

Supplemental Poverty Measure Thresholds: Imputing Noncash Benefits to the Consumer Expenditure Survey Using Current Population Survey-Parts I and II

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Abstract

In March 2010 an Interagency Technical Working Group (ITWG) released guidelines on thresholds and resources for a Supplemental Poverty Measure (SPM), recommending that thresholds include in-kind benefits that are accounted for in resources; however, only limited in-kind benefit information is available in the Consumer Expenditure Survey (CE), the data source upon which the thresholds are based. Garner (2010a,b,c) imputed in-kind rates and benefits for the National School Lunch Program (NSLP) and Women, Infants, and Children Program (WIC) using eligibility guidelines (CE Eligibility Method). To better reflect reported rates of participation, data from the Current Population Survey (CPS), the basis of the SPM resource measure, are used to model imputations to the CE for participation in NSLP and WIC (CPS Program Participation Method). Thresholds based on the CPS Program Participation Method are produced for 2009 and compared to thresholds based on the CE Eligibility Method. Preliminary results reveal that the two sets of thresholds defined for owners with mortgages, owners without mortgages, and renters are not statistically significantly different from each other. In contrast, when housing tenure thresholds are compared to each other within each method group, statistically significant differences arise.

Key Words: Supplement Poverty Measure (SPM), Poverty Thresholds, CE Interview, CPS ASEC

1. Introduction

In March 2010 an Interagency Technical Working Group (ITWG) published guidelines for the development and production of thresholds and resources for a Supplemental Poverty Measure (SPM). Consistent with the findings of the National Academy of Sciences (NAS) panel (Citro and Michael 1995), these guidelines recommended that thresholds be based on U.S. Consumer Expenditure Survey (CE) data and that resource calculations be based on data from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). Although the thresholds are based on a set of commodities that families must purchase: food, clothing, shelter, and utilities (FCSU), the ITWG further recommended that efforts should be made to also include the value of in-kind benefits in the thresholds in order to ensure the consistency of the threshold and resource definitions. Specifically, the ITWG stated “so far as possible with available data, the calculation of FCSU should include any in-kind benefits that are counted on the resource side for food, shelter, clothing and utilities. This is necessary for consistency of the threshold and resource definitions.” See Johnson (2010) for an overview of the

ITWG guidelines.¹ The ITWG guidelines are similar to those presented in *The Measuring of American Poverty Act of 2009*.

In several recent studies, researchers have added the value of in-kind benefits in Supplemental Poverty Measurement (SPM) defined resources and thresholds. Included in resources are benefits that include Supplemental Nutrition and Assistance Program (SNAP), National School Lunch Program (NSLP), Women, Infants, and Children Program (WIC), rent subsidies, and energy assistance (Short 2011a, b; Short and Renwick 2010). However, including such benefits in thresholds poses a particular challenge since only limited in-kind benefit information is available in the CE. For example, the CE collects information on rental housing that is subsidized and market rents so that rent subsidies can be imputed. Also, the CE collects information on food expenditures that implicitly include the cash value of benefits from the SNAP (previously known as food stamps). However, no information is collected regarding participation in the NSLP and WIC. To estimate NSLP and WIC subsidies, Garner (2010a, b, c; 2011) used program eligibility guidelines and consumer unit characteristics; she assumed that all consumer units eligible for benefits under these two programs participated in the programs (CE Eligibility Method).² Yet, eligibility rates do not equal participation rates, since not all eligible individuals or households participate in these programs. For example, Jackowitz and Tiehen (2010) report that only 79.1 percent of eligible households participated in WIC during the postnatal period.

A different method to impute the value of NSLP and WIC program benefits (CPS Program Participation Method) was first introduced by Garner and Hokayem (2011a). Data from the CPS ASEC for 2006-2010 were used to estimate a multinomial probit model for NSLP participation and a binomial probit for WIC participation.³ In the current study, to estimate participation rates in the NSLP and WIC in the CE, CPS-based probit coefficients are applied to the CE Interview⁴ sample. The U.S. Department of Agriculture is the source of the NSLP and WIC benefit levels assigned to consumer units in the CE. CPS data that refer to 2005 through 2009 are used for participation rate modeling. Rates are imputed for consumer units participating in the CE any time between 2005 quarter two through 2010 quarter one. Imputations are produced using pooled data over these years, with year serving as a control variable in the models.

Our preliminary conclusions from this study are three:

¹ ITWG guidelines available at http://www.census.gov/hhes/www/poverty/SPM_TWGObservations.pdf.

² In each of the Garner studies cited on SPM thresholds, rental subsidies were estimated and counted in shelter expenditures for renters when renters noted that they lived in subsidized rental units. See <http://www.census.gov/hhes/povmeas/methodology/supplemental/index.html> and <http://www.bls.gov/pir/spmhome.htm> for ongoing SPM research.

³ See Garner and Hokayem (2011a) for a presentation of reported and predicted participation rates using the CPS data and models. See Garner and Hokayem (2011b) for a longer version of the material presented in this Proceedings article.

⁴ The CE is composed of two parts: the Interview and the Diary. The Interview is used to collect information over a longer period of time than is the Diary. Also, detailed clothing, shelter and utilities expenditures data are available in the Interview. Food expenditures are most extensive in the Diary; however, since it is necessary to produce the SPM thresholds using consumer unit specific data, global food expenditures collected in the Interview were used. In the future, the Division of Consumer Expenditure Surveys will be conducting research on how to combine data from the Diary and Interview to produce a better estimate of food expenditures. See <http://www.bls.gov/cex/> for a detailed description of the CE Diary and Interview survey instruments.

1. The CPS Program Participation Method is a viable option for imputing NSLP and WIC benefits to the CE. Kernel density plots and predicted probabilities of the CPS and CE program participation rates suggest that the CPS Method translates to comparable rates for the CE.
2. The two sets of SPM thresholds for 2009 -- based on the CPS Program Participation Method and the CE Eligibility Method as defined for owners with mortgages, owners without mortgages, and renters -- are not statistically significantly different from each other.
3. A major finding is that thresholds for owners with mortgages are statistically different from thresholds for renters for both methods at the 0.05 level. Differences for all other pairs of housing status are statistically different at the 0.001 level.

2. Methods to Impute NSLP and WIC Participation to CE Data

This section describes two methods currently developed to impute NSLP and WIC participation rates to consumer units in the CE:

1. The CPS Program Participation Method (Garner and Hokayem 2011a,b)
2. The CE Eligibility Method (Garner 2010c, 2011)

The key difference in the two methods rests on the assumption of participation rates among eligible households. The first method estimates the probability of program take-up and assigns benefits based on this probability (CPS Program Participation Method). In contrast, the second method assumes full take-up of program benefits by all consumer units who are eligible based on program guidelines and consumer unit characteristics. See Garner (2011a) for a description of the CE Eligibility Method, i.e., how the program eligibility guidelines are applied. The CPS Program Participation Method estimates a model predicting program participation using data from the CPS ASEC. Results from this model are used to impute participation rates for consumer units in the CE before assigning program benefits. The CPS model specifications draw on the findings from the previous literature on NSLP and WIC participation, mainly that program participation is a function of demographic characteristics, socioeconomic characteristics, and participation in other public assistance programs.⁵ A multinomial probit model is used to estimate NSLP participation, and a probit model is used to predict WIC participation.

The motivation for a multinomial probit model for the NSLP comes from the method of adding school lunch benefits to measures of resources. All children who eat a lunch at school participate in the NSLP, and all lunches in the NSLP are subsidized. Children qualifying for a free or reduced price school lunch receive a large subsidy, while those buying a school lunch that is not free or reduced price receive a small subsidy. An estimated cash value is added to resources for children reported as receiving a free or reduced price meal and for children reported as receiving a subsidized meal. In the CPS, the reference person identifies the number of children who “usually” ate a hot lunch.⁶ In a separate question, the reference person identifies the number of children who received a

⁵ See Garner and Hokayem (2011) for a review of the literature.

⁶ The CPS question asks, “During 20XX, how many of the children in this household usually ate a complete hot lunch offered at school?”

free or reduced price lunch.⁷ The CPS instrument does not distinguish between children receiving a free lunch and children receiving a reduced price lunch. The answers to these questions are used to identify the three mutually exclusive alternatives for the multinomial probit model:

1. At least one child in the household eats a subsidized school lunch **and** the child ate that lunch because he/she qualified for a free or reduced price (referred to “Subsidized Lunch with a Free or Reduced Price”).
2. At least one child in the household eats a subsidized school lunch but no child or children in the household qualified for a free or reduced price (referred to “Subsidized Lunch”).
3. No child in the household eats a subsidized school lunch or qualified for a free or reduced price (referred to “No Subsidized Lunch”). This means that the child does not eat a school-provided meal of any type.

The multinomial probit model is specified in the following way:

$$y_{ij} = \mathbf{x}'_i \beta + \tau + \alpha_s + \varepsilon_{ij} \quad (1)$$

where i indexes household i , and s indexes the state in the U.S. in which the household lives. y_{ij} represents household i 's choice of alternative j from the set of three alternatives outlined above. The three random error terms, ε_{ij} , are independently and identically distributed with a joint normal distribution. The model produces coefficient estimates for each alternative and does not depend on the independence of irrelevant alternatives (IIA) assumption (Cameron and Trivedi 2005).

The motivation for the WIC binomial probit model for WIC participation also comes from the method of adding WIC benefits to measures of resources. This method adds the value of WIC benefits based on program information from the U.S. Department of Agriculture. It relies on a CPS question asking about anyone in the household who was on WIC.⁸ This question is used to determine the outcome of the probit model.

The binomial probit model is specified in the following way:

$$y_i = \mathbf{x}'_i \beta + \tau + \alpha_s + \varepsilon_i \quad (2)$$

where y_i is a dichotomous variable equal to one for WIC program participation and zero otherwise. The random error, ε_i , follows a normal distribution. The other variables are the same as those for the multinomial probit model with the exception of \mathbf{x}'_i .

\mathbf{x}'_i differs for NSLP and model WIC specifications only in the age composition of children variables. Since the NSLP program is focused on school-age children, the NSLP specification only includes a count of the number of children in the household for the age groups corresponding to elementary school (ages 5-10), middle school (ages 11-13), and high school (ages 14-18). Similarly, the WIC program is focused on infants and young children below the age of 5; the WIC specification includes a count of the number of children in the household between ages 0 and 5.

In both models, \mathbf{x}'_i is a vector of demographic characteristics for the head of household, household characteristics, and variables representing public assistance and geography of

⁷ The CPS question asks, “During 20XX, how many of the children in this household received free or reduced price lunches because they qualified for the federal school lunch program?”

⁸ The CPS question asks, “At any time last year, (were you/was anyone in this household) on WIC, The Women, Infants, and Children Nutrition Program?”

residence.⁹ τ is a vector of annual dummy variables for 2005-2009, omitting the year 2005. α_s is a vector of state fixed effects, omitting the state of Oklahoma. Both model specifications are estimated via maximum likelihood.

3. Estimation Samples and Results for the CPS and CE

The analysis, using the CPS ASEC data, are for a pooled sample of households whose data refer to calendar years 2005-2009 but are collected in 2006 through 2010. The CE sample and characteristic variables, to which the CPS estimated multinomial and binomial probit coefficients are applied, are defined following the CPS definitions. CE quarterly Interview data from 2005 quarter two through 2010 quarter one are used to produce the NSLP and WIC participation rates. The CE data are collected quarterly, so the CE sample is pooled, assuming data from each quarter are independent of data from other quarters. Pooling the data allow for larger sample sizes by state for estimating state fixed effects. To create consistent samples for the CPS ASEC and the CE, the CPS estimation sample covers all states excluding Iowa, New Mexico, North Dakota, Vermont, and Wyoming.¹⁰ To be in the CPS NSLP universe a household must have a child between the ages of 5 and 18, inclusive. To be in the CPS WIC universe a household must meet one of two conditions: (1) have at least one female member age 15 or above and a child less than age 6; or (2) have at least one female member between the ages of 15 and 45.¹¹ Both samples omit any household reporting negative income or income greater than \$200,000.¹² The CPS sample also omits households headed by an individual whose work status is the Armed Forces. The comparable CE sample omits consumer units with a reference person or spouse whose work status is the armed forces; the reason for restricting the CE sample for both reference person and spouse is due to the fact that reference person identification is not the same as head of household in the CPS; either the “head” or another adult could be the reference person.

The results of applying the CPS estimated coefficients to the CE and also to the CPS, for validation, samples are presented first as kernel density plots and second as average participation rates. To produce the predicted probabilities, the CPS estimated model coefficients are applied to household characteristics in the CPS and CE samples. The cumulative normal distribution function is used to produce the WIC probabilities of participation and the bivariate normal distribution is used to produce the NSLP probabilities of participation. All statistics are population weighted.

The plots presented in Figure 1 are kernel density plots of the CPS and CE predicted probabilities, based on the CPS Program Participation Method, for the NSLP weighted samples and the WIC samples next..

The average predicted probabilities in Tables 1 and 2 are first produced by year and then for the pooled samples. For the CPS, the probabilities are based on models estimated with household weights. For the CE, the predicted probabilities are estimated using the CPS

⁹ See Garner and Hokayem (2011) for a complete description of explanatory variables.

¹⁰ The Consumer Expenditure Survey, during the periods upon which this study is based, did not sample consumer units in these states. The concern for the CE is to produce population estimates by region, not states.

¹¹ Defining the universe in this way also includes potentially pregnant women eligible for WIC.

¹² Any household reporting zero income is changed to \$1 to facilitate taking the natural log for model estimation.

coefficients (from the models estimated with weights) applied to the NSLP and WIC samples.¹³ Average CE probabilities are weighted using CU replicate weights. Table 2 includes these probabilities for households and consumer units that have exactly two children. The focus on two children is because the SPM threshold sample includes only two children but with any number of adults. In the last row of Table 2, probabilities for the SPM sample, upon which the 2009 SPM thresholds are based, are presented. For threshold production, the pooled sample is used.

To provide an indication of the distribution of school lunches, data from the USDA (USDA 2007, 2008, 2010, 2011) are used. In FY 2006, free meals represented half of all school meals served, reduced-price meals represented 10 percent and other school meals (paid) represented about 40 percent. By FY 2009, the percentage of schools meals that were free increased to 52 percent, reduced priced meals were level at 10 percent, and other paid school meals represented 38 percent of all school lunches served.

4. Procedures to Impute In-Kind Benefits to CE Data Based on the CPS Program Participation Method

School lunch and WIC benefits are produced for each quarter of the CE data. Then they are added to expenditures for food, clothing, shelter and expenditures and annualized to form the basis of the SPM thresholds. For food stamps, we assign a average (over the 48 contiguous states) school lunch values reported by the USDA for schools in which less than 60 percent of the lunches, served during the second preceding school year, were served free or at a reduced price. Also included in the imputation of school meal values are commodity school lunch program values. We obtained these data from the Census Bureau though the data are available via web link from the U.S. Department of Agriculture. For WIC, USDA produces average monthly WIC benefits per person. CE characteristics data are used in combination with average monthly WIC benefits to produce quarterly values for the CE sample.¹⁴

For the NSLP universe sample, we assume that children receive free and reduced-priced meals 167 days per year, as have researchers at the Census Bureau who imputed these benefits and added them to resources for poverty measurement (e.g., Short 2011 and Short and Renwick 2011). To impute a value for school lunches, we multiply the number of eligible school aged children within a consumer unit times the number of days receiving meals times the dollar amount per lunch. This number is then multiplied by the CE probabilities that are derived from the CPS multinomial probit model. An additional assumption is needed to estimate the value of free and reduced meal subsidies because the estimated probability is for free and reduced meal participation together (Choice 1 in

¹³ Note that the change in WIC sample sizes from 2007 to 2008 for the CPS ASEC is due to a change in the way the survey has identified the WIC universe. Beginning with 2008, the CPS ASEC began indentifying whether they considered the households as not being in the WIC universe. Prior to 2008, the CPS ASEC grouped households not in the WIC universe together with households reporting “No” to the question regarding whether anyone in the household was on WIC in the last year. The household participation rates in Table 1 and Table 2 are not comparable to individual participation rates published by the Department of Agriculture since these are for specific estimation samples and not the total NSLP and WIC population.

¹⁴ In some states, WIC benefits are transferred to participants via debit cards while other states give participants checks to be used for WIC-approved food. In this study, we assume that participants use checks and thus their WIC benefits are not automatically included in reported food expenditures for the CE.

Section 2), but the subsidy amounts differ for free and reduced meals. School lunch program participation guidelines are used to assign the relevant subsidy values.

In a similar manner, WIC predicted probabilities are used to assign benefits to consumer units. A consumer unit is predicted to participate in WIC if the predicted probability exceeds 50 percent. For those predicted to participate in WIC, benefits are computed as the number of eligible members in the WIC universe sample times the average national food cost by monthly WIC benefits. Monthly benefits are converted to quarterly benefits simply by multiplying by 3.

The NSLP and WIC average benefit amounts from the Census Bureau and the USDA are also applied when imputing NSLP and WIC benefit levels using the CE Eligibility Method. However the NSLP and WIC universes differed somewhat for the participation and eligibility methods. Rental housing subsidies are estimated just as they were for the Garner (2010a,b,c) papers. Food stamps are implicitly included in reported CE food expenditures. Information on energy assistance is not asked in the CE and thus benefits from this assistance are not valued for this paper.

5. Production of SPM Thresholds

5.1 The Estimation Sample and Equivalence Scale

The estimation sample is composed of consumer units with exactly two children. Since the number of people in a consumer unit can differ from one case to the next (i.e., the number of adults can vary although the number of children is fixed at two), an equivalence scale is needed to equalize expenditures across all consumer units. The number of equivalent adults is determined by the number of adults and children in the household. For each consumer unit, FCSU expenditures are divided by the number of adult equivalent units. Each person in the consumer unit is assigned the adult equivalent value of FCSU expenditures for his or her consumer unit. Adult equivalent expenditures are then converted to those for two-adult two-child consumer units by applying the equivalence scale factor for this CU type to the single adult equivalent value.

As recommended in the ITWG guidelines, a three-parameter equivalence scale is used to adjust FCSU expenditures. The three-parameter scale allows for a different adjustment for single parents (Betson, 1996). This scale has been used in several BLS and Census Bureau studies (Garner and Short 2010; Johnson et al., 1997; Short et al., 1999; Short 2001). The three-parameter scale is shown below.

$$\text{Single adult scale} = 1.00 \quad (3a)$$

$$\text{Childless couple scale} = 1.41 \quad (3b)$$

$$\begin{aligned} \text{Single adult with children scale} \\ = (\text{adults} + 0.8 * \text{firstchild} + 0.5 * \text{otherchildren})^{0.7} \end{aligned} \quad (3c)$$

$$\text{All other families: } \text{scale} = (\text{adults} + 0.5 * \text{children})^{0.7} \quad (3d)$$

The economy of scales factor is set at 0.70 for consumer units with children. The NAS Panel recommended a range of 0.65 to 0.75.

5.2 Threshold Estimation

SPM thresholds are based on a range of expenditures around the 33rd percentile of FCSU expenditures for two-adult two-child consumer units (but based on expenditures for all

consumer units with exactly two children as described above). To identify the range, FCSU expenditures are ranked from lowest to highest, weighting the data by the number of consumer units in the U.S. The range is defined as within the 30th and 36th percentile points in the FCSU distribution. Restricting the estimation sample to this range of expenditures results in thresholds that are based on the expenditures of a subsample of the original estimation sample composed of two-child consumer units.

The ITWG guidelines stated that there be separate SPM thresholds for owners with mortgages, owners without mortgages, and renters. The ITWG method to account for spending needs by housing status uses the within range means of FCSU and shelter plus utilities overall and, in addition, the means of shelter plus utilities for groups of consumer units distinguished by housing status. To produce housing-based FCSU thresholds, first a SPM threshold that is not distinguished by housing status is produced. The overall threshold equals the mean of the range of FCSU expenditures times 1.2; the multiplier is to account for other basic goods and services. Second, expenditures for overall shelter and utility expenditures are substituted by the shelter plus utility expenditures for each housing status subgroup. Below is the equation used to produce the FCSU thresholds for two-adult, two child consumer units and for each i housing status group.

$Threshold_j =$

$$\left[(1.2 * FCSU) - (shelter \& utilities) + (shelter \& utilities)_j \right]_{\text{within 30th to 36th percentile range}} \quad (4)$$

Variables $FCSU$ and $shelter \& utilities$ are the means for all consumer units within the range without distinction by housing status, while j refers to the housing status group.

6. Thresholds

SPM thresholds, based on the CPS Program Participation Method and the CE Eligibility Method, are presented in Table 3. Standard errors too are presented. All thresholds and standard errors are based on replicate weights. Thresholds that only include food stamps are presented for comparison to those with imputed benefits for NSLP, WIC, and rental subsidies using the two methods described in this study. Thresholds are for two adults with two children but the estimation sample is based on a sample composed of all consumer units with two children, as noted before. Figure 2 shows the relative magnitude of the SPM thresholds. As expected, it appears that thresholds based on the CPS Program Participation Method are lower than those based on the CE Eligibility Method. Thresholds based on these two methods are higher than those with only food stamps included as an in-kind benefit.

Statistical tests are conducted to determine if thresholds based on the CPS and CE Methods are statistically different, and whether there are differences between thresholds based on housing status. Statistical differences in the thresholds are determined using the standard formula for differences between means for uncorrelated data (Downie and Heath 1974). Since overlapping years of quarterly CE data are being used and the thresholds based on the CPS and CE Methods are based on similar consumer units, the data are clearly correlated. As noted in Downie and Heath (1974), when data are correlated, the size of the standard error of the difference in the means is reduced, depending on the size of the correlation coefficient (not produced for this study). When the standard error of the difference decreases, the size of the computed t is larger, with the same numerator value. Thus, by using the formula for uncorrelated data, a very stringent test is being applied to test differences in the thresholds. In other words, when the computed t is 3.54 with a

sample size of 1000, for example, with correlated data, the actual t would be much larger. Thus any statistical result that is reported in this study would be even greater if the correlation had been incorporated in the test.

The tests of statistical differences suggest the following:

1. The two sets of SPM thresholds for 2009 -- based on the CPS Program Participation Method and the CE Participation Method and defined for owners with mortgages, owners without mortgages, and renters -- are not statistically significantly different from each other at the 0.001 level.
2. However, within imputation method group, housing-specific thresholds are statistically significantly different from each other. Thresholds for pairs of housing status thresholds are statistically significantly different: owners with mortgages vs. renters (at 0.05 level); owners with mortgages vs. owners without mortgages (at 0.001 level); and owners without mortgages vs. renters (at 0.001 level).

7. Discussion and Summary

There were two aims for this study: (1) to impute in-kind benefits for NSLP and WIC to the CE Interview based on a newly developed CPS Program Participation Method, and (2) to produce housing specific SPM thresholds using the imputed NSLP and WIC benefits based on this method. This exercise was successful. To evaluate the new method, SPM thresholds were also produced using an earlier CE Eligibility Method. Statistical tests of differences in the two sets of housing-specific SPM thresholds reveal that the thresholds are not statistically different from each other, at least for 2009.

Another issue examined in this study was whether thresholds for owners with mortgages, owners without mortgages, and renters are different or whether only two thresholds are needed: one for owners without mortgages and everyone else (combining the owners with mortgages and renter groups). Statistical tests of differences in housing-specific SPM thresholds, within imputation method type group, reveal that housing tenure thresholds are different. This result provides support for continuing to produce separate thresholds for owners with mortgages, owners without mortgages, and renters.

While the CPS Program Participation Method offers one way to impute in-kind benefits in the CE and the CE Eligibility Method another, additional methods should be explored. One alternative method is a statistical matching model. The model developed in this paper can be used as a basis for a predictive mean matching model where CE consumer units are matched to CPS households based on the predicted probabilities. The matched CPS household would serve as the “donor” observation for the NSLP or WIC benefit of the CE consumer unit. This method would need to rely on the public use CPS data (rather than the internal data) since, under current federal government regulations it is not possible to share internal household survey data across agencies. To test how well such a matching model might perform, the model created for this study could be applied to the CPS public use data with results compared to those from the current study.

Once there is agreement on the method to impute in-kind benefits for school lunches and WIC, SPM thresholds with these benefits can be produced at the BLS. These then would

be sent to the Census Bureau for geographic price adjustment.¹⁵ The price-adjusted thresholds would then be used by Census Bureau staff to produce Supplement Poverty Measure statistics based on the ITWG guidelines.

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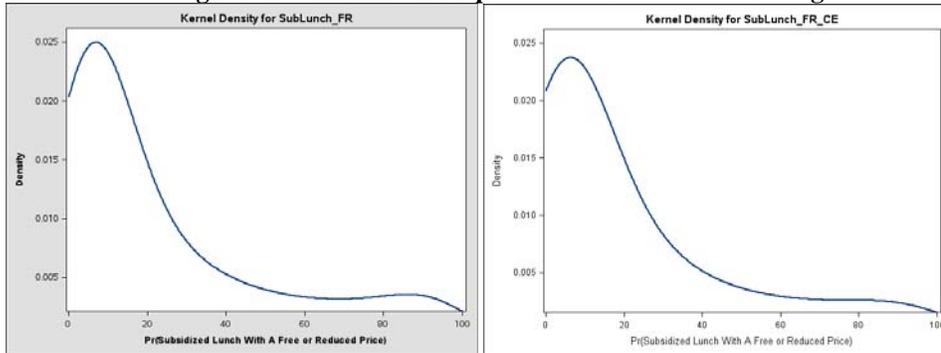
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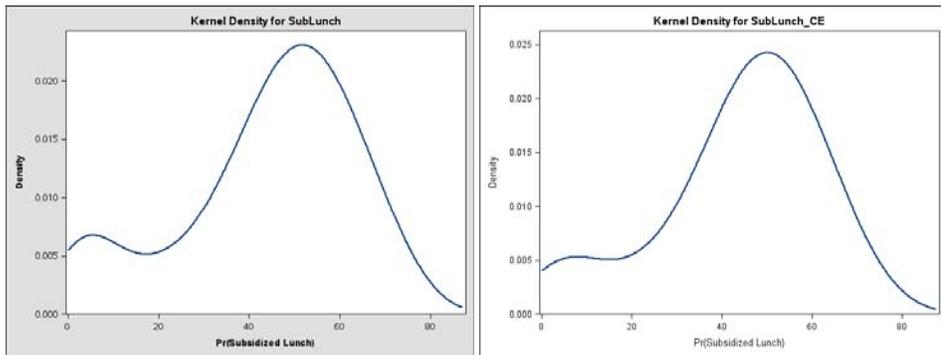
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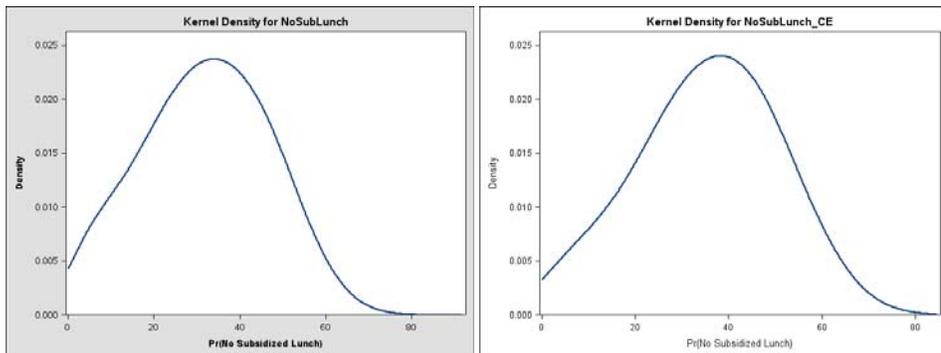
Figure 1: Predicted Participation in NSLP and WIC Programs



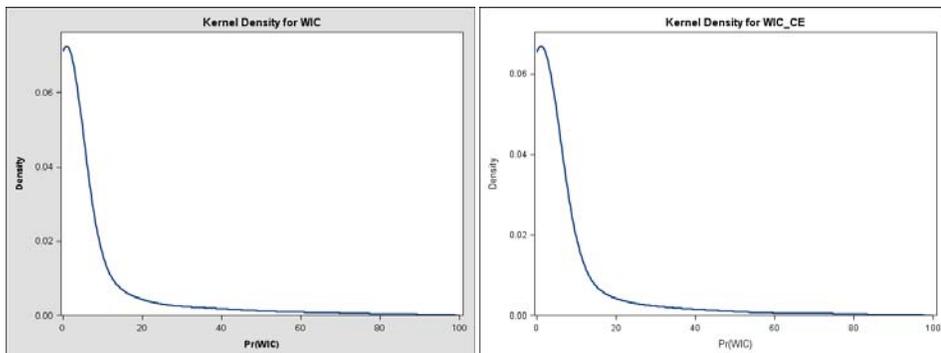
Predicted Free or Reduced Lunch Participation: CPS ASEC 2006-2010 (left) and CE 2005Q2-2010Q1 (right)



Predicted Paid Lunch Participation: CPS ASEC 2006-2010 (left) and CE 2005Q2-2010Q1 (right)



Predicted No School Lunch Participation: CPS ASEC 2006-2010 (left) and CE 2005Q2-2010Q1 (right)



Predicted WIC Participation: CPS ASEC 2006-2010 (left) and CE 2005Q2-2010Q1 (right)

Table 1: Weighted Predicted Probabilities of School Lunch and WIC Program Participation Using Model Estimation: CPS ASEC and CE Interview

Data Collected	Source	Sample Size	School Lunch Model			WIC Model	
			Subsidized, FR	Subsidized Lunch	No subsidized Lunch	Sample Size	WIC
2006	CPS ASEC	25,000	23.7%	45.3%	30.9%	68,121	3.4%
2005Q2-2006Q1	CE Interview	8,857	20.8%	45.2%	34.1%	13,661	4.3%
2007	CPS ASEC	24,546	23.5%	44.7%	31.8%	67,443	3.3%
2006Q2-2007Q1	CE Interview	7,924	20.7%	44.3%	35.0%	12,496	4.1%
2008	CPS ASEC	24,721	22.8%	44.2%	33.0%	18,045	12.5%
2007Q2-2008Q1	CE Interview	7,579	18.7%	44.9%	36.4%	11,931	5.3%
2009	CPS ASEC	24,533	24.0%	43.7%	32.3%	18,198	13.0%
2008Q2-2009Q1	CE Interview	7,405	19.5%	44.8%	35.7%	11,618	5.6%
2010	CPS ASEC	24,441	26.4%	42.6%	31.0%	18,826	13.6%
2009Q2-2010Q1	CE Interview	7,446	22.3%	43.2%	34.5%	11,883	6.2%
2006-2010	CPS ASEC	123,241	24.1%	44.1%	31.8%	190,633	6.2%
2005Q2-2010Q1	CE Interview	39,211	20.4%	44.4%	35.1%	61,589	5.1%

^a U.S. Census Bureau, Current Population Survey, 2006-2010 Annual Social and Economic Supplement. Sample probabilities are based on a model that uses household weights. For outcomes, “Subsidized, FR” refers to receiving a subsidized lunch with a free or reduced Price, “Subsidized Lunch” refers to receiving a subsidized lunch, and “No Subsidized Lunch” refers to not receiving a subsidized lunch. For information on sampling and nonsampling error, see <www.census.gov/aprd/techdoc/cps/cpsmar10.pdf>.

^b Bureau of Labor Statistics, U.S. Department of Labor, Consumer Expenditure Interview Survey, 2005Q2-2010Q1. Sample statistics are weighted using the quarterly consumer unit weights. For information on sampling and nonsampling error, see <<http://www.bls.gov/cex/anthology/csxanth5.pdf>>.

Table 2: Weighted CE Interview Predicted Probabilities of School Lunch and WIC Program Participation Using Model Estimation for Consumer Units with Two Children

Data Collected	Source	Sample Size	School Lunch Model			WIC Model	
			Subsidized, FR	Subsidized Lunch	No subsidized Lunch	Sample Size	WIC
2006	CPS ASEC	9,330	22.5%	47.1%	30.4%	10,868	7.1%
2005Q2-2006Q1	CE Interview	3,195	19.0%	47.1%	33.9%	3,398	6.2%
2007	CPS ASEC	9,141	22.3%	46.3%	31.3%	10,649	6.9%
2006Q2-2007Q1	CE Interview	2,977	18.4%	46.6%	35.0%	3,195	6.2%
2008	CPS ASEC	8,933	21.1%	46.4%	32.5%	5,245	14.5%
2007Q2-2008Q1	CE Interview	2,794	16.5%	47.1%	36.3%	2,954	7.2%
2009	CPS ASEC	8,869	22.7%	45.8%	31.5%	5,317	15.4%
2008Q2-2009Q1	CE Interview	2,825	18.5%	45.9%	35.6%	2,079	7.9%
2010	CPS ASEC	8,796	25.0%	44.8%	30.2%	5,410	16.2%
2009Q2-2010Q1	CE Interview	2,747	21.3%	44.7%	34.0%	2,922	9.1%
2006-2010	CPS ASEC	45,069	22.7%	46.1%	31.2%	37,489	10.6%
2005Q2-2010Q1	CE Interview	14,538	18.7%	46.3%	35.0%	15,448	7.3%
2005Q2-2010Q1	CE Interview: in 30-35th FCSU range (threshold estimation sample) ^c	1,054	21.2%	46.0%	32.8%	1,054	7.0%

^a U.S. Census Bureau, Current Population Survey, 2006-2010 Annual Social and Economic Supplement. Sample probabilities are based on a model that uses household weights. For outcomes, “Subsidized, FR” refers to receiving a subsidized lunch with a free or reduced Price, “Subsidized Lunch” refers to receiving a subsidized lunch, and “No Subsidized Lunch” refers to not receiving a subsidized lunch. For information on sampling and nonsampling error, see <www.census.gov/aprd/techdoc/cps/cpsmar10.pdf>.

^b Bureau of Labor Statistics, U.S. Department of Labor, Consumer Expenditure Interview Survey, 2005Q2-2010Q1. Sample statistics are weighted using the quarterly consumer unit weights. For information on sampling and nonsampling error, see <<http://www.bls.gov/cex/anthology/csanth5.pdf>>.

^c For the SPM estimation sample, the NSLP percentages have been rebased to equal 100 percent. The non-rebased probabilities for the three NSLP groups are 17.9 percent, 38.8 percent, and 27.7 percent respectively. Since the NSLP original probabilities were estimated for the NSLP sample as a whole, there is no guarantee that the sum of the probabilities for the estimation sample will equal 100 percent.

Table 3: FCSU (with In-Kind Benefits) Expenditures and Thresholds Based on 30th to 36th Percentile FCSU Expenditure Range: 2009

Cus with Two Children, FCSU	2A+2C Consumer Units																	
	With Only Food Stamps (n=1,063)						Eligibility Guidelines + CE Characteristics (n=1,048)						CPS Probit Estimation+CE Characteristics (n=1,054)					
	30-36th percentile range of FCSU		Shelter + Utilities within FCSU 30-36 range		Std. Error		30-36th percentile range of FCSU		Shelter + Utilities within FCSU 30-36 range		Std. Error		30-36th percentile range of FCSU		Shelter + Utilities within FCSU 30-36 range		Std. Error	
With Subsidies (adding values for CE-Based Rental Subsidies and CE- and CPS-Based NSLP and WIC Subsidies)																		
FCSU	\$19,879	(15.99)					\$21,093	(15.82)					\$20,966	(12.65)				
Food	\$6,931	(96.62)					\$7,442	(91.02)					\$7,344	(102.39)				
Clothing	\$1,163	(39.40)					\$1,173	(44.22)					\$1,155	(50.72)				
Shelter	\$8,102	(117.64)					\$8,702	(136.81)					\$8,762	(160.40)				
Utilities	\$3,683	(52.11)					\$3,776	(62.12)					\$3,705	(57.75)				
Other	\$3,976	(3.20)					\$4,219	(3.16)					\$4,193	(2.53)				
Treatment of shelter+utilities																		
Not accounting for housing status			\$11,785	(99.16)	\$23,854	(19.19)			\$12,477	(103.54)	\$25,311	(18.99)			\$12,467	(129.04)	\$25,159	(15.18)
Accounting for housing status																		
Owners with mortgages			\$12,381	(107.27)	\$24,450	(94.45)			\$13,087	(132.78)	\$25,921	(118.06)			\$13,024	(147.20)	\$25,716	(128.23)
Owners without mortgages			\$8,229	(294.87)	\$20,298	(303.29)			\$8,533	(396.31)	\$21,367	(388.08)			\$8,368	(333.67)	\$21,060	(313.04)
Renters			\$11,804	(141.63)	\$23,874	(97.49)			\$12,420	(176.26)	\$25,255	(149.80)			\$12,593	(193.13)	\$25,286	(148.93)

CE sample restricted to owners with and without mortgages, and renters with and without government rental subsidies. Annual CPI-U All Items were used to adjust quarterly expenditures to 2009 year dollars. Five years of CE interview data were used to produce these estimate; quarterly interview reports were considered to be independent, as in official BLS publications of CE data.

*Threshold=(1.2*FCSU)-(shelter+utilities share for all) + (shelter+utilities for subgroup)

Thresholds produced by Thesia I. Garner, BLS, July 14, 2011 using CPS probit coefficients produced by Charles Hokayem June 2010. Marisa Gudrais produced the standard errors, using replicate weights, on July 15, 2011.

Figure 2: 2009 SPM FCSU Thresholds with and without Imputed Subsidies

