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Household Food Security in the United States, 1998 and 1999

Technical Report

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Abstract

This report complements prior reports on measuring household food security in the United States. It explores key technical issues related to Current Population Survey Food Security Supplement data, focusing especially on the August 1998 and April 1999 surveys. These technical issues include the estimation of standard errors using either balanced repeated replication techniques or generalized variance functions (GVFs) developed by the Census Bureau; the effect of alternating survey periods between spring and fall for the 1995-99 CPS Supplement; and the effect of using different Item Response Theory (IRT) modeling approaches and software to create the food security scale. The report also presents 1998 and 1999 item calibrations and household scores developed through the use of IRT modeling.

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EXECUTIVE SUMMARY

Methods used to measure food security and food insecurity with precision have been refined since the initial implementation of the Food Security Supplement to the Current Population Survey (CPS) in 1995. This report provides a technical discussion on several key methodological issues related to the CPS Food Security Supplement data, including techniques used to estimate standard errors, the effects of alternation of survey periods between Spring and Fall, and different item response theory (IRT) modeling approaches used to create the food security scale.

Estimating Standard Errors

Standard errors computed by most common statistical packages are not accurate estimates of the standard errors for the prevalence estimates calculated from a complex-sample survey such as the CPS. Given the limited sample-design information in the publicly available CPS data, the most accurate standard error estimates are produced using balanced repeated replication methods (BRR). However, not all researchers will have the software needed to adequately implement BRR methods. The Census Bureau's generalized variance functions (GVF's), with appropriate adjustments, can also be used to approximate standard errors of food security prevalence rates. The GVF-based standard errors are easier and less costly to calculate than BRR estimates, but they generally underestimate standard errors by approximately 25 percent.

Impact of Survey Season on Food Security Prevalence

The Food Security Supplement has been included in the CPS yearly since 1995, but the data have not been collected in the same month in all years. The months of collection were as follows: April 1995; September 1996; April 1997; August 1998; April 1999 and September 2000. Beginning in 2001, the Food Security Supplement will be fielded annually in early December. An analysis of prevalence rates of food insecurity and hunger across five years was conducted to determine whether the alternation between Spring and Fall data collection introduced a "seasonality" component into the annual estimates. The findings suggest that survey season did affect the measured prevalence of food insecurity and hunger.

Calculating Item Calibrations and Household Scale Scores

The food security scale was developed using statistical methods based on the Rasch measurement model. The model assumes an underlying continuum on which both items and households can be located. Two Rasch modeling approaches have been used to calculate item calibrations, marginal maximum likelihood estimation (MML) and joint or unconditional, maximum likelihood estimation (JML). Item calibrations produced by BILOG's MML procedures are very similar to those produced by JML procedures but are not identical. They differ somewhat because the conditions that the two methods impose on the maximum likelihood solution differ. Further, characteristics of the BILOG software in conjunction with characteristics of the food security data limit the precision of the MML estimates and require special handling. These differences do not threaten the meaning or reliability of the measure.