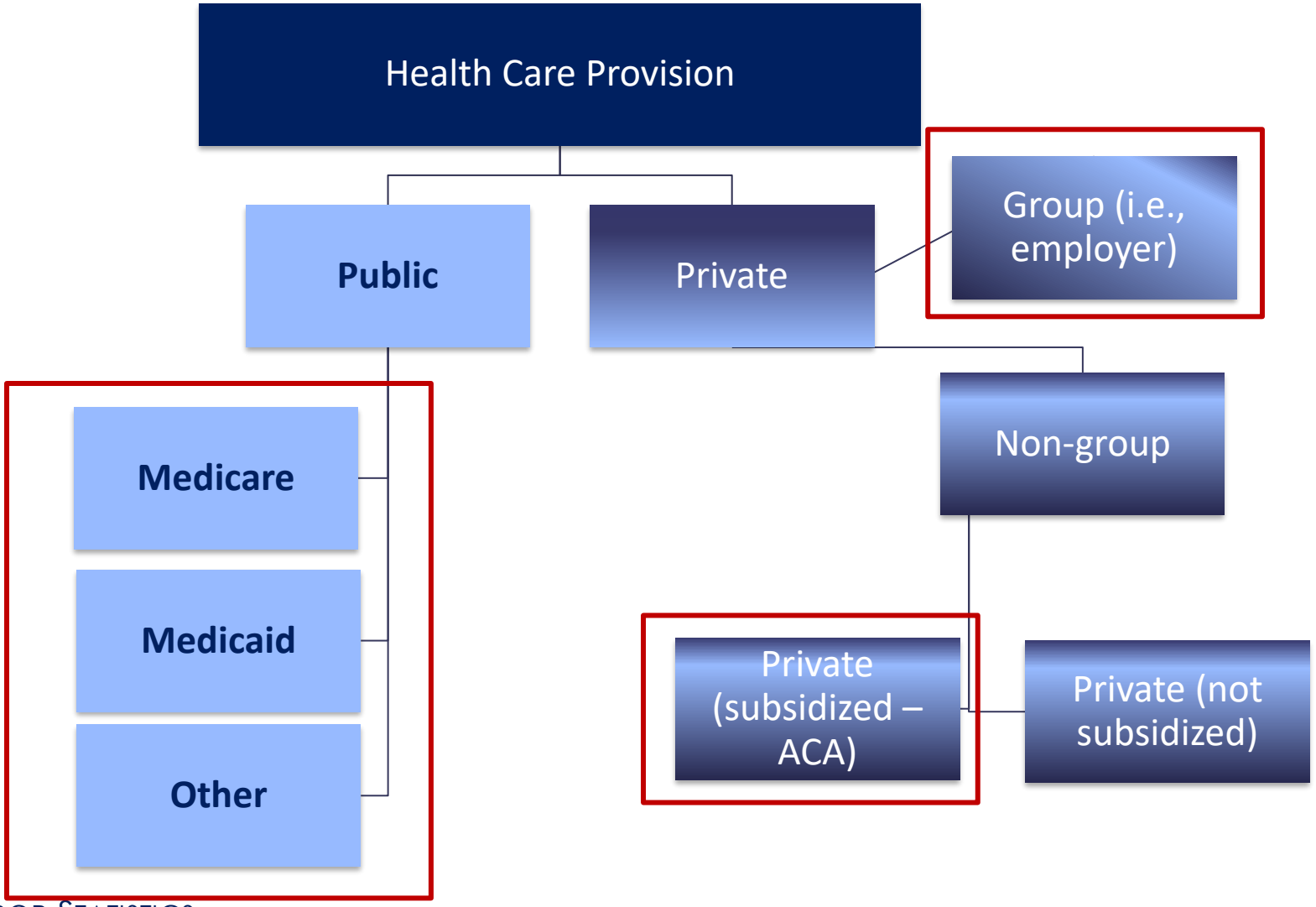
- Start with CE
  - Use Interview as base (represents ~ 95% of total expenditures)
  - Apply statistical matching to impute the remaining 5% from the Diary as only source (e.g., non-prescription drugs) or better measured (e.g., apparel)
  - To represent 2019 annual estimates, use Interviews with reference period November 2018 – February 2020
  - Sample of CUs with 2 to 4 quarterly reports which are annualized with weights calibrated to reflect U.S. 2019 population
- Organize CE to match PCE category definitions with adjustments
  - Omit household-to-household sales of vehicles
  - Allocate CE defined health care expenditures to PCE categories
- Augment CE health expenditures with administrative data
  - Since CE only includes out-of-pocket spending for health insurance and health care goods and services
  - PCE also includes expenditures by employers and the government on behalf of consumers
  - Without imputations, assume missing health care expenditures distributed identically to the non-missing values
- Scale up CE to PCE major product aggregates using proportional allocation for remaining gap (after health care expenditure allocations and imputations)

Method to Produce Distributions of PCE

- Focus on aggregate PCE and product type (durables, non-durables, services) - exclude expenditures by NPISHs
- Consumer Expenditure Survey values, with allocations and imputations, based on PCE definitions
- Preliminary annual estimates for 2019
- Divide CU expenditures by $\sqrt{cu\ size}$ to derive equivalized PCE
- Rank CUs by equivalized PCE (population weighted, as opposed to household weighted)
- PCE distributed *implicitly* across the population (by weighting by people living in CUs)
- Ranking by equivalized PCE at the CU observation unit level ensures that all members of the CU are in the same percentile group
- Shares and rank percentiles based on equivalized values (population weighed) unless otherwise noted

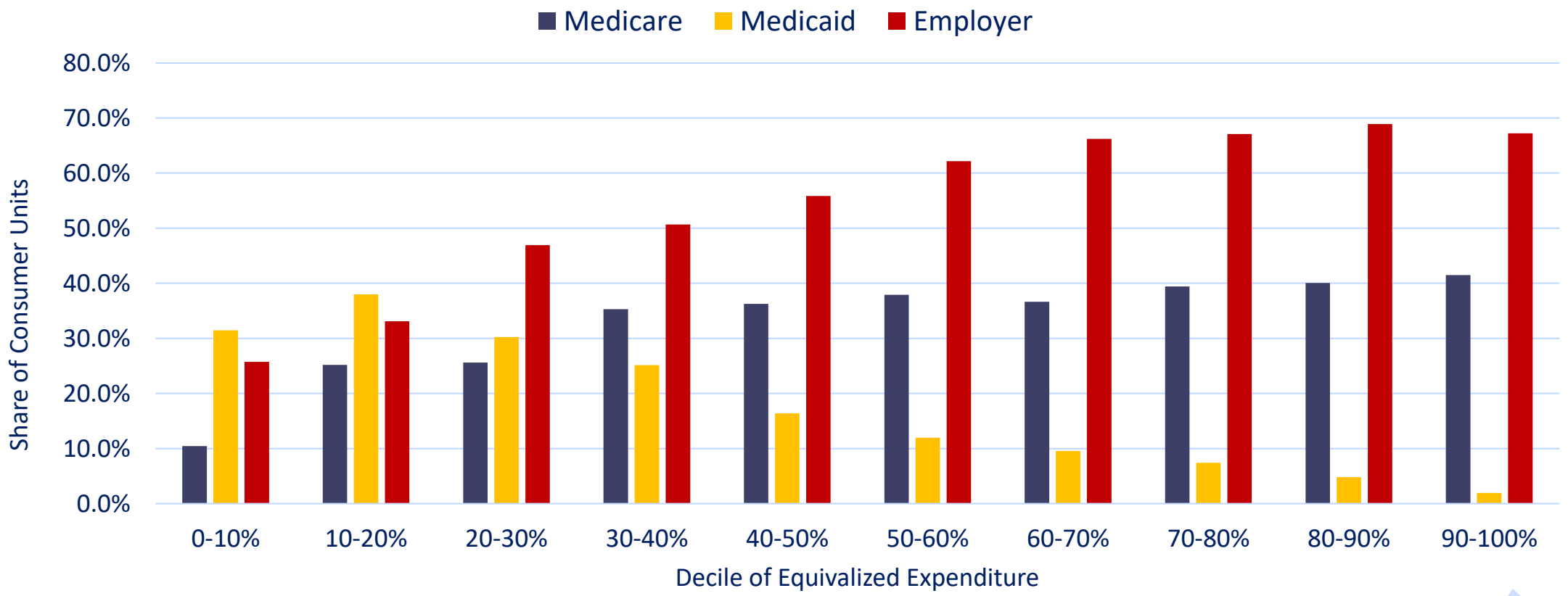
NOTE: Differs from other NIPA consumption expenditure-based analyses in that we rank by equivalized PCE, not equivalized NIPA income (per BEA preference) & ranking is of people not households (following methods in economics literature on inequality) and fact that PCE measures goods and services purchased by "persons" (see BEA NIPA Chapter 5).

Structure of U.S. Health Care System – Need for Imputations



Imputations Assigned to Consumer Units with Different Health Insurance Types by Decile – 1

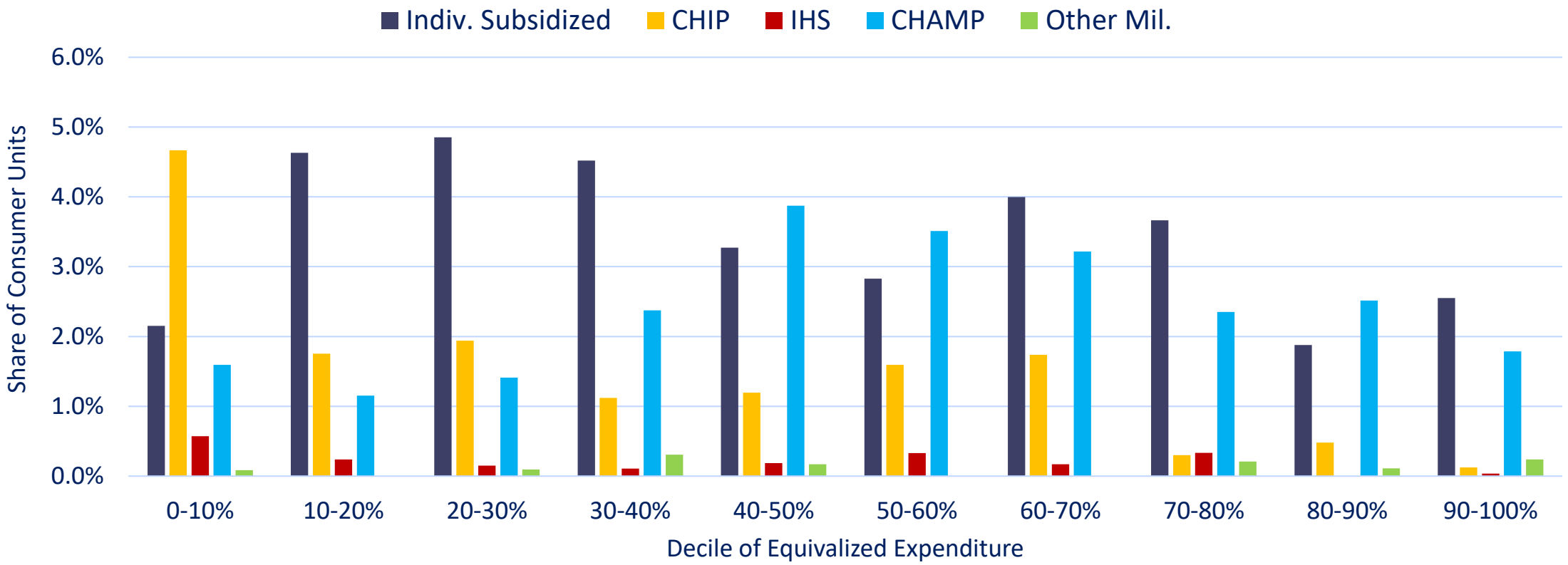
Preliminary Estimates 2019



NOTE: ranking of eq. PCE expenditures after scaling up

Imputations Assigned to Consumer Units with Different Health Insurance Types by Decile – 2

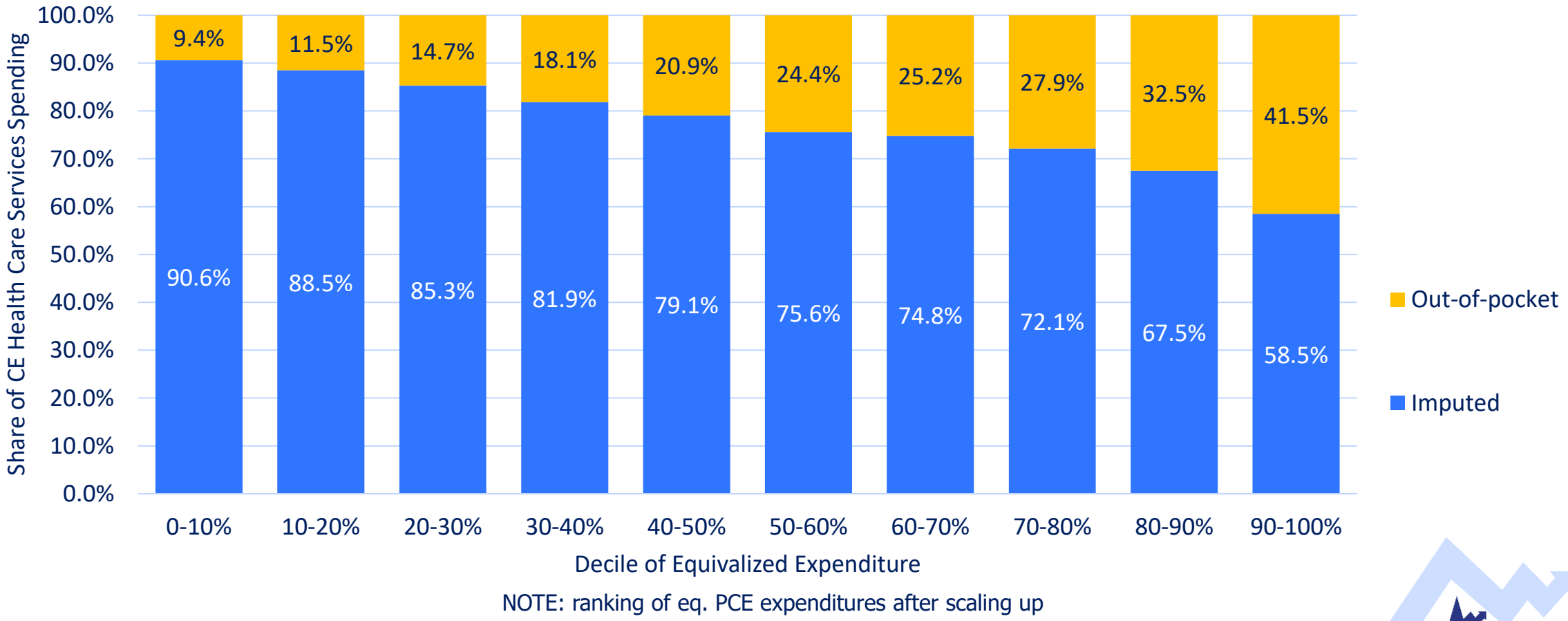
Preliminary Estimates 2019



NOTE: ranking of eq. PCE expenditures after scaling up

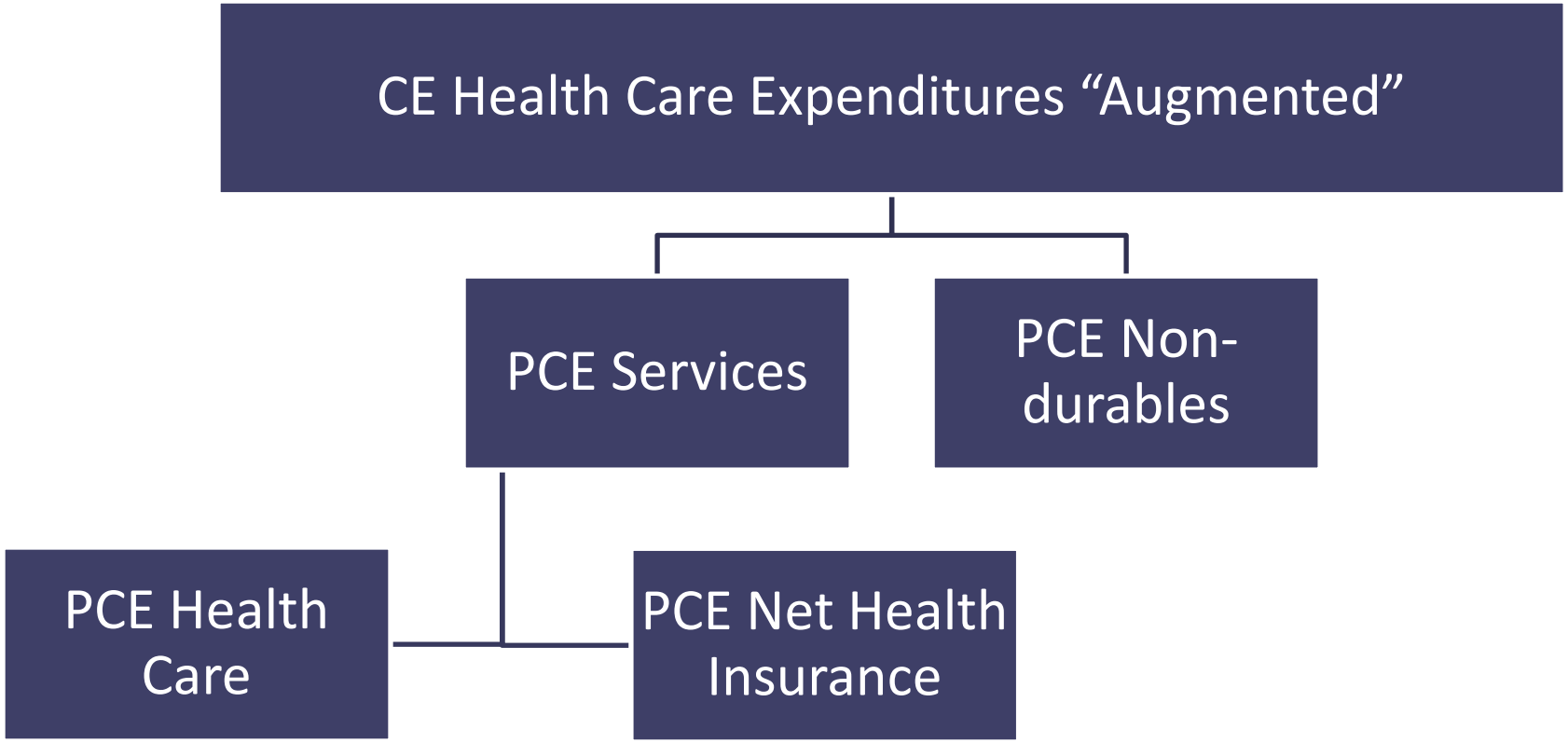
Impact of Imputations: Shares of CE Spending (before Scaling-up) on PCE-defined Health Care Services by Decile

Preliminary Estimates 2019

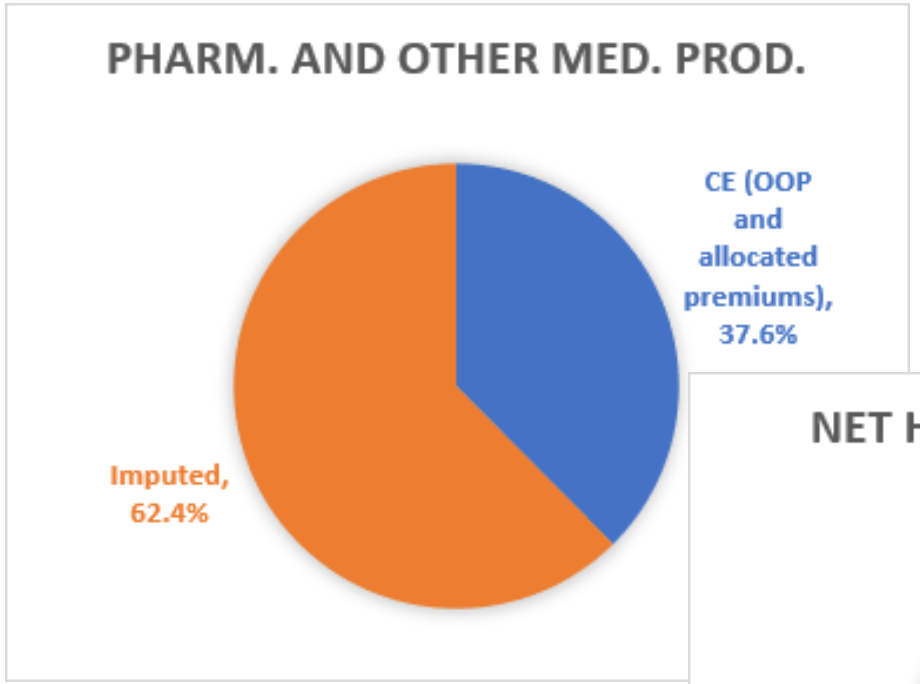


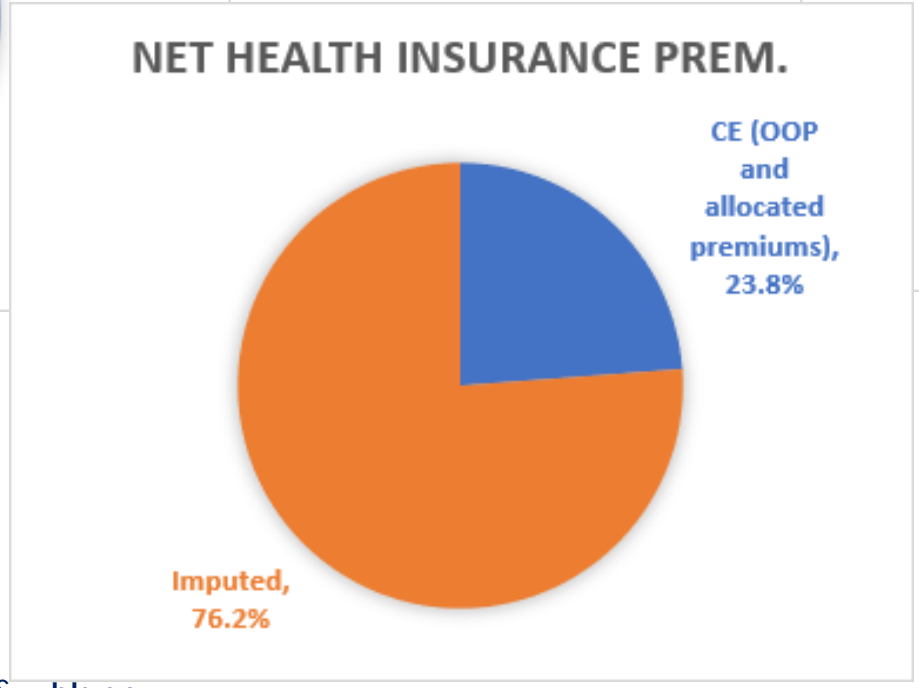
NOTE: ranking of eq. PCE expenditures after scaling up

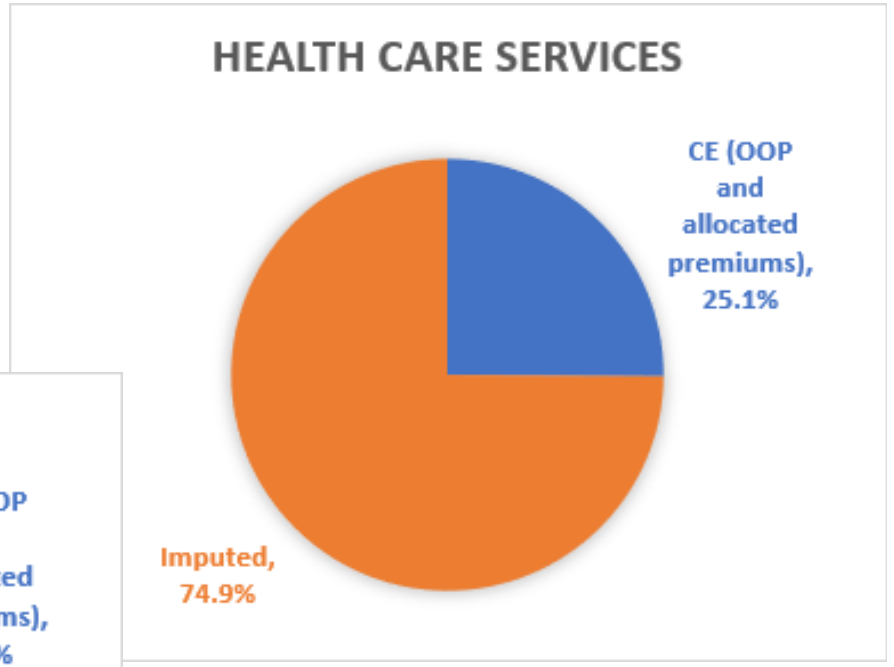
Allocation of CE Expenditures to PCE Categories



Impact of Adjustments: Imputed Share of CE Spending (before scaling-up) by PCE Health Categories







NOTE: Adjustments=imputations + allocations

Most Health Care Spending Not in CE but Is Added at the Consumer Level Preliminary Estimates 2019

CE to PCE Ratios			
PCE Category	**Diary imputed to Interview before adjustments (all out-of-pocket)**	**+ Adjustment to split CE OOP health insurance premium into PCE categories**	**+ With imputations for value of benefits (before scaling up)**
Pharmaceuticals and other medical goods	0.16	0.25	0.65
Health care services	0.05	0.20	0.80
Health insurance premium (net for split)	1.85	0.19	0.79

NOTE: ranking of eq. PCE expenditures after scaling up

CE/PCE Ratios After All Adjustments to CU Expenditures but before "Scaling up" to PCE Totals

Preliminary Estimates 2019

	CE/PCE before scaling up	CE/PCE published	CE/PCE published "comparable"
PCE less final Cons. Exp. of NPISHs	0.70	0.60	0.73
Durable goods	0.55	0.59	0.65
Nondurable goods	0.63	0.52	0.53
Services	0.75	0.63	0.87

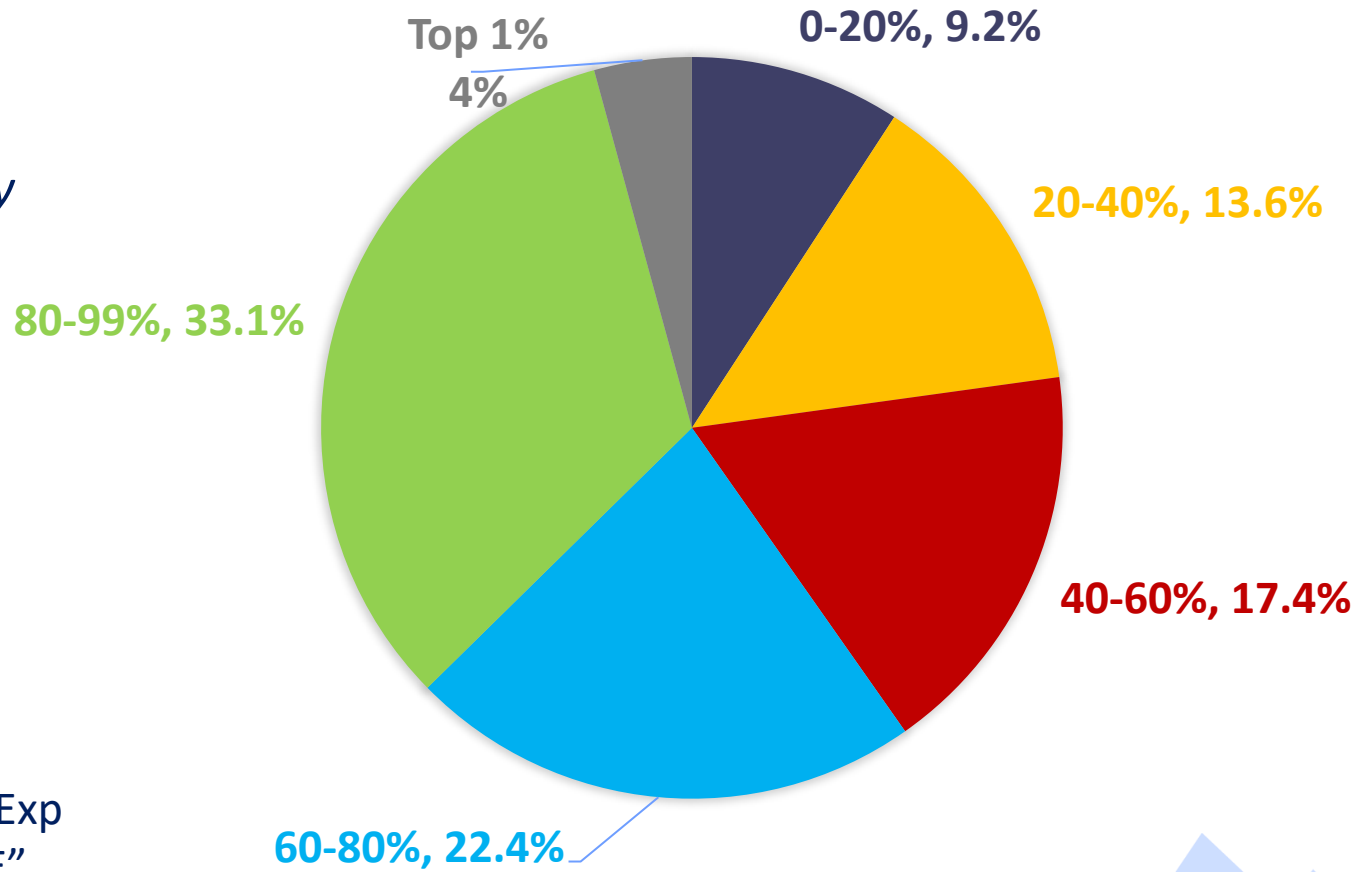
NOTE: Adjustments=imputations + allocations
Source for published CE/PCE: https://stats.bls.gov/cex/cecomparison/pce_profile.htm

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 equivalized CE-PCE expenditure percentile range

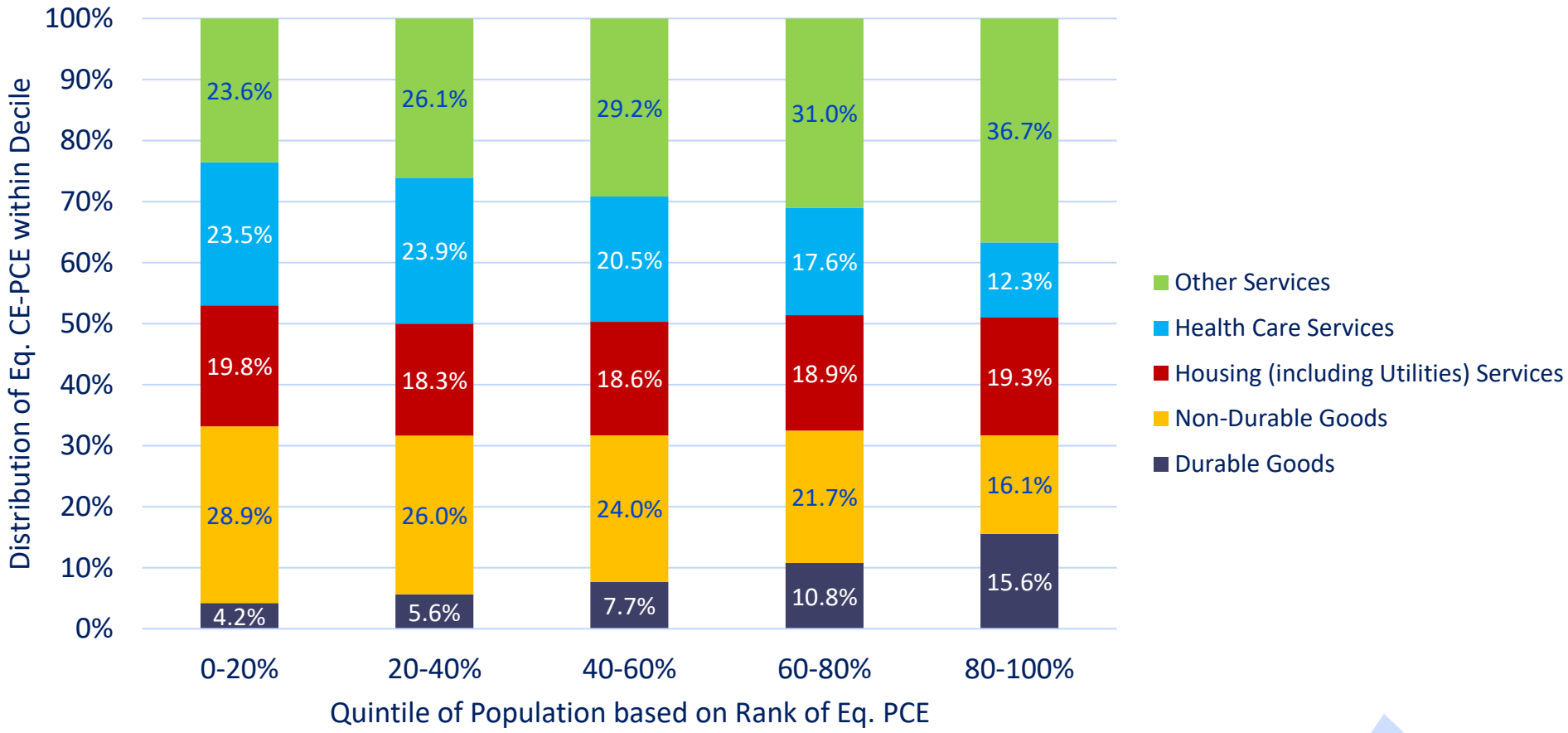


NOTE: Shares and rank percentiles based on CExp scaled up to PCE, referred to a “Equivalized PCE”

Composition of PCE by Quintile

Preliminary Estimates 2019

For example…
23.5% of PCE accounted for by households in the bottom quintile, is for Health Care

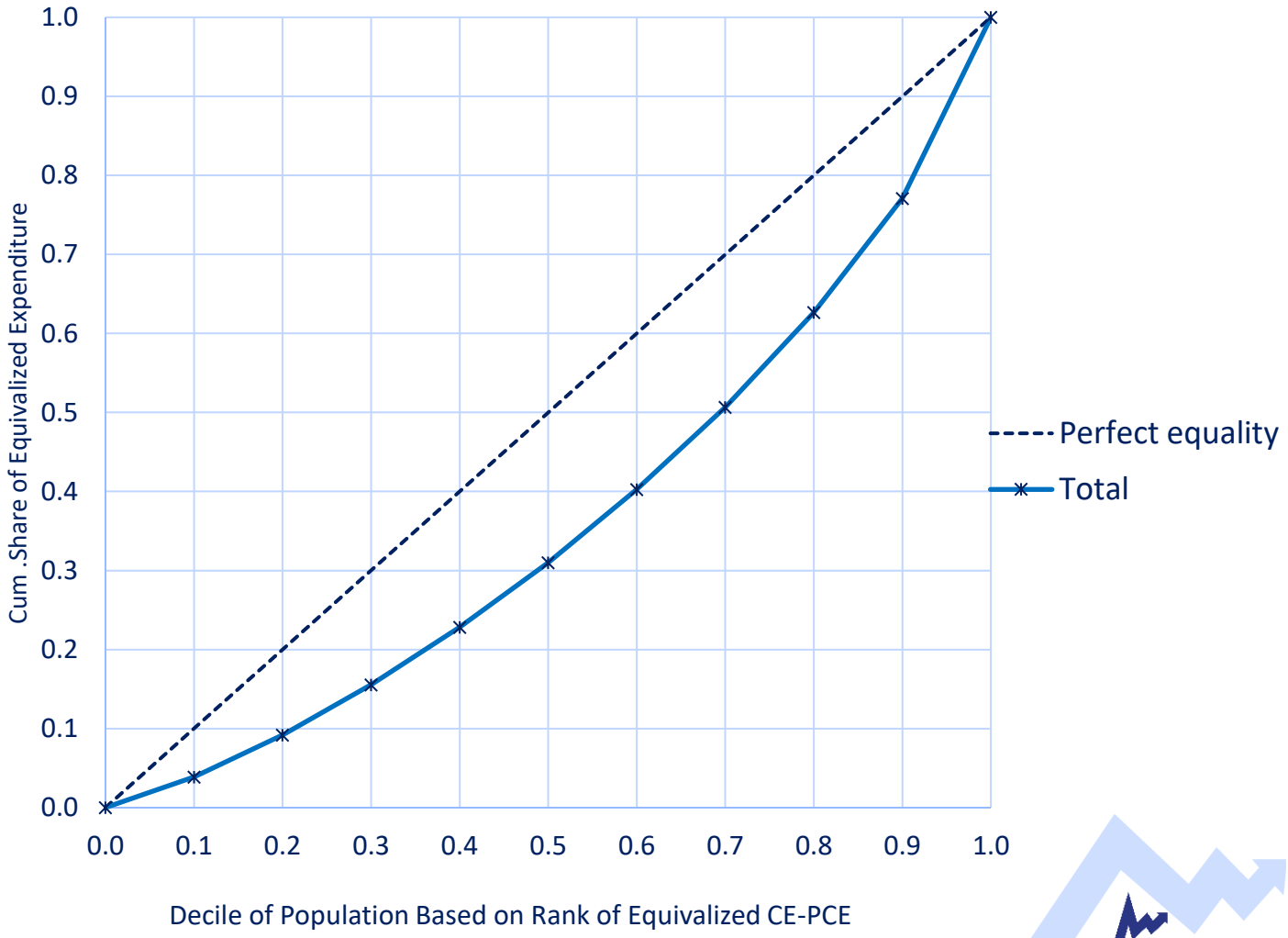


NOTE: ranking of eq. PCE expenditures after scaling up

Equivalized PCE: Aggregate Inequality Indices & Lorenz Curve

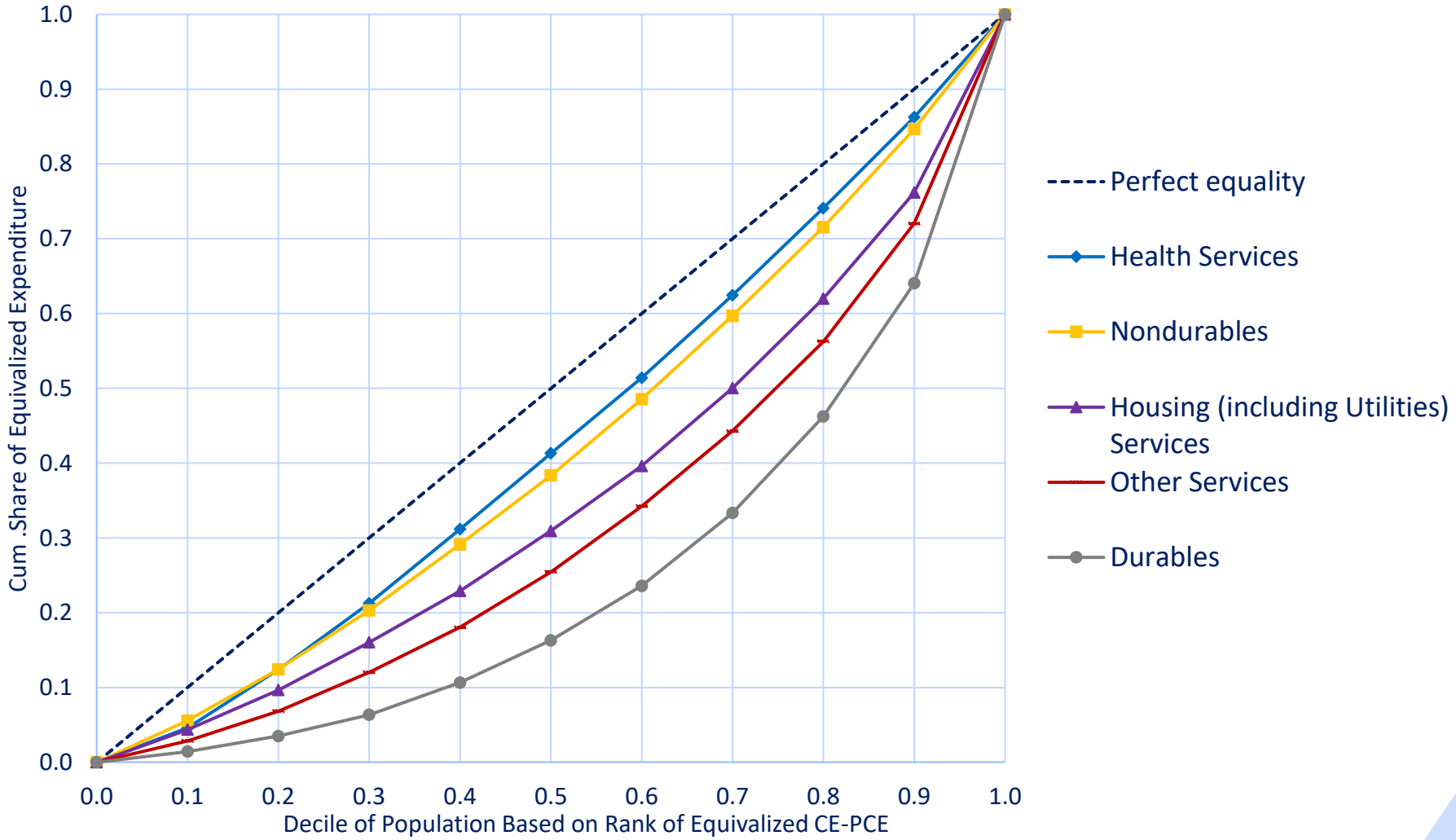
Preliminary Estimates 2019

Aggregate Inequality Indices	
Gini	0.28
Thiel	0.14
Mean log dev.	0.13
90/10 ratio	3.40



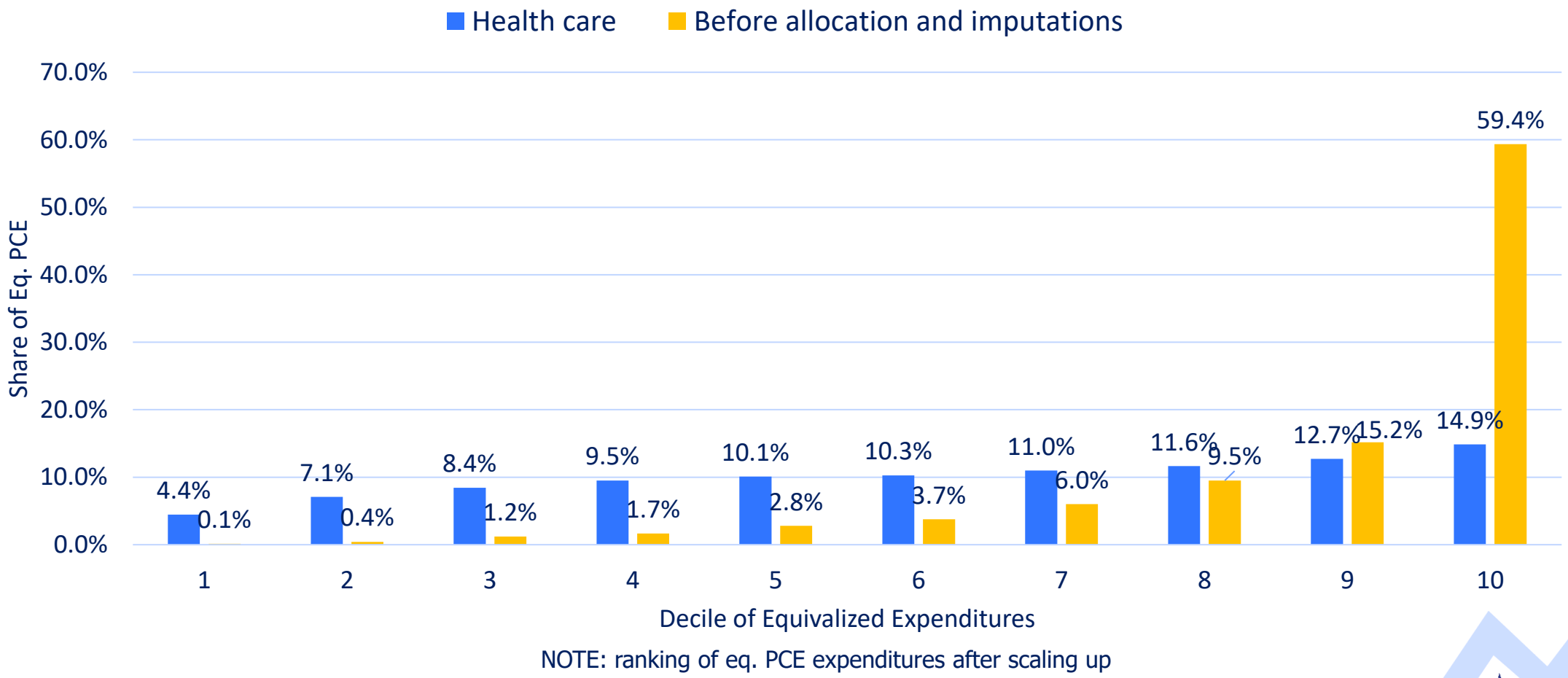
Equivalized PCE: Concentration Curves by PCE Product

Preliminary Estimates 2019



Example of Impact: Health Care Services Share of Eq. PCE before Adjustments and after Scaling-up by Decile

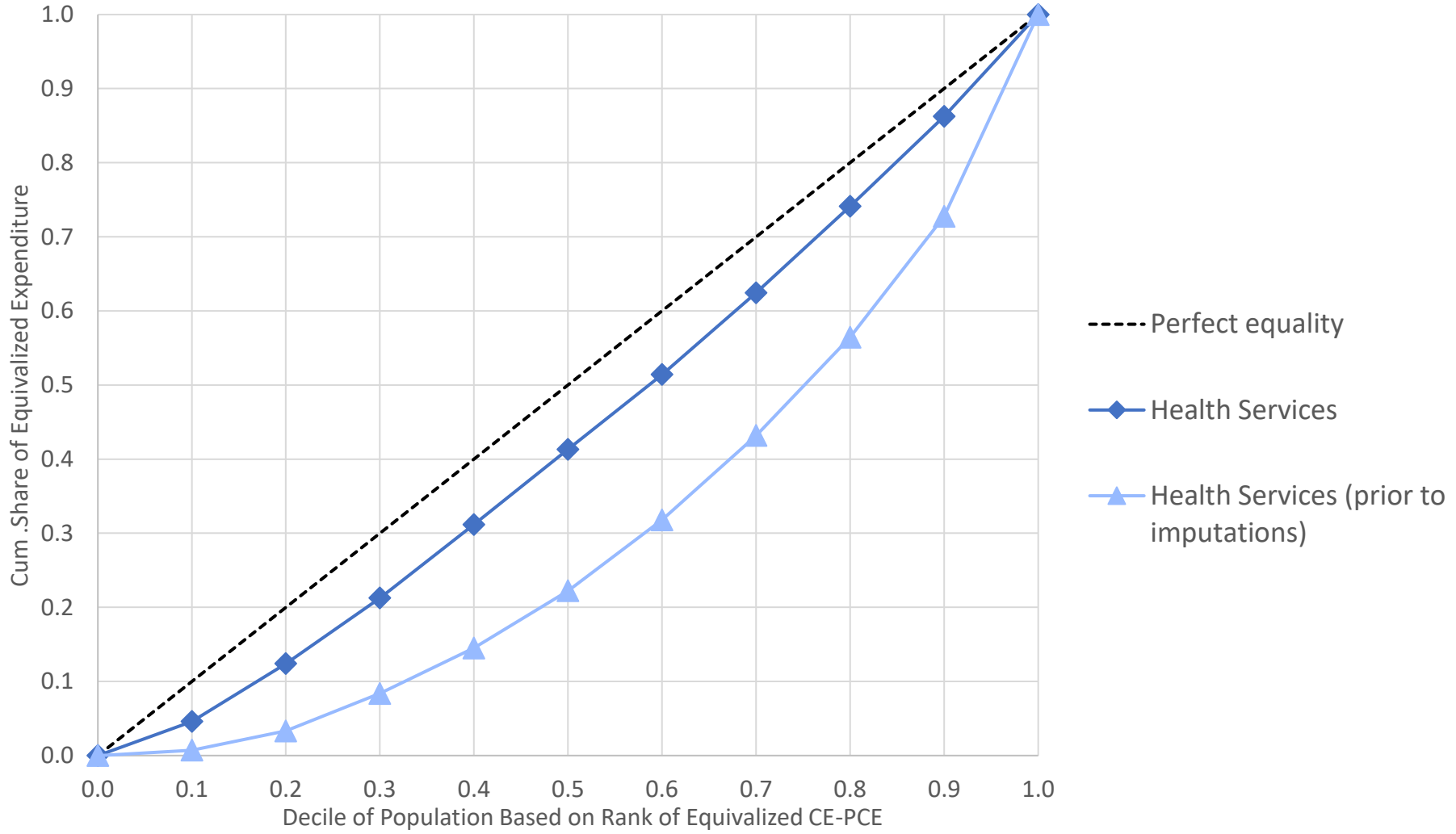
Preliminary Estimates 2019



NOTE: ranking of eq. PCE expenditures after scaling up

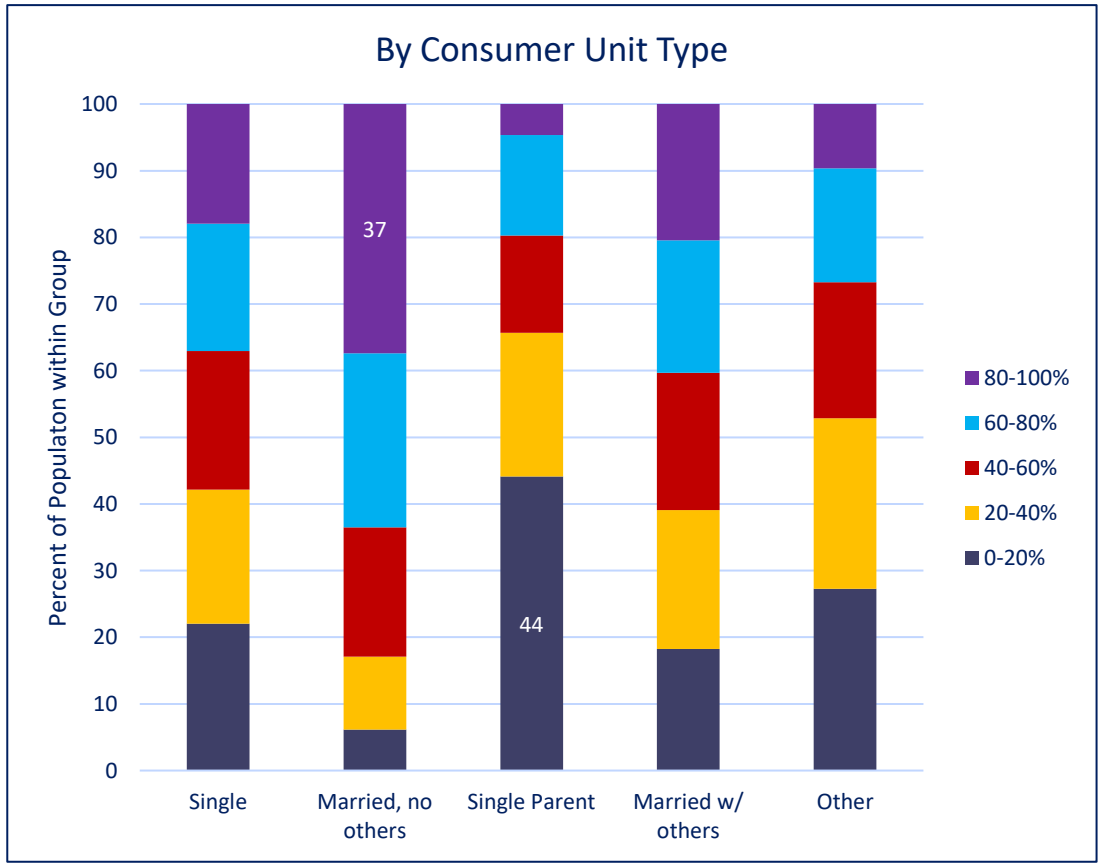
Equivalized PCE: Concentration Curves for Health Care

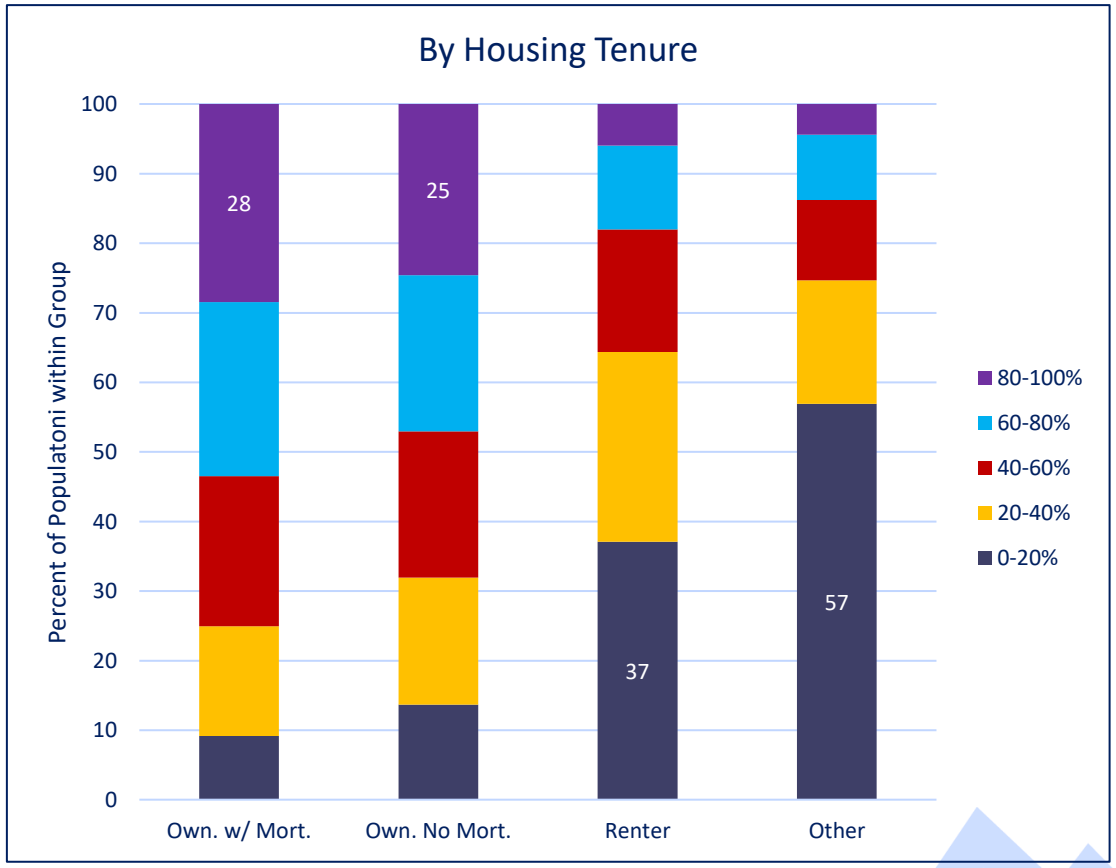
Preliminary Estimates 2019



Quintile Membership by Demographic Characteristics of Consumer Unit (CU)

Preliminary Estimates 2019

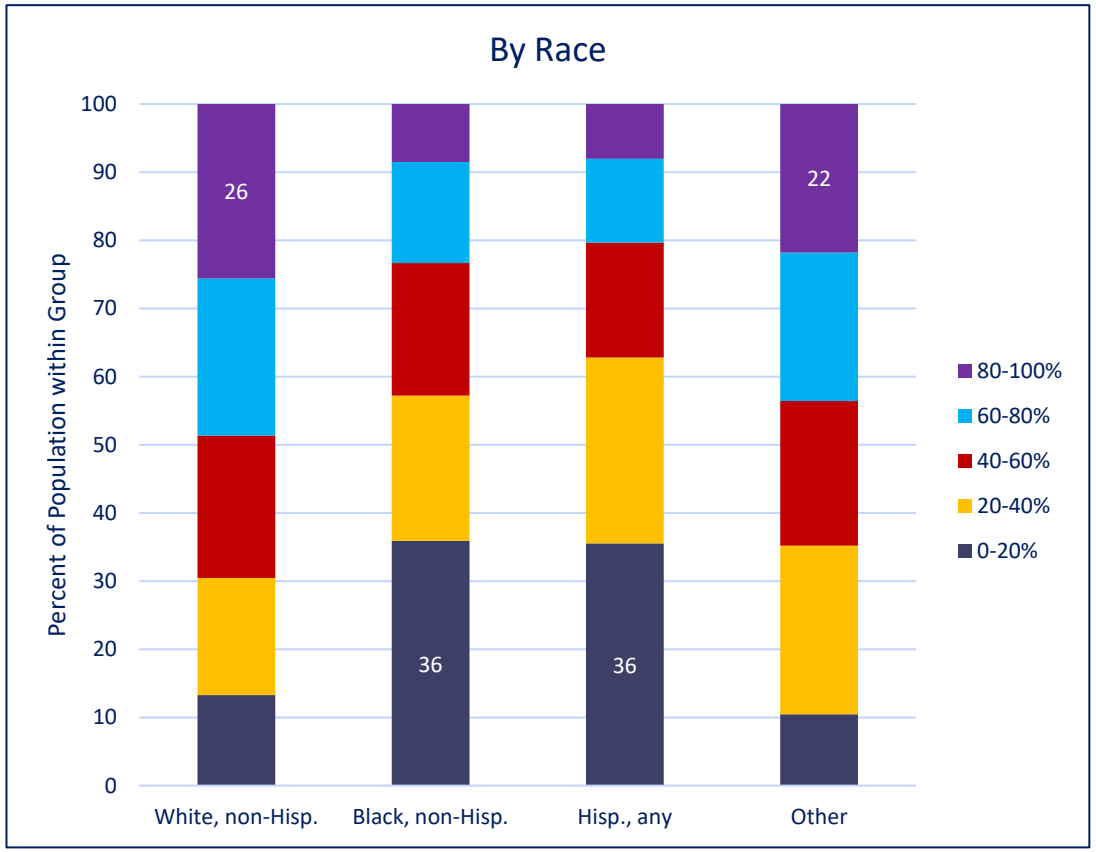


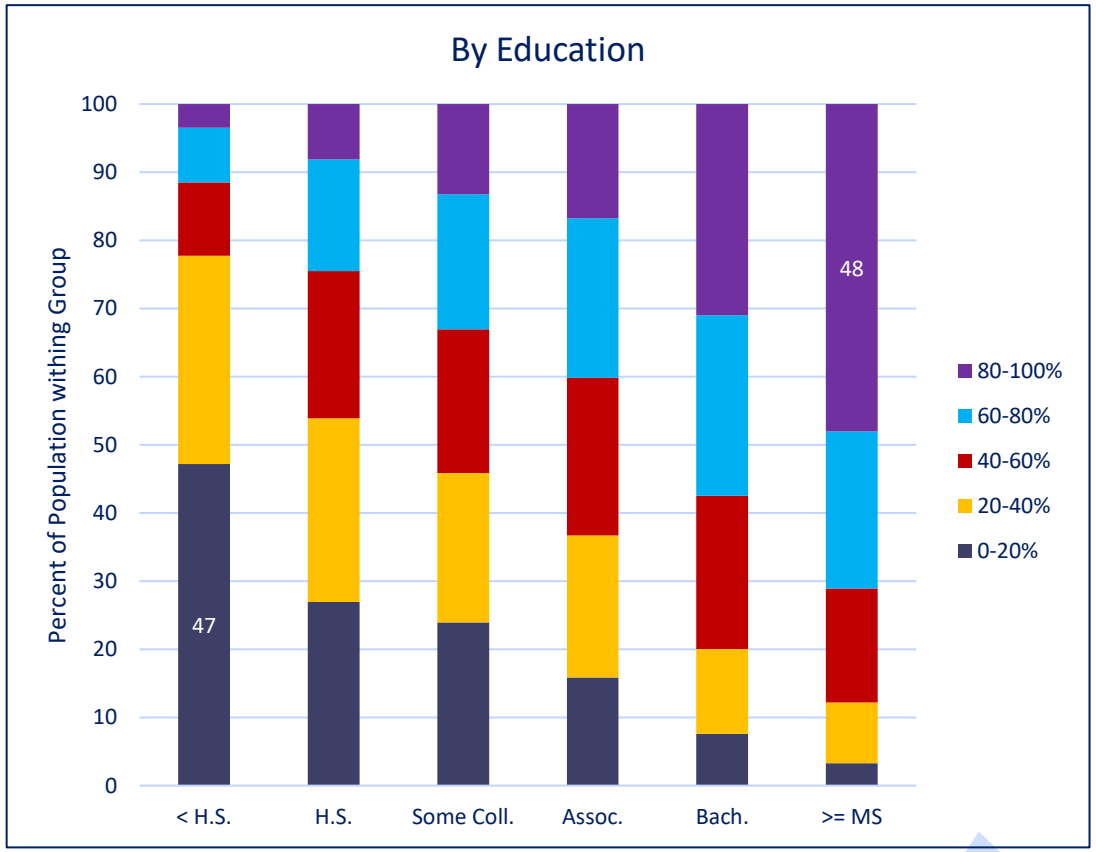


"Other": own but do not know if have mortgage; rent without payment of rent; student housing

Quintile Membership by Demographic Characteristics of Reference Person

Preliminary Estimates 2019





Summary

- Distributional PCE accounts and inequality
  - Refinements to CE allocations and adjustments
    - Imputations for health care expenditures based on CU characteristics, e.g., disability status, number of children
    - Add pareto adjustment to upper tail of the distribution
      - Should the upper tail of consumption expenditure distribution reflect upper tail of income distribution?
      - Should the adjustment be based on something else?
  - Update to more recent time periods
  - Add rankings by equivalized income and for households
- Forthcoming *BLS Working Paper*
- Progress posted on https://www.bls.gov/cex/consumption-home.htm

Contact

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