The National Academies of SCIENCES ENGINEERING MEDICINE

COMMITTEE ON NATIONAL STATISTICS

Modernizing the Consumer Price Index for the 21st Century

A Consensus Study Report of

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SCIENCES · ENGINEERING · MEDICINE

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Panel on Improving Cost-of-Living Indexes and Consumer Inflation Statistics in the Digital Age

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Excerpts from Statement of Task

- Examine potential to improve CPI by **incrementally transitioning from traditional survey-based data to an approach that blends multiple data sources** (survey and non-survey, government and commercial).
- Consider opportunities to apply new data sources to **improve the construction of specific elementary item-area indexes . . . .**
- Propose solutions for some **historically difficult-to-measure expenditure categories**
- Consider opportunities to use new data sources to improve aggregation and to **mitigate upper-level substitution bias** in the CPI-U and the CPI-W.
- Assess prospects for creating new index aggregates **across the income distribution**.

Report Contents

Backdrop: Rapid Changes in Consumer Landscape

- More products; rapid product turnover, and larger share of information products
- More diverse outlets, with rising share of e-commerce (chart)
- Explosion of alternative digital data sources (“Big Data”)

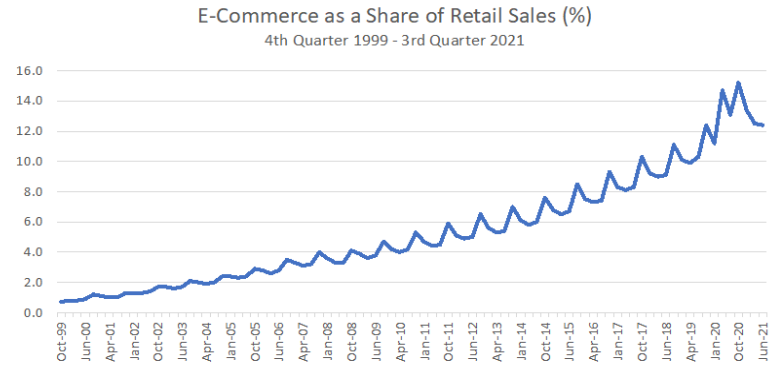

FIGURE 1-1 Growth of online shopping since 1999 in the United States (excluding food services).
SOURCE: Quarterly data from Retail Indicators Branch, U.S. Census Bureau.

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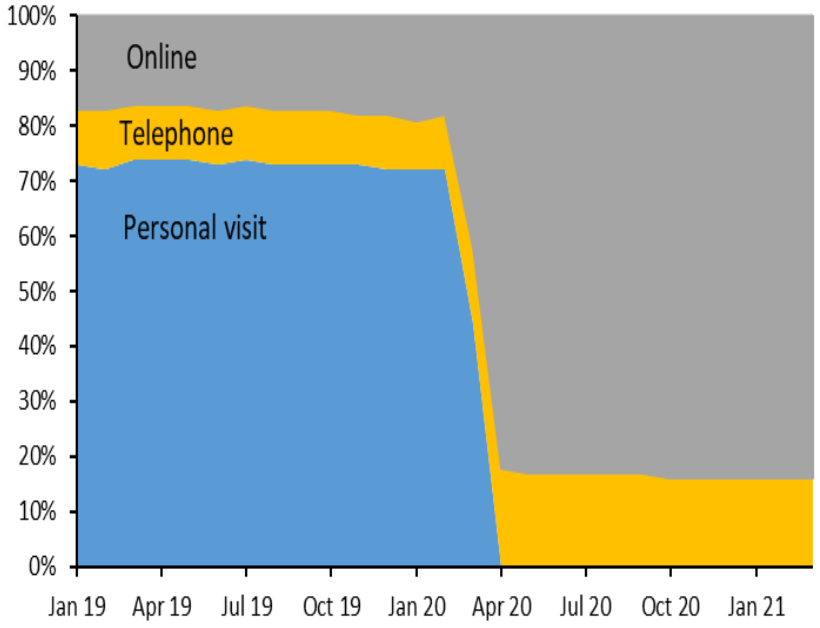
Backdrop: Price Collection

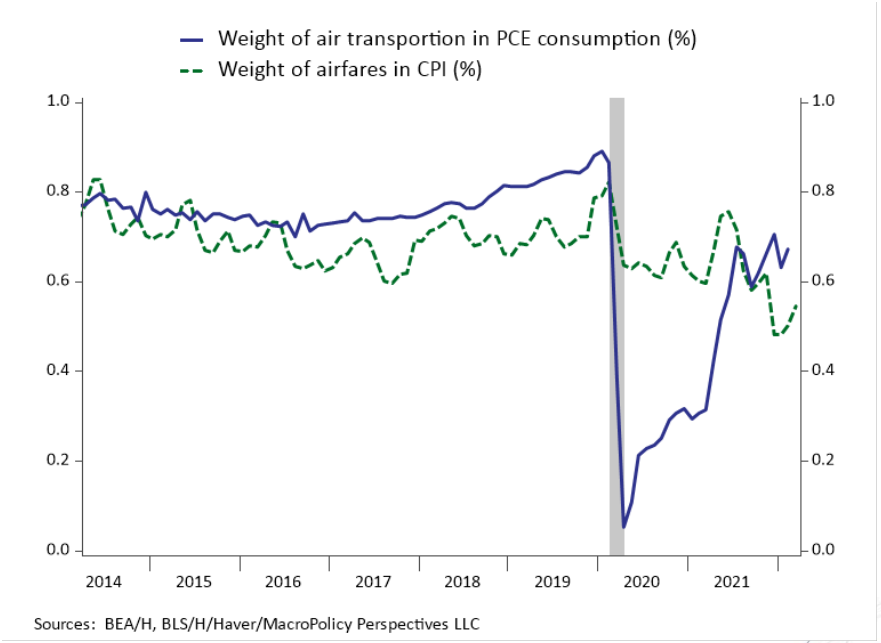
- Traditional data sources more difficult to collect and less representative

- COVID highlights challenges of old methodology but also opportunities



Backdrop: Weights

- CE Survey response rates falling
- Current survey methodology too rigid to capture rapid changes in consumer behavior (e.g. COVID)
- New expenditure shares incorporated with average lag of 36 months
- Chart: **weight of airfares during COVID**



Big-Picture Message: Modernization is Imperative

- Panel recognizes challenges ahead including resource constraints.
- That said, imperative that BLS transition to a blended approach incorporating alternative data along with traditional data sources.
- Success will require:
  - Paradigm shift, lessening reliance on older survey-based approaches and methodologies
  - New methodologies and new metrics for gauging data quality
  - High-level focus, new skills, and new resources

Modernizing Elementary Indexes

BLS should embark on a broad-based strategy of **accelerating and significantly enhancing the use of transactions data and other alternative data sources** (Rec 2.1)

- Continue identifying promising alternative data sources: **scanner data, web-scraped, direct feeds from large retailers**

- Research to support use of:
  - Alternative data
  - Associated new methodologies (such as multilateral indexes)
  - Implications for measuring quality change
  - New metrics for assessing data quality

At Same Time, Changes Must be Made Carefully

BLS should accelerate testing of new indexes . . . and maintain a significant overlap period during which parallel indexes based on new data sources can be tested . . . . (Rec 2.4)

BLS should ensure that key **information about data modernization is readily available to all stakeholders**. (Rec 7.6)

Higher-Level Aggregation: Updating Weights

BLS must update upper-level weights . . . more frequently and rapidly (Rec 3.1)

BLS must improve the accuracy of weights applied to specific items that the CE Survey measures poorly and for which alternative data are likely more accurate. (Rec 3.1)

Ideally, the **expenditure data used to calculate CPI weights would come from a single 12-month period ending no more than six months prior to their introduction.** (Rec 3.2)

- BLS just announced that will use 12-months of CE data to construct annual weights!

Higher-Level Aggregation: New Data Sources

BLS should invest in collecting comprehensive data for individual spending using electronic means of payments such as credit/debit cards or other electronic payment processors . . .

- After an adequate period of study expenditure patterns … should be derived as a blend of data on spending from the CE, timely private sources, and that national accounts (Rec 3.3)

One option for blending PCE and CE data would be to **integrate PCE data** to adjust the acknowledged weakest categories of the Consumer Expenditure Survey. (Rec 3.4)

BLS should begin exploring **development of a household-based scanner recording program** that would capture prices, quantities, and item characteristics of purchases made by surveyed respondents. (Rec 3.5)

Housing/Shelter

BLS should continue using rental equivalence as the primary approach to estimating the price of housing services for owner-occupied units. (Rec 4.1)

BLS should seek to identify new data sources that would allow for improved coverage of [rents for] single-family homes. New data sources could also provide ***monthly*** data to more quicklyreflect rapid changes in rent growth . . . (Rec 4.2)

BLS should consider alternative strategies for estimating expenditure shares for owner-occupied housing, especially ones that would make use of the rich housing characteristics information that are often available in property tax data. (Rec 4.3)

Housing/Shelter (cont)

BLS should publish additional detail on the housing components of the CPI, such as indexes by structure type and for a larger number of geographic areas. (Rec 4.4)

- Broadening the geographic scope of the CPI could be facilitated by de-linking the housing sample from the samples of other CPI Items.

Rental equivalence might not be the best approach for some market segments such as high-priced homes. Accordingly,. . . **BLS should compare rental equivalence estimates to user cost estimates** for individual properties, and also explore the **opportunity cost approach**. (Rec 4.6)

Medical Care

The **indirect method has practical advantages** and therefore should, in the short to medium run, **continue to be the method for pricing health insurance in the CPI.** (Rec 5.1)

BLS should explore the **historical differences between the indirect and direct methods** doing a true apples-to-apples comparison. (Rec 5.2)

Medical Care (cont)

BLS should consider a number of potential improvements to the indirect approach . . . explore using a multiyear rolling average of retained earnings per unit of health services . . . rather than an annual value. (Rec 5.4)

BLS should continue evaluating how to **accelerate incorporation of claims data, hospital data, health plan data, and scanner data on drugs** (Rec 5.8)

Price Indexes by Income

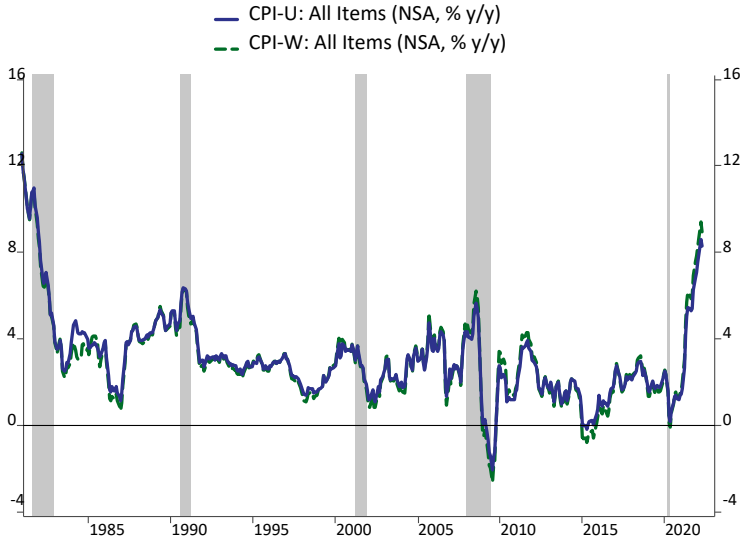
Because of the urgency of issues related to income and wealth inequality, social welfare, and poverty, **developing price indexes for population subgroups along the income distribution** should be a high priority for BLS. (Rec 6.1)

Current data collection system cannot produce CPIs by income that capture all relevant variation.

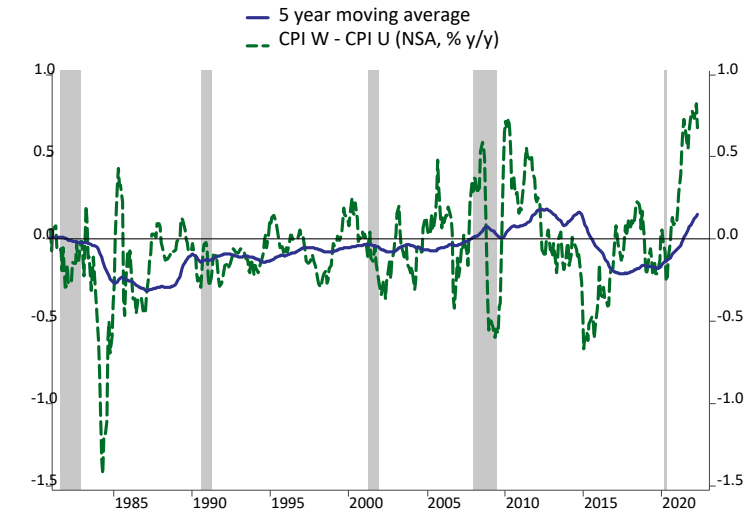
Indeed, research suggests that the **greatest source of heterogeneity in households' inflation rates is variation in prices paid for similar types of goods** rather than just differences in expenditure patterns.

Price Indexes by Income

Typically, not so much difference from just reweighting expenditures for different groups.



Source: BLS/Haver/MacroPolicy Perspectives LLC



Source: Haver/MacroPolicy Perspectives LLC

Price Indexes by Income

Kaplan and Schulhofer-Wohl (2017) use Nielsen scanner data and find that **2/3 of inflation heterogeneity across income groups from variation in prices paid for identical goods.**

But, this research based on Nielsen scanner data for subset of goods so limited coverage.

- Larsen and Molloy (2021) did not find big differences in rent inflation across income groups during 1985-2019.

- Need comprehensive data to fully understand differences in inflation by income group.

Price Indexes by Income

To identify and obtain the data necessary to estimate accurate subgroup price indexes, no one size will fit every category of goods and services. **BLS will have to be creative and flexible in finding and blending different data sources.** (Rec 6.3)

- Household based scanner data would be useful.

The panel recommends that BLS **NOT** devote resources to CPIs by income that just reweight price changes (Rec 6.2)

Organizational Considerations

BLS should designate a single, high-level person within the agency . . . whose job is to lead data transformation efforts. Would ensure focused coordinated effort and accountability. (Rec 7.1)

More extensive collaboration between the Census Bureau, BLS, and BEA—along with other statistical agencies that collect key economic data, such as the U.S. Department of Agriculture—is needed to advance the acquisition and use of alternative data sources in the production of economic statistics. (Rec 7.2)

BLS should **enhance its contacts and collaborations with CPI staff in statistical agencies beyond the U.S. system.** (Rec 7.3)

Organizational Considerations (cont)

BLS should enhance its interactions with outside experts (in academia, industry, and elsewhere) (Rec 7.4)

In addition to hiring staff with data science skills, BLS should strive to develop this talent in-house by supporting and rewarding staff who pursue training and educational opportunities to develop requisite technical expertise. (Rec 7.5)

As CPI modernization proceeds, BLS should ensure that key information is readily available to all stakeholders . . . The agency also should **aggressively and frequently communicate with stakeholders in the user and research communities.** (Rec 7.6)

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Questions/Discussion