Attachment K

2023 Federal Committee on Statistical Methodology Research and Policy Conference Presentation "Addressing Nonresponse Bias in Food Security Measures Using Weighting Adjustments"

Addressing Nonresponse Bias in Food Security Measures Using Weighting Adjustments

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Survey Non-Response

- Response rates for the CPS and other surveys plummeted during COVID-19 and have generally fallen
- CPS module response rates have also decreased
- Non-response may lead to non-representative samples and affect estimates of food insecurity and other outcomes
- Data available within the CPS to adjust for non-response are limited

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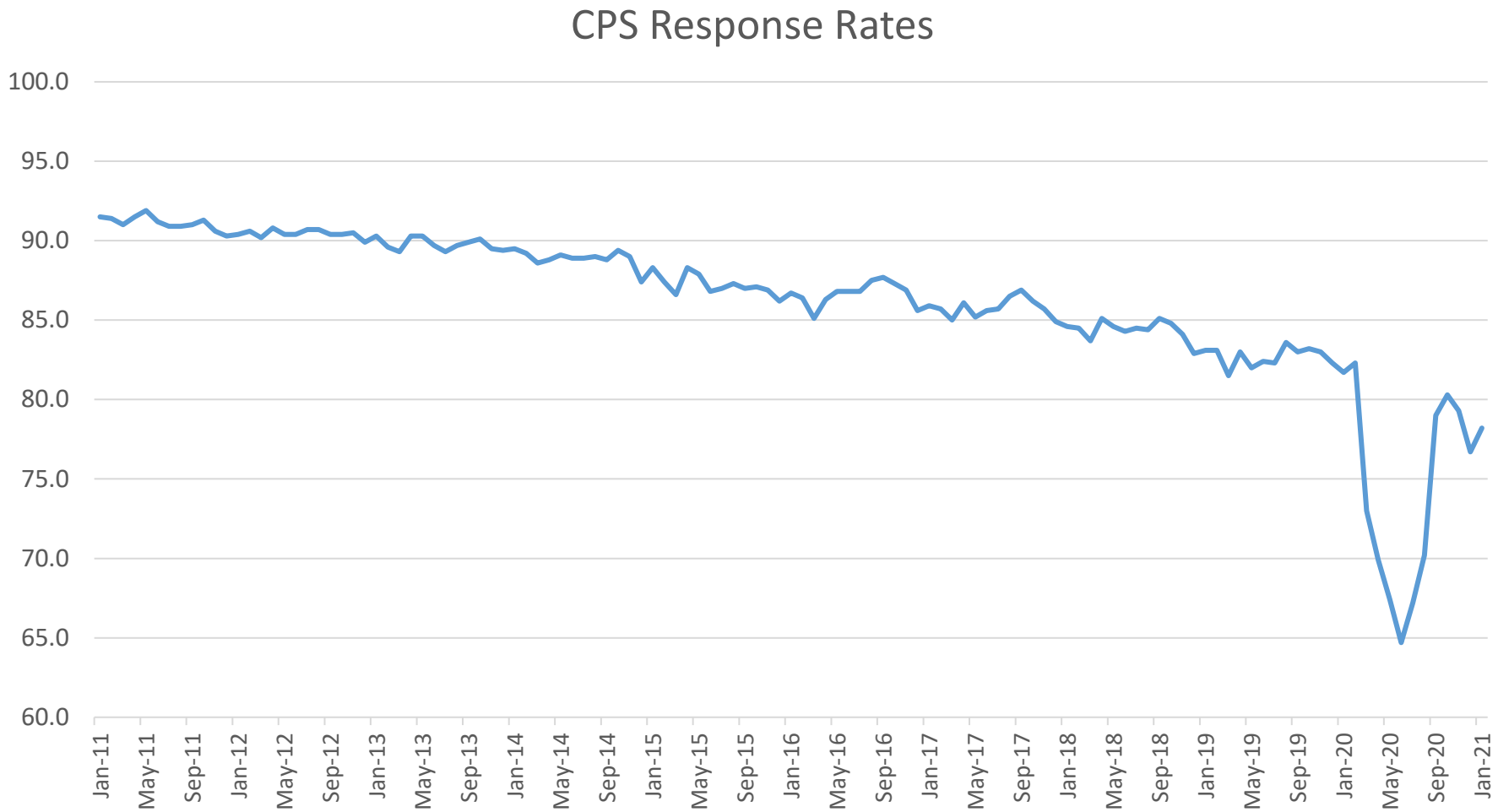
CPS Response Rates
100.0
95.0
90.0
85.0
80.0
75.0
70.0
65.0
60.0
Jan-11
May-11
Sep-11
Jan-12
May-12
Sep-12
Jan-13
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Sep-20
Jan-21

Source: BLS

CPS Food Security Supplement

- Focus on CPS Food Security Supplement
- Sponsored by the Economic Research Service-USDA and fielded by the Census Bureau as an annual supplement to the December CPS
- Source for federal statistics on household food security in U.S.
- Food security: *access at all times to enough food for an active, healthy life for all household members*

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Non-response in the Food Security Supplement

- Recent research on the CPS Annual Social and Economic Supplement finds lower income people are less likely to respond (Rothbaum & Bee, 2020)
- Differential non-response affects estimates of poverty rates and other income distribution statistics
- Not fully addressed by standard weighting procedures
- Because of the relationship between income and food security,
  - Differential non-response likely occurs in the Food Security Supplement
  - And may affect estimates of food security

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This paper

- Applies the methodology developed in research on the basic monthly CPS to improve the weighting correction for non-response
- Utilizes data from multiple administrative data sources including IRS 1040 and 1099 data, SSA benefit data, earnings data from the Longitudinal Employer-Household Dynamics, state public assistance records, and other sources
- Develops and calibrates new weights from these sources
- Applies the weights and compares estimates based on the standard weighting methodology and this new methodology

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Weighting Overview

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What Do Survey Weights Do?

- Simple overview: weights increase or decrease the “importance” of individual respondents to make the responding sample look more like the target population
- For example, if older individuals are more likely to respond to a survey than younger individuals, we would give older individuals lower weight values and younger people higher weight values to make the sample (hopefully!) more representative

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Overview of CPS-FSS's Weighting Algorithm

1. Household Noninterview Adjustment
    - Using *microdata* on both respondent and nonrespondent households, distribute the weights of nonrespondents to the respondent households with similar characteristics
2. Second Stage Adjustment
    - Adjust CPS-FSS weighted counts of age, race, Hispanic origin, and sex to independent Census population estimates at national and state levels
    - Also adjust CPS-FSS metro status and income statistics to same measures calculated on the Basic Monthly CPS

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Overview of CPS-FSS's Weighting Algorithm

- Current Household Noninterview Adjustment
  - Adjustment based only on geography (state and metropolitan status)
  - Concern: this may not fully account for economic characteristics that influence response
- Calibration Step
  - While had adjustment for income, target based on CPS basic respondents, which may be nonrepresentative

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Administrative Data

- Add the following administrative data to CPS-FSS's weighting algorithm
  - IRS 1040 and 1099
  - SSA program benefit data
  - Demographic data from 2010 Census and SSA
  - Industry data from the Census Business Register
  - Third-party home value data
  - Quarterly earnings data from the Longitudinal Employer-Household Dynamics (LEHD) program
  - State SNAP/TANF/WIC Data
- Have these data not only for many respondents, but also for CPS-FSS and CPS Basic nonrespondents

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Modifications to Weighting Algorithm

- Replace geography-based noninterview adjustment with one based on IRS microdata and other administrative data
  - Create new cells with CART (Classification and Regression Tree)
  - Run model of household food security on administrative data in order to create cells that have a good correlation with our key outcome of interest
  - Estimate model on respondents. Apply model output to both respondents and nonrespondents to create noninterview adjustment cells.
- Add administrative data to calibration step as well
  - Use same CART model. Target is predicted probabilities of food security status, where the administrative data are the inputs for creating the predicted probabilities

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Strength and Weaknesses of Administrative Data

- Administrative data includes information that should be highly related to food security
  - IRS Income
  - SNAP and WIC receipt
- Nevertheless, we don't actually observe food security in the administrative data
- If there are additional factors correlated with both food security and response even after controlling for these observables, some nonresponse bias will remain
  - E.g. Don't observe expenditures. Differences in expenditures decisions for a given level of income and SNAP benefit amounts could affect food security, but could also be correlated with behavioral differences that influence whether someone responds to a survey

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Results-Household Food Insecurity

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	Percent Food Insecure (Low or Very Low Security) Production Estimate	Change in Food Insecurity Estimates with Using Administrative Data	
	2019	2019	2020
All households	10.54%	0.20%	0.36%
With children < 18 years old	13.65%	0.41%	0.49%
____With children < 6 years old	14.47%	0.20%	0.31%
____Married-couple families	7.54%	0.17%	0.43%
____Female head, no spouse	28.73%	0.95%	0.28%
____Male head, no spouse	15.37%	-0.42%	0.29%
With no children < 18 years	9.27%	0.10%	0.31%
____More than one adult	6.72%	0.13%	0.24%
____Women living alone	13.05%	0.30%	0.40%
____Men living alone	12.84%	-0.37%	0.29%
With elderly	7.22%	0.24%	0.36%
____Elderly living alone	8.70%	0.32%	0.46%

Source: 2019 and 2020 CPS-FSS + Administrative Data

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	Percent Food Insecure (Low or Very Low Security) Production Estimate	Change in Food Insecurity Estimates with Using Administrative Data	
	2019	2019	2020
White, non-Hispanic	7.93%	0.22%	0.32%
Black, non-Hispanic	19.07%	0.25%	0.46%
Hispanic	15.63%	0.17%	0.45%
Other, non-Hispanic	9.47%	-0.01%	0.21%
Under 1.00 Poverty Line	34.86%	-0.28%	0.19%
Under 1.30 Poverty Line	33.02%	-0.31%	-0.01%
Under 1.85 Poverty Line	27.65%	-0.33%	-0.05%
1.85 and over Poverty Line	5.08%	0.04%	0.13%
Income unknown	8.38%	-0.08%	0.32%
Northeast	9.60%	0.30%	0.32%
Midwest	10.53%	0.17%	0.39%
South	11.19%	0.25%	0.33%
West	10.16%	0.06%	0.42%

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Source: 2019 and 2020 CPS-FSS + Administrative Data

Results-Child Food Insecurity

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Source: 2019 and 2020 CPS-FSS + Administrative Data

	Percent Food Insecure (Low or Very Low Security) Production Estimate	Change in Food Insecurity Estimates with Using Administrative Data	
	2019	2019	2020
All households	7.04%	0.36%	0.12%
____With children < 6 years old	6.65%	0.42%	-0.09%
____Married-couple families	3.40%	0.12%	0.08%
____Female head, no spouse	16.89%	1.01%	0.03%
____Male head, no spouse	7.02%	-0.46%	-0.09%
White, non-Hispanic	5.25%	0.18%	0.14%
Black, non-Hispanic	13.54%	0.98%	0.19%
Hispanic	8.28%	0.49%	-0.03%
Other, non-Hispanic	5.35%	0.22%	0.01%
Under 1.00	20.91%	0.61%	-0.32%
Under 1.30	19.88%	0.33%	-0.18%
Under 1.85	17.23%	0.13%	-0.14%
1.85 and over	2.36%	0.09%	0.17%
Income unknown	5.53%	0.22%	0.31%
Northeast	7.35%	0.38%	-0.01%
Midwest	7.38%	0.10%	-0.08%
South	6.77%	0.48%	0.15%
West	6.96%	0.36%	0.32%

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Conclusion

- Adding administrative data to CPS-FSS's weighting algorithm results in a modest change in food security estimates
  - Shifts largely from change in estimates of the income distribution
  - Change in estimates larger in 2020 compared to 2019 for household food security
  - Pattern reversed/not as consistent for child food security

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