

Using the American Community Survey (ACS) to Implement a Supplemental Poverty Measure (SPM)¹

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Introduction

In 2009, the Office of Management and Budget's Chief Statistician formed an Interagency Technical Working Group (ITWG) that issued a series of suggestions to the Census Bureau and the Bureau of Labor Statistics on how to develop a new Supplemental Poverty Measure (SPM).² Their suggestions drew on the recommendations of the 1995 report of the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance and the extensive research on poverty measurement conducted over the past 15 years at the Census Bureau and elsewhere. The ITWG suggestions focused on the implementation of the new measure using the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). The ITWG stated that the SPM will not replace the official poverty measure and will not be used to define program eligibility. The Census Bureau released preliminary research SPM estimates in November 2011 (Short 2011).

¹ Paper to be presented at the May 2012 Annual Meeting of the Population Association of America, San Francisco, CA. This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone more limited review than official publications. Any views expressed on statistical, methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau. The authors thank Brian O'Hara and Kevin McGee for their contributions to the work presented here.

² Observations from the Interagency Technical Working Group on Developing a Supplemental Poverty Measure. March 2010, http://www.census.gov/hhes/www/poverty/SPM_TWGObservations.pdf

The Census Bureau releases official poverty estimates each year using the CPS ASEC. Poverty estimates calculated using the official definition can be created relatively easily in other surveys. For official poverty estimates for state and sub-state geographic units, the Census Bureau recommends the use of the American Community Survey (ACS).

The SPM estimates released in November 2011 used the CPS ASEC. Unlike the official definition, the SPM is not as easily calculated in other surveys. Therefore, on April 1, 2011, the Census Bureau sponsored a workshop at the Urban Institute on State Poverty Measurement Using the American Community Survey.³ The workshop participants discussed the challenges involved in using the ACS to produce SPM estimates. The ACS does not have a number of key data elements required to produce SPM estimates. The ACS does not ask whether or not anyone in a household receives housing assistance, participates in the school lunch program, receives benefits from the Supplemental Nutrition Program for Women, Infants, and Children (WIC) or low-income home energy assistance (LIHEAP). It does not ask the value of Supplemental Nutritional Assistance Program (SNAP, formerly food stamp) benefits. There is no information on medical out-of-pocket expenditures (MOOP), childcare or child support outlays. Calculation of tax liabilities is hampered by a lack of relevant information on relationships and specific income sources. In addition, the ACS only collects information about the relationships to the reference person. Therefore, it is not possible to identify unrelated subfamilies or unmarried partners of persons other than the reference person of each household.

³ For a summary of the workshop see <http://www.urban.org/publications/412396.html>

Despite these limitations, researchers have been actively involved in exploring ways in which the ACS data can be used to produce NAS-based and/or SPM poverty estimates. The New York City Center for Economic Opportunity has produced NAS-based estimates for 2005, 2006, 2007, 2008 and 2009. Professor Mark Stern, at the University of Pennsylvania, has produced estimates for 2005-2007 using the ACS three-year file for the city of Philadelphia and its metropolitan area. New York State's Office of Temporary and Disability Assistance has presented estimates for the state of New York. The Urban Institute has created a NAS-style measure for Minnesota, Connecticut, Georgia, Massachusetts and Illinois and the Institute for Research on Poverty at the University of Wisconsin has implemented NAS-based measure for the state of Wisconsin.⁴

The purpose of this paper is to lay out a proposal for how these data limitations might be overcome to produce SPM estimates using ACS data. For solving missing data issues, this paper examines how the data in the CPS ASEC might be used to inform ACS imputations. In order to allow outside researchers to work on this issue, this paper assesses the feasibility of producing an ACS public use research file with these imputations that researchers could use to produce substate SPM estimates. The analysis in this paper uses the 2010 ACS Public Use Microdata Sample (PUMS) file.

The first section of the paper examines the unit of analysis and poverty universe used to produce SPM estimates. The second section examines the value of noncash benefits that are added to resources to produce the SPM resource measures. The third section looks at the estimates of tax credits and tax liabilities. The fourth section reviews

⁴ For a comparison of the methods used by each of these groups, see David Betson, Linda Giannarelli and Sheila Zedlewski, Workshop on State Poverty Measurement Using the American Community Survey,"Urban Institute, July 18, 2011, <http://www.urban.org/publications/412396.html>

the models used to estimate the expenditure amounts subtracted from resources to produce the SPM resource measure. The fifth section discusses the geographic adjustment of the SPM thresholds. The sixth section looks at some preliminary ACS poverty estimates using the imputed values.

1. Poverty Universe/Unit of Analysis

The SPM estimated using the CPS ASEC data defines the poverty universe as the resident civilian noninstitutionalized population. In order to construct ACS estimates comparable to these CPS ASEC estimates, the ACS sample needs to be limited to the resident civilian noninstitutionalized population. While the internal ACS data provides sufficient detail to determine which residents of noninstitutionalized group quarters to exclude (military and college quarters) to construct a comparable sample, the PUMS data does not. Therefore, this analysis limits the sample to persons living in households.⁵

The SPM uses a unit of analysis that differs from the traditional Census Bureau family definition (two or more related persons) used in the official poverty estimates. For the SPM, the unit of analysis is the family plus any cohabiting partners and their relatives. In addition, the SPM expands the poverty universe to include unrelated children under age 15 and groups them in the resource unit of the household reference person. These children are not included in the universe for the official poverty estimates. The SPM includes all foster children who are less than 22 years of age in the resource unit of the household reference person. In the official measure, foster children under the age of 15 are excluded from the poverty universe while foster children between the ages of 15 and 21 (inclusive) are considered unrelated individuals with their poverty status

⁵ New York City, Wisconsin and the Urban Institute limit their samples in a similar fashion.

determined by their own income and the threshold for a single individual. In the SPM all these foster children are included in the resource unit of the household reference person.

The ACS does not have all the information necessary to implement this new unit of analysis. Since the ACS only describes people's relationships to the household reference person, only the cohabiters of household reference persons can be identified. The ACS does not include any questions that can be used to identify unrelated subfamilies. For this analysis, unrelated children are grouped in the family of the household reference person. All other unrelated individuals (with the exception of the cohabiting partner of the household reference person) are treated as unrelated individuals. Some of these unrelated individuals may actually be members of unrelated subfamilies, sharing resources and benefitting from economies of scale that are not recognized in this analysis. Others may be related to the cohabiting partner and should be included in the primary resource unit. Using the CPS ASEC data, one is able to include the relatives of a cohabiting partner in the same resource unit as the cohabiting partner. Since this information is not available from the ACS, these relatives of the cohabiting partner are treated as unrelated individuals if they are age 15 or older. (Those under age 15 will be included in the resource unit of the household reference person.)

Table 1 provides descriptive summary statistics on the unit of analysis used in the official poverty measure and this preliminary SPM measure. In the 2010 ACS, there were 124.1 million SPM resource units and 131 million official poverty resource units (76 million families plus 55 million unrelated individuals).⁶ There were 3.9 million more SPM multi-person resource units than official multi-person resource units. For the official poverty measure, all multi-person resource units are families. For the SPM these multi-

⁶ For a discussion of the impact of the new unit of analysis in the CPS ASEC, *see* Provencher (2011).

person resource units include families plus groups formed by either combining a cohabiting partner, a foster child or an unrelated individuals under age 15 with a nonfamily householder.

In the 2010 ACS, approximately 6.8 million households included a cohabiting partner; 158,000 households included a foster child, and 517,000 households included an unrelated child under age 15 not listed as a foster child. Grouping unrelated children under age 15 into resource units adds about 900,000 individuals to the poverty universe.⁷ After these new units are formed, the number of unrelated individuals falls from 55 million using the official poverty resource unit definition to approximately 44 million with the new definition. The average size of a resource unit increases from 2.3 people to 2.4 people per resource unit.

Another paper in this panel explores alternative methods of forming resource units, specifically those that rely on the relationship imputations provided by the IPUMS project. (Heggeness, et.al.) Analysis in this paper uses only the expanded resource unit possible from the information on the Census Bureau's ACS PUMS file.

2. Program Participation/Value of Noncash Benefits

The SPM adds to cash income the value of five noncash or in-kind benefits: SNAP, WIC, school lunch, housing assistance and LIHEAP. Since the ACS asks only whether or not a household receives SNAP benefits (and not the value of SNAP benefits received) and does not ask about other noncash benefits, if the value of these benefits are to be added to resources, methods must be developed to assign participation status to

⁷ In the 2010 CPS ASEC, there were 124.2 million SPM resource units, 7.8 million cohabiting partners, 127,000 households with foster children and 292,000 households with other unrelated children. (Provencher, 2011, p. 12) The number of SPM resource units from the 2010 CPS ASEC was not statistically different from the number of SPM resource units in the 2010 ACS.

ACS households. Researchers estimating SPM-like poverty measures using the ACS have made decisions about which programs to impute. For example, NYC CEO does not include LIHEAP or WIC benefits in its resource measure.⁸ The Institute for Research on Poverty does not include the value of WIC nor school lunch benefits in its Wisconsin poverty measure. The Urban Institute did not include school meals in its estimates for Minnesota.

When researchers using the ACS have imputed program participation, they have employed several different methods. The Wisconsin Poverty Measure (IRP) estimates eligibility for LIHEAP and housing assistance and then randomly draws participants from eligibility groups. New York City CEO assumes that all eligible children participate in free or reduced price school lunch. NYC CEO imputes participation in housing assistance using a statistical match to the New York City Housing and Vacancy Survey. For the Minnesota estimates, the Urban Institute simulated WIC and LIHEAP eligibility rules and then used state administrative data to select participants so that the simulated caseload approximates the administrative data. IRP, NYC CEO and Urban all attempt to correct for underreporting of SNAP benefits in the ACS by imputing SNAP participation to households that did not report SNAP receipt.

The CPS ASEC includes specific questions on receipt of each of these benefits and asks respondents the value of SNAP and LIHEAP benefits received in the past 12 months. In addition, the CPS ASEC asks respondents who in the household received

⁸ Descriptions of the NYC CEO measure are from “Policy Affects Poverty: The CEO Poverty Measure 2005-2009: A Working Paper by the NYC Center for Economic Opportunity, March 2011. Descriptions of the Institute for Research on Poverty are from Julia B. Isaacs, Joanna Y. Marks, Timothy M. Smeeding and Katherine A. Thornton, “Wisconsin Poverty Report: Methodology and Results for 2009,” Institute for Research on Poverty University of Wisconsin-Madison, May 2011. Descriptions of the Urban Institute methods are from Sheila Zedlewski, Linda Giannarelli, Laura Wheaton, and Joyce Morton, “Measuring Poverty at the State Level,” The Urban Institute, March 2010.

WIC benefits, the kind of housing assistance (public housing vs. housing voucher), and whether or not children received free or reduced price school lunches. The Census Bureau has developed methods to use these data to estimate the cash value of WIC, school lunch, and housing assistance.⁹

In this paper participation status or reciprocity is modeled using data from the CPS ASEC and a standard logistic model.¹⁰ The logistic model follows this specification:

$$\Pr(y = 1) = \frac{1}{1 + e^{X_i\beta}}$$

where y is a dichotomous variable equal to “1” for program participation and “0” otherwise. The error for this model follows a Type-I extreme value distribution. The model parameters, β , are estimated via maximum likelihood using the LOGISTIC procedure in SAS. The covariates, X_i , contain household/family characteristics. For some benefit types, state dummy variables, omitting the state of Washington, are also included. The other household/family characteristics included in the model vary by benefit type. Where possible, this analysis used the logistic models developed in previous research on these areas with covariates limited to variables included in both the CPS ASEC and the ACS files. Table 2 provides a list of these household/family characteristics. The appendix provides parameter estimates for the covariates in each of the models.

For each benefit type, the logit model parameters were used to assign a predicted probability of participation to each household/individual who would have been in the

⁹ See Kathleen Short, 2011, *The Research Supplemental Poverty Measure: 2010*, U.S. Census Bureau, Current Population Reports, P60-241, pp 19-21. The Appendix of this report provides detailed descriptions of each of these in kind benefits, http://www.census.gov/hhes/povmeas/methodology/supplemental/research/Short_ResearchSPM2010.pdf

¹⁰ Modeling each outcome separately ignores any correlation among outcomes. For example, receiving housing assistance is independent of receiving energy assistance.

universe and asked the program participation question in the CPS ASEC.¹¹ Once the probability of participation is estimated, this probability is compared to a random number between 0 and 1. If the probability exceeds the random number, the person or household record is coded as “recipient.” This paper does not adjust estimates of program participation to correct for underreporting in the CPS ASEC.

For SNAP and LIHEAP, the analysis uses a regression model to predict the value of SNAP and LIHEAP benefits using responses from the 2011 CPS ASEC. Each amount is modeled using a Poisson regression model with a log-link function. The specification for the model follows:

$$\ln(y_i) = X_i\beta + \epsilon_i$$

where y_i is a continuous variable representing the amount. The error term, ϵ_i , follows a Poisson distribution. The model parameters, β , are estimated via maximum likelihood using the GENMOD procedure in SAS. The covariates, X_i contain household/family characteristics. The covariates include state dummy variables, omitting the state of Washington. Covariates used by previous research on these programs were included in the model if these covariates were available in both the ACS and the CPS ASEC. The other household/family characteristics included in the models vary by the program or benefit and are shown in Table 2. The appendix provides parameter estimates for the covariates in each of the models.

The parameters from the regression models run on the CPS ASEC are applied to the household characteristics in the ACS PUMS file to estimate a benefit level for each household reporting SNAP benefits and each household for which LIHEAP participation

¹¹ The CPS ASEC instrument asks each respondent questions about participation in school lunch but asks only lower income households questions about housing assistance, SNAP benefits, energy assistance, participation in the WIC program, and receipt of free or reduced school lunches.

was imputed. This paper does not adjust the estimated benefit amounts to account for underreporting of SNAP or LIHEAP benefits in the CPS ASEC. For both LIHEAP and SNAP benefits, household amounts are converted to per capita amounts in order to prorate the values across SPM resource units. For example, if a household has a three-person family and two unrelated individuals, a \$100 household LIHEAP benefit would be prorated \$60 to the family and \$20 to each of the unrelated individuals.

The values of benefits for WIC and school lunch are estimated using administrative estimates of average benefit outlays from the U.S. Department of Agriculture (USDA). These are the same averages used to assign values to these program benefits in the CPS ASEC. In the CPS ASEC when a household answers affirmatively to the WIC receipt question, the respondent is asked to list the individuals in the household who receive WIC. On average, about 87.5 percent of children ages 0 to 5 in households reporting WIC receipt were listed as recipients. This factor was used to adjust the value of WIC benefits to ACS households.

For school lunch, two logit models were used to estimate (1) which school age children bought a lunch at school and then (2) of those who bought lunch at school, who received a free or reduced price lunch. Of those receiving a free or reduced price lunch, household income data were used to assign free lunch vs. reduced price lunch to each household.¹² The value of school lunch benefits to the resource unit was calculated by multiplying the number of school age children by the relevant average subsidy per meal (regular, reduced or free) times 167 school days per year.

¹² The method used to do this is similar to the method used in the CPS ASEC to assign free vs. reduced price lunches to each household.

Receipt of housing assistance was assigned using a logit model based on CPS ASEC responses to the questions on housing assistance. The value of the housing subsidy is estimated using data from the Department of Housing and Urban Development (HUD) and reported household income. Specifically, the SPM considers the value of a housing subsidy to be the difference between the market rent of the housing unit and the rent paid by the household. Since the CPS ASEC does not ask respondents about the market rent of their housing unit, the market rent of subsidized housing for the CPS ASEC is derived from a statistical match between the CPS ASEC and HUD administrative records. For this ACS analysis, the average market rent for one, two and three-person subsidized units in the CPS ASEC were used to assign a market rent to each public use microdata area (PUMA).¹³ Household income and composition data from the ACS were used to calculate the household's required contribution towards housing as per HUD's program rules as a proxy for rent paid which is not known.¹⁴ This required contribution was subtracted from the imputed market rent of the household to estimate the subsidy value. Consistent with the Census Bureau practice in estimating the value of housing subsidies for the CPS ASEC SPM, the value of the housing subsidy is limited to be no more than the housing portion of the threshold minus the expected household contribution.¹⁵

¹³ Specifically, average market value rents for households with one, two and three or more persons were calculated for each metropolitan statistical area identified on the CPS ASEC public use file. (Generally these are MSAs with populations greater than 100,000.) These average amounts were then merged onto the ACS internal file by MSA and used to calculate an average market rent value for each household size for each PUMA.

¹⁴ The ACS asks respondents to provide the market rent of their units, not the actual rent paid.

¹⁵ For more detailed description of the method for estimating the value of housing subsidies, see Paul Johnson, Trudi Renwick and Kathleen Short, 2010, "Estimating the Value of Federal Housing Assistance for the Supplemental Poverty Measure," Poverty Measurement Working Paper, U.S. Census Bureau.

Table 3 presents the ACS imputed reciprocity rates with the estimated reciprocity rates in the CPS for each benefit type. It also shows the mean and aggregate benefit amounts in the two surveys, as well as the mean and aggregate benefits for those with income below the official poverty threshold.¹⁶ The model-based estimates of overall participation rates for school lunch, WIC and housing assistance were statistically different in the ACS and the CPS ASEC. However, the differences were small in magnitude, about two-thirds of a percentage point or less. The ACS LIHEAP participation rate was not statistically different from the CPS estimate.¹⁷

The comparison between CPS ASEC and ACS participation rates for resource units designated as poor under the official measure show more differences. For school lunch, WIC, housing subsidies and LIHEAP the ACS estimates are smaller than the CPS ASEC estimates. Compared to the CPS, the models used to assign program participation are assigning participation to fewer resource units in the bottom of the cash income distribution. These are precisely the units whose poverty status might be changed by the addition of the value of these benefits to cash income.

The comparison of the mean amount added to the resources of each SPM resource unit for each noncash benefit presents a mixed story. The differences in the means for LIHEAP and housing assistance were not statistically significant. The model-based estimates in the ACS for SNAP and school lunch were lower than the CPS ASEC estimates. The model-based estimate for WIC was higher in the ACS.

¹⁶ The estimates from the 2011 CPS ASEC were taken from Short (2012).

¹⁷ SNAP was the only benefit type reported on the ACS. The ACS SNAP participation rate was 2 percentage points higher than the CPS SNAP participation rate.

For the aggregate amounts, SNAP and WIC totals were greater in the ACS than in the CPS ASEC. School lunch, housing assistance and LIHEAP were lower in the ACS than in the CPS ASEC. Summing all five noncash benefits, for the overall population the ACS estimates were not statistically different from the CPS ASEC estimates because the higher estimate for SNAP was balanced by the lower estimate for housing assistance. For resource units classified as in poverty using the official method, the total benefits assigned were lower in the ACS for three of the five programs. Across the five programs, for the officially poor the ACS estimates were \$3 billion less than the CPS ASEC estimates.

3. Tax Obligations and Tax Credits.

The SPM resource measure adds estimated values for tax credits and subtracts estimated values for tax obligations. This paper estimates tax obligations and tax credits using a tax calculator. For the CPS ASEC, the Census Bureau uses a tax calculator that takes data from the CPS ASEC questionnaire enhanced with data from a statistical match to Internal Revenue Service (IRS) data. The Census Bureau is working to adapt this tax calculator to use ACS data. This process involves forming tax units from ACS households (recognizing that ACS relationship data is more limited than CPS ASEC relationship data) and dividing up some broader ACS income categories into taxable and nontaxable income. This analysis uses very preliminary estimates that result in many more single tax filers and does not break down broad income categories in a way that is possible with the CPS.

Table 3 provides some summary measures of the means and aggregate dollar amounts for federal insurance contributions act (FICA) payroll tax, federal income tax

before credits, and the federal earned income tax credit. State taxes are also included in the calculations. The table shows that a slightly higher percentage of units are assigned payroll taxes overall in the ACS than in the CPS. For those classified as in poverty using the official measure, 53 percent were assigned payroll taxes in the ACS while 46 percent were assigned payroll taxes in the CPS. Average amounts assigned for payroll taxes are slightly lower in the ACS for both groups.

Federal income taxes before credits show a different pattern. A greater percentage of those below poverty using the official measure are assigned tax liability in the CPS. Mean amounts are lower on average in the ACS compared to the CPS for both the entire population and those below poverty using the official measure. The aggregate amounts are therefore lower for the ACS.

The EITC calculation results in a higher percentage of the official poor eligible for the EITC in the ACS than in the CPS. Average assigned amounts are lower in the ACS than in the CPS, resulting in aggregate amounts with small differences.

These estimates of tax liabilities are preliminary and there are clear improvements that have been made in other work. More complex approaches have been used to form tax units, improve estimates of tax deductions based on reporting housing expenses in the ACS and divide “other income” into taxable and nontaxable portions.

New York City and New York State address the problem of forming tax units by first dividing ACS households into Minimal Household Units (MHUs) that create a richer set of information about how persons in the household are related to each other. For example, two married boarders with a child will be identified as such, using age and other demographic characteristics. The children of unmarried partners (unless they are coded as

children of the respondent) are identified in a similar manner and are then coded as the child of a specific parent.¹⁸ Next, the tax model identifies who in each MHU is a filer and who in the household might be their spouse or dependent. Additional decisions are made about allocating children and indigent household members to filers as dependents.¹⁹ Each tax filer is then given a filing status of Married Filing Joint, Head of Household, Single, or Married Filing Separate.²⁰ This status will determine their tax rate, exemptions, deductions, and eligibility for credits. Then a simulated Federal, New York State, and New York City tax return is prepared for each tax filing unit based on income and other data provided in the ACS. They assume all filers use the standard deduction.

University of Wisconsin and Urban Institute researchers begin with the IPUMS version of the ACS that includes pointers describing these relationships. Wisconsin's IRP assigns head of household to unmarried primary/subfamily heads. They initially assign children to family/subfamily heads, but if the head would not likely file a return, children are assigned to other household members. The tax calculator estimates interest deduction as 80 percent of the mortgage payment; property tax deduction is calculated using ACS reported property tax; state tax deduction is simulated using calculated state taxes.

Urban Institute calculates taxes using their TRIM 3 model, designed for the CPS, but applied to the more limited information in the ACS. Using IPUMS relationship data, head of household status is assigned only to unmarried householders with qualifying

¹⁸ The MHU methodology is derived from Jeffrey Passel, "Editing Family Data in Census 2000 Public-Use Microdata Samples: Creating Minimal Household Units (MHU's)." (August 23, 2002).

¹⁹ See NYC Center for Economic Opportunity, *The CEO Poverty Measure, 2005-2008*, (2010), for details on the creation of tax filing units.

²⁰ The ACS does not provide enough information to identify widowed filers, the other status used by the IRS.

dependents. They apply qualifying child and dependent rules to first see if person can be claimed as dependent of a parent; if not, then of the householder. They do not model sharing of children for EITC or dependency. The mortgage interest deduction is set equal to 80 percent of the mortgage payment (based on WI). The property tax deduction is obtained from reported ACS value. The state tax deduction is set at the greater of the state income taxes (from a preliminary state tax simulation) and the state sales tax deduction (from IRS look-up table). Average charitable contributions are assigned based on IRS data by AGI level and state. State taxes are recalculated based on the final federal tax simulation.

4. Subtractions from Resources

The SPM uses thresholds derived from Consumer Expenditure Survey data on spending on food, clothing, shelter and utilities. The ITWG suggested that Census subtract expenditures on childcare, child support paid and medical out of pocket expenditures from resources because these three key items are not included in the thresholds and outlays for these purposes reduce the resources available to purchase the expenditures categories included in the threshold. In order to estimate SPM poverty rates in the ACS, the amounts to be subtracted from resources for these expenditures need to be imputed. Child support paid is not included in this paper.²¹

Prior to the 2010 introduction of specific CPS ASEC questions on these expenditures, childcare and medical out of pocket expenditures (MOOP) were imputed in the CPS ASEC in order to produce the NAS-based poverty estimates. As detailed in the early reports on the NAS measures, various methods to derive estimates for these two

²¹ In the CPS ASEC, the impact of child support paid is very small. The overall poverty rate for 2010 changed from 16.0 percent to 15.9 percent when child support paid was subtracted from resources.

items were evaluated. The June 1999 “Experimental Poverty Measures” report (Short, Garner, Johnson and Doyle, 1999) compares three methods for assigning child care expenses and compares subtracting MOOP from resources to including MOOP in the thresholds. The methods currently used to model these items for the NAS-based measures posted on the Census Bureau website are described in the 2001 report. (Short, 2001) Since that report, numerous Census Bureau working papers have explored alternative imputation strategies.²²

Researchers using the ACS to estimate alternative poverty measures have borrowed from the CPS ASEC research. New York City CEO uses a model based on the Iceland/Ribar model to estimate childcare expenses and a predicted mean match to the Medical Expenditure Panel Survey (MEPS) data to estimate MOOP.²³ The Wisconsin Poverty Measure uses a regression model to estimate weekly childcare amounts but assumes that all families with working parents and children under 12 have some expenses. Wisconsin deals with MOOP by including MOOP in the thresholds using the Census Bureau risk factors. The Urban Institute estimates childcare expenses for nonsubsidized working families using the 2002 National Survey of American Families and simulates childcare subsidies based on program rules. The Urban Institute also uses MOOP in the thresholds

4a. Child Care

The NAS-based poverty estimates currently use the response to the CPS ASEC question on whether or not anyone in the household paid for childcare and model the amount of childcare expenditures using the parameters from an OLS regression model

²² All of these papers can be found at <http://www.census.gov/hhes/povmeas/publications/working.html>

²³ See Iceland and Ribar, 2001 for more detailed description of this model.

using data from the Survey of Income and Program Participation (SIPP). The model includes race, ethnicity, age of the children, region of residence, log of family income, age, educational attainment, proportion of earnings from the mother, average hours worked, and number of adults in the household as covariates. Models are estimated separately for single parents and married couple families.²⁴ Prior to the introduction of the CPS question on whether or not anyone paid for childcare, a logistical model was used to impute whether or not anyone in the household paid for childcare.

In a subsequent working paper, Short (2009) updated the Iceland/Ribar model using SIPP data for 2005. After tests for estimating separate models for unmarried and married parents did not support significant differences, a single model was used which included slightly different covariates and some interaction terms. The updated model took advantage of CPS ASEC questions on whether or not families received help with childcare expenses. In another working paper, Short (2010) used predicted childcare expenses in both the SIPP and the CPS ASEC to perform a statistical match, assigning the actual reported expenses once the match was made.

This paper uses statistical modeling to estimate childcare expenditures. For childcare, the sample was limited to those households with children under the age of 12. For married-couple households or households reporting an unmarried partner, the universe was limited to households in which both the reference person and the spouse or partner were earners. For unmarried household reference persons, the sample was limited to those in which the reference person reported earnings. A standard logistic model was used to predict which households had childcare expenditures. The logistic models followed this specification:

²⁴ See Iceland and Ribar, 2001 for more detailed description of this model.

$$\Pr(y = 1) = \frac{1}{1 + e^{X_i\beta}}$$

where y is a dichotomous variable equal to 1 for positive expenditures and zero otherwise. The error for this model follows a Type-I extreme value distribution. The model parameters, β , are estimated via maximum likelihood using the LOGISTIC procedure in SAS. The covariates, X_i , contain family characteristics. These covariates are listed in Table 2. An appendix table summarizes the parameter estimates.

For those households that were designated as “paying for childcare,” the parameters from a regression model were used to estimate the weekly outlay on childcare. Weekly amounts were modeled using a Poisson regression model with a log-link function. The specification for the model follows:

$$\ln(y_i) = X_i\beta + \epsilon_i$$

where y_i is a continuous variable representing the amount. The error term, ϵ_i , follows a Poisson distribution. The model parameters, β , are estimated via maximum likelihood using the GENMOD procedure in SAS. The covariates, X_i , contain family/person characteristics.

For households designated as “paying for childcare,” the predicted weekly outlay was multiplied by the number of weeks worked in the previous year by the reference person, spouse or cohabiting partner with the least number of weeks worked.²⁵ Since the ACS public use data provides only categorical responses to the question on the number of weeks worked, households were assigned the midpoint of the category as the number of weeks worked. This same estimate of the number of weeks worked was used to assign

²⁵ The sample used to estimate the childcare amount was trimmed to eliminate the top 1 percentile of responses. This eliminated cases where the annual expenditures on childcare were reported to exceed \$31,200.

other work-related expenses using 85 percent of the median other work expenses reported in the SIPP. Finally, work-related expenses including childcare were limited to be no more than the earnings of the household reference person, spouse or cohabiting partner with the lowest earnings. This limit is was the similar to the limit on work expenses used for the CPS ASEC SPM estimates.

Table 3 compares summary statistics for the ACS imputed childcare outlays to the reported childcare outlays from the CPS ASEC. While 6.3 percent of resource units report some childcare expenses in the CPS ASEC, only 4.9 percent of resource units in the ACS were designated as childcare payers. For all resource units, the mean outlays were about \$5,000 in the CPS ASEC but around \$5,900 in the ACS. For resource units with cash income below the official poverty thresholds, the mean imputed amount was \$2,718 as compared to the \$2,085 reported in the CPS ASEC. Despite these higher means, the aggregate childcare amount in the ACS was \$3.8 billion less than in the CPS ASEC.

Table 3 also compares total work expenses. For this variable, 53 percent of official poor resource units were assigned some expenses in the ACS as compared to about 46 percent in the CPS ASEC. Mean amounts for the all resource units and the officially poor resource units were higher in the ACS. As a result, the aggregate amount of work-related expenses subtracted from ACS resource units was \$31 billion more than the CPS ASEC amount.

The childcare imputation is less robust in the ACS due to the limited relationship information. In the CPS ASEC there are parent pointers that enable one to cap childcare and other work-related expenses at the earnings of the parent with the least amount of

earnings. In the ACS file the reference person, spouse or cohabiting partner of the household may not even be the parent of the child for whom childcare expenses are imputed. The parent might work full time and pay for childcare for 52 weeks while the reference person, spouse or cohabiting partner does not work at all. The method used in this analysis would erroneously fail to impute childcare expenses to this household.

4b. MOOP Models

For the SPM, medical out of pocket expenditures (MOOP) are subtracted from resources before comparing resources to the poverty threshold. Since the CPS ASEC includes specific questions on MOOP spending, these responses are used to estimate total MOOP spending for each resource unit. Prior to the introduction of these questions in 2010, the Census Bureau employed a two-step procedure to estimate MOOP for the NAS measures. Parameters from a logistic model are used to estimate the probability of incurring expenses while parameters from an OLS model are used to estimate the amounts for those with positive expenditures.

There has been extensive research on estimating MOOP, particularly prior to the introduction of the questions on MOOP in the 2010 CPS ASEC.²⁶ Short, Garner, Johnson and Doyle (1999) describe a model using 1987 National Medical Expenditure Survey data, which like childcare, first estimated the probability of having expenditures and then the level of those expenditures. Short (2001) describes three different methods: deducting family obligations for MOOP expenses from resources; adding the average obligations for the MOOP to the threshold and combining the first two approaches. The 2001 report used 1996 and 1997 Consumer Expenditure data to estimate the model for

²⁶ Numerous working papers on MOOP can be found on the Census Bureau Experimental Poverty website: <http://www.census.gov/hhes/povmeas/publications/wp-medical.html>.

the first approach. The MOOP in the thresholds approach used data from the 1996 Medical Expenditure Panel Survey (MEPS) to adjust the thresholds to vary by determinants of expenditures that differ from those of the two-adult, two-child reference family while estimating the based MOOP amount from CE data. The NAS-based poverty estimates published each year by the Census Bureau provide estimates for using both approaches: MOOP subtracted from resources and MOOP in the threshold.

After the 2001 report, several conference papers discuss variations and improvements for the MOOP imputations. O'Hara and Doyle (2001) compared estimates using SIPP, MEPS and the CE and compared estimates using a statistical match to the model-based approach. A 2009 paper by O'Donnell and Beard compared model-based estimates to estimates using a predicted means match to the Survey of Income and Program Participation. Short (2010) used the predicted means match approach to produce poverty estimates.

In this paper, the CPS ASEC data on MOOP are used to model expenditures on health insurance premiums and other medical out of pocket outlays. Outlays on premiums were set to \$0 for individuals and families reporting no health insurance or only public health insurance. Outlays on premiums for Medicare Part B were set at the federal premium amounts for all individuals reporting Medicare coverage using household income to assign the appropriate Part B premium amount for Medicare recipients. All households/persons reporting private health insurance (either employer provided or direct purchase) were assumed to have positive premium outlays.

For other medical outlays, a logit model was used to determine which persons/households had positive expenditures on these items. Like the models for

program participation, the models were standard logistic models. The logistic models follow this specification:

$$\Pr(y = 1) = \frac{1}{1 + e^{X_i\beta}}$$

where y is a dichotomous variable equal to 1 for positive expenditures and zero otherwise. The error for this model follows a Type-I extreme value distribution. The model parameters, β , are estimated via maximum likelihood using the LOGISTIC procedure in SAS. The covariates, X_i , contain family or individual characteristics. Table 2 provides a summary of the covariates for each model. An appendix table provides the parameter estimates.

Models were then used to estimate the amount of premium and other medical out of pocket expenditures. Separate models were used for family insurance units, unrelated individuals and the elderly. Family insurance units were limited to spouses and children of the householder. All other household members were treated as unrelated individuals. Each amount was modeled using a Poisson regression model with a log-link function. The specification for the model follows:

$$\ln(y_i) = X_i\beta + \epsilon_i$$

where y_i is a continuous variable representing the amount. The error term, ϵ_i , follows a Poisson distribution. The model parameters, β , are estimated via maximum likelihood using the GENMOD procedure in SAS. The covariates, X_i , contain family/person characteristics. Table 2 provides a summary of the covariates for each model. An appendix table provides the parameter estimates.

Table 3 provides some summary statistics for the MOOP imputations and compares these to reported MOOP expenditures from the CPS ASEC. In the CPS ASEC, 94 percent of resource units had some MOOP outlays. For the ACS the modeled estimate is 93.2 percent, statistically different from the CPS ASEC estimate. For officially poor resource units, the estimates are 83 percent and 78 percent. For both the total sample and the officially poor resource units, the mean of the imputed ACS MOOP is larger than the reported MOOP from the CPS ASEC. The total ACS imputed MOOP is 49 billion dollars more than the CPS ASEC reported amount.

The MOOP imputations are constrained by the limited data available from the ACS. The ACS does not ask about health status or receipt of disability payments, two variables important in the MOOP model used in the NAS measures. In addition, the health insurance questions are not directly comparable between the two surveys. The CPS ASEC asks about health insurance at any time during the reference year. The ACS asks about health insurance coverage at the time of the survey.

5. Thresholds.

The ACS is a continuous survey and asks respondents to report their income in the previous 12 months. When calculating ACS estimates of poverty rates using the official definition, the poverty thresholds vary by family size, age of reference person, number of children and the month of the survey. Since this research uses the PUMS file (which does not disclose the month of the survey), an annual threshold is used. In order to be consistent with this threshold choice, the analysis uses the adjusted cash income variable from the PUMS file.²⁷

²⁷ Thresholds are estimated by the Bureau of Labor Statistics and can be found at <http://www.bls.gov/pir/spmhome.htm>.

The ITWG suggested that the housing portion of the SPM thresholds be adjusted for geographic differences in housing costs.²⁸ These adjustment factors are calculated for specific metropolitan statistical areas with populations greater than 100,000. There is a single average adjustment factor for smaller metropolitan areas in each state and one adjustment factor for households outside metropolitan statistical areas in each state. Since the ACS PUMS files does not identify metropolitan statistical areas, the adjustment factors used for the 2009 and 2010 research SPM estimates from the CPS ASEC were used with the ACS 2010 internal file to calculate average geographic adjustment factors for each PUMA. These adjustment factors were then assigned to each household based on the location of the unit.

While PUMAs were selected as the geographic unit for the indices because this is the smallest level of geography identifiable on the ACS PUMS file, the index values are based on differences in housing costs across larger metropolitan areas. The April 2011 Urban Institute workshop included a discussion of the appropriate level of geography to calculate the geographic indices. In that discussion there was concern that the geographic unit should be larger than a single PUMA. The Urban Institute used Super-PUMAS in their analysis. IRP aggregated PUMAs into larger regional units. NYC CEO used a single geographic adjustment factor for all parts of New York City, in essence combining numerous PUMAs.²⁹

6. Preliminary SPM estimates

Tables 4 and 5 use the 2010 ACS PUMS files to replicate the SPM poverty estimates included in the November 2011 Research SPM report. Table 4 provides

²⁸ See Renwick, Trudi. Geographic Adjustments of Supplemental Poverty Measure Thresholds: Using the American Community Survey Five-Year Data on Housing Costs, July 2011, U.S. Census Bureau.

²⁹ Betson, Giannarelli and Zedlewski (2011) p. 6.

poverty estimates by demographic group including age, family type, race, Hispanic origin, nativity, tenure, region of residence and health insurance status. Table 5 summarizes the effect of excluding individual resource elements on SPM poverty rates.

For 2010, the overall SPM poverty rate using the ACS is 16.7 percent, higher than the 16.0 overall SPM poverty rate estimated from the CPS ASEC. There are many reasons why the poverty estimates from the ACS would not be the same as the CPS ASEC poverty estimates. These include differences in the reference period (the past calendar year vs. the past 12 months), more detailed income-reporting categories in the CPS ASEC than in the ACS, and mode of data collection.³⁰ Despite these reservations, it is important to assess to what extent these differences are a result of imprecise imputation of the missing elements.

The estimates in Table 3 provide some insight into other reasons why the overall ACS poverty estimate is higher than the CPS ASEC poverty estimate. The sums of the aggregate amounts added to income were not statistically different for the ACS than the CPS ASEC. However, the sum of the aggregate amounts for items subtracted from income to create the SPM resource measure was greater in the ACS than the CPS ASEC.

The ACS SPM estimates were either higher or not statistically different from the CPS estimates for almost all demographic groups shown in Table 4. The only groups with a statistically significant difference in which the ACS estimate was lower than the CPS estimate were those aged 65 years and older and whites.

Table 5 examines the effect of each resource element on the overall SPM poverty rate and the SPM poverty rates for specific age groups. For example, in the ACS the

³⁰ For more information on the differences between the ACS and CPS ASEC poverty estimates see. <http://www.census.gov/hhes/www/poverty/about/datasources/factsheet.html>

SPM poverty rate without the EITC would be 18.9 percent rather than 16.7 percent. In other words, adding the EITC to resources decreases the overall poverty rate by 2.2 percentage points. In the CPS, the impact of the EITC is to reduce the SPM poverty rate from 18 percent to 16 percent, a decrease of 1.9 percentage points. From these estimates one can see that if MOOP were not subtracted from resources, the overall ACS SPM estimate would not be statistically different from the overall CPS ASEC SPM estimate.

Some of estimates in Table 5 are consistent with the Table 3 estimates. The ACS imputations add more SNAP benefits to resources than the CPS ASEC does and per Table 5 the impact of SNAP on SPM poverty rates is slightly larger. The EITC and WIC follow a similar pattern --- ACS imputations add more to resources and there is a greater impact on SPM poverty rates. On the other hand, the aggregate amount of LIHEAP added to resources is smaller in the ACS than in the CPS but the impact on the SPM poverty rate is greater in the ACS than in the CPS. While the aggregate amounts added for housing subsidies and school lunch are smaller in the ACS than in the CPS, there are no statistical differences in the impacts on the SPM poverty rates.

Looking at the four resource elements that are subtracted from resources, Table 5 shows that three of the four (FICA, work expenses and MOOP) have a greater impact on SPM poverty in the ACS than in the CPS. For work expenses and MOOP this is consistent with the greater aggregates from the ACS shown in Table 3. For FICA, the aggregate amount from Table 3 is smaller in the ACS than in the CPS but the incremental impact on the poverty rates is greater (1.7 percentage points vs. 1.5 percentage points). For the fourth element, federal taxes before credits, the ACS aggregate was less than the CPS aggregate amount and the impact on the SPM poverty rate was also smaller.

Future Research

There is much work to be done improving each of the models used in this analysis. This analysis should be taken as only a very preliminary look at what is possible. As has been found in other research, (*see* O'Donnell (2009) and Levitan and Renwick (2010)) models can fairly accurately mimic the mean of the distribution but they do not do a very good job of modeling the tails. Previous research has found that predicted means statistical matches are better equipped to model the entire distribution. The models presented in this paper can serve as the initial step in testing a predicted means matching approach.

While a predicted means match may do a better job of capturing the distribution of benefits and expenditures, the size of the ACS sample creates some special challenges. Some records would be used as donors multiple times in this process. If the cells for the statistical match are geographically stratified, some cells may not include a sufficient number of donors to accurately replicate the distribution.

Another approach that should be considered would be including some of the unknown income elements in the thresholds rather than subtracting them from income. For example, putting medical out of pocket expenses in the thresholds would eliminate the need to impute MOOP. Both the Urban Institute and the Institute for Research on Poverty have used this approach in developing their SPM-like state level measures. Likewise, putting childcare expenditures in the thresholds would eliminate the need to impute childcare.

Another area of research involves the unit of analysis and how relationship pointers can be imputed for ACS survey households. The paper presented by Heggeness

et.al. for this panel provides more details about this aspect of the project. Use of these pointers could improve the tax calculator by more closely approximating tax-filing units.

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Table 1. Estimated Number of Supplemental Poverty Measurement Resource Units by Definition of Unit and Data File

| | Official definition of resource units NOT incl. GQ using Internal File | | Number of Resource units based on SPM definition - Excluding GQ | | | |
|--|--|----------------|---|----------------|-------------|----------------|
| | Estimate | Standard error | Internal File | | PUMS File | |
| | | | Estimate | Standard error | Estimate | Standard error |
| Number of individuals in poverty universe | 300,428,418 | 13,102 | 301,362,366 | - | 301,362,366 | 161 |
| Number of foster children | 74,877 | 3,452 | 263,089 | 7,834 | 265,971 | 9,373 |
| Under age 15 | - | | 188,212 | 6,075 | 189,090 | 7,302 |
| Age 15 to 21 | 74,877 | 3,452 | 74,877 | 3,452 | 76,881 | 3,977 |
| Number of other unrelated individuals under 15 | - | | 745,736 | 12,267 | 748,364 | 15,418 |
| Number of cohabiting partners | 6,792,607 | 25,243 | 6,792,607 | 25,243 | 6,788,872 | 28,400 |
| Number of resource units | 131,000,872 | 135,416 | 124,133,388 | 136,148 | 124,108,813 | 149,772 |
| Families (old) | 76,089,045 | 85,907 | 76,089,045 | 85,907 | 76,060,319 | 88,921 |
| New multi-person resource units | | | 3,902,605 | 20,025 | 3,911,042 | 21,489 |
| With an unmarried partner only | | | 3,631,142 | 19,312 | 3,637,838 | 20,475 |
| With unrelated individual under 15 years or foster under 22 only | | | 99,980 | 3,336 | 100,205 | 4,003 |
| With BOTH unmarried partner and unrelated individual under 15 years of age | | | 171,483 | 4,115 | 172,999 | 5,152 |
| Single person resource units | 54,911,827 | 104,679 | 44,141,738 | 103,707 | 44,137,452 | 118,588 |
| Householders in nonfamily households | 38,478,374 | 58,933 | 34,575,769 | 56,290 | 34,596,088 | 60,336 |
| Unrelated individuals - 15 years and older | 16,433,453 | 86,513 | 9,565,969 | 87,101 | 9,541,364 | 102,091 |
| Average size of resources units | 2.29 | 0.002 | 2.43 | 0.003 | 2.43 | 0.003 |
| Number of households with cohabiting partners | 6,768,083 | 23,709 | 6,768,083 | 23,709 | 6,762,604 | 27,295 |
| Number of households with foster children | 158,111 | 3,824 | 158,111 | 3,824 | 160,987 | 4,695 |
| Number of households with other unrelated children under 15 | 517,489 | 7,805 | 517,489 | 7,805 | 516,461 | 9,626 |

Source: U. S. Census Bureau, 2010 American Community Survey - Internal and Public Use Microdata Sample

For information on confidentiality protection, sampling error, nonsampling error and definitions, see http://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/ACS_Accuracy_of_Data_2010.pdf

Table 2: Model Covariates by Benefit Type/Expenditure

| | Housing Assistance (logit) | Child Care (logit and genmod) | LIHEAP (logit and genmod) | Subsidized Lunch (logit) | Free or Reduced Lunch (logit) | SNAP (genmod) | WIC (logit) |
|---------------------------|---|--|-------------------------------|---|---|---|---|
| Household/ Family Type | Single parent with child (dummy) | Married (dummy) | Single person (dummy) | Household head female (dummy) | Household head female (dummy) | Single person | Household head female (dummy) |
| | Husband and wife with child (dummy) | Number of additional adults in family | Children in household (dummy) | Household head not married (dummy) | Household head not married (dummy) | Presence of children in the household | Household head not married (dummy) |
| Household/ Family Size | Household size dummies (2,3,4,5,6 persons) | Number of children with age between 0 and 2; 3 to 5; 6 to 11; 12 to 15. | Household size | Number of children with age between 5 and 10, 11 and 13 and 14 to 18. | Number of children with age between 5 and 10, 11 and 13 and 14 to 18. | Number of people in the household | Household size |
| | | | | | | | Number of children with age between 0 and 5 |
| Age | Household member above 65 (dummy) | | | Household head age | Household head age | Presence of persons age 65 or older - dummy | Household head age |
| Educational Attainment | High School or less education (dummy) | High school education (dummy) | | Household head education high school through Associate Degree (dummy) | Household head education high school through Associate Degree (dummy) | | Household head education High school through Associate Degree (dummy) |
| | | Some college or Associate degree (dummy) | | Household head education Bachelor's Degree or more (dummy) | Household head education Bachelor's Degree or more (dummy) | | Household head education Bachelor's Degree or more (dummy) |
| | | Bachelor's degree (dummy) Masters degree or more (dummy) | | | | | |
| Income | Log of household income | Log of family income | Log of household income | Log of household income | Log of household income | Log of household income | Log of household income |
| | | Share of total earnings earned by member with lower earnings | | | | | |
| Program Participation | Welfare receipt (dummy) | Welfare receipt (dummy) | Welfare receipt (dummy) | SNAP receipt (dummy) | SNAP receipt (dummy) | Receipt of public assistance - dummy | SNAP receipt (dummy) |
| | SNAP receipt (dummy) | | Medicare | Welfare receipt (dummy) | Welfare receipt (dummy) | Whether anyone in household receives Medicaid - Y/N | Welfare receipt (dummy) |
| | | | SNAP receipt (dummy) | Medicaid (dummy) | Medicaid (dummy) | | Medicaid (dummy) |
| Geography | State dummies | Regional dummies | State dummies | State dummies | State dummies | State dummies | State dummies |
| Employment | | Hours of work | Full time worker (dummy) | Household head does not work (dummy) | Household head does not work (dummy) | Household head works full time/full year - dummy | Household head does not work (dummy) |
| | | Hours of work squared | No work (dummy) | Household head works part time (dummy) | Household head works part time (dummy) | Household head did not work last year - dummy | Household head works part time (dummy) |
| Other | US Citizen (dummy) | | Renter (dummy) | | | | |
| Universe | All interviewed households reporting "rented" as tenure | Households with children under age 12 in which for husband-wife families head and spouse are classified as "earners"; for male-headed or female-headed households where head is earner; for households with unmarried partner, where head and partner are earners. | All households | All households with school age children | All households with school age children | All households with school age children with household income less than \$50,000 who are assigned "yes" to school lunch participation question. | All households with children ages 0-5 or a childbearing female with household income less than \$50,000 |
| Source | Leviton and Renwick (2010) | Short (2009). | | Hokayem and Garner (2012) | Hokayem and Garner (2012) | Leviton and Renwick (2010) | Hokayem and Garner (2012) |

Table 2: Model Covariates by Benefit Type/Expenditure

| | MOOP Families – Premium Amounts/YN Other Spending/Other | MOOP Elderly Individuals (logit and genmod) | MOOP Insured Unrelated Individuals (logit | MOOP Individuals with No Premiums (logit and |
|------------------------------------|---|--|--|--|
| Household/Family Type | Number of adults in family | | | |
| Household/Family Size | Family size | Family size | | |
| | One person family - dummy | | | |
| | Two person family - dummy | | | |
| Age | Household head age | Household head age | Age | Age |
| | Household head age squared | Household head age squared | Age squared | Age squared |
| Income | Log of family income | Log of family income | Log of family income | Log of family income |
| Health Insurance Status | Family covered by private insurance (dummy) | Medicaid (dummy) | Covered by public insurance (dummy) | Medicaid (dummy) |
| | Family covered by employer insurance (dummy) | Medicare (dummy) | Covered by private insurance (dummy) | Medicare (dummy) |
| | Family covered by public insurance (dummy for logistic and genmod regressions on other expenditures only) | Medicaid and Medicare (dummy) | Covered by employer insurance | Medicaid and Medicare (dummy) |
| | Family not covered by any health insurance (dummy) | | | |
| Geography | State (only for premium and other MOOP genmod estimates) | State (only for premium and other MOOP genmod estimates) | State (only for premium and other MOOP genmod estimates) | State (only for other MOOP genmod estimates) |
| Universe | Universe: Primary families consisting of husband/wife and children under age 25. | Universe: Household members over age 65 | All other individuals | Individuals with no health insurance or only public health insurance |

Table 3. Estimated Reciprocity Rate, Mean Amount and Aggregate Amount for Resource Elements by Survey for All People

| Reciprocity Rate | | | | | | | | | | |
|-----------------------------|------------------|-----------------|------------------------------|-----------------|------------------|-----------------|------------------------------|-----------------|------------|-----------------|
| variable | CPS ASEC | | | | ACS | | | | Difference | |
| | All ¹ | SE ² | Officially Poor ³ | SE ² | All ⁴ | SE ² | Officially Poor ⁵ | SE ² | All | Officially Poor |
| SNAP | 10.30 | 0.10 | 37.20 | 0.50 | 12.32 | 0.04 | 40.21 | 0.16 | 2.02 * | 3.01 * |
| School Lunch | 18.40 | 0.20 | 25.90 | 0.50 | 17.73 | 0.04 | 22.54 | 0.13 | -0.67 * | -3.36 * |
| WIC | 2.90 | 0.10 | 9.70 | 0.30 | 2.53 | 0.02 | 6.99 | 0.08 | -0.37 * | -2.71 * |
| Housing Assistance | 3.50 | 0.10 | 14.70 | 0.50 | 3.25 | 0.02 | 12.74 | 0.10 | -0.25 * | -1.96 * |
| LIHEAP | 3.50 | 0.10 | 11.50 | 0.40 | 3.35 | 0.02 | 9.84 | 0.09 | -0.15 | -1.66 * |
| EITC | 15.50 | 0.20 | 34.70 | 0.60 | 17.02 | 0.04 | 36.41 | 0.15 | 1.52 * | 1.71 * |
| Federal Tax Before Credits | 69.50 | 0.20 | 11.00 | 0.30 | 68.70 | 0.05 | 9.91 | 0.10 | -0.80 * | -1.09 * |
| FICA | 76.00 | 0.20 | 45.70 | 0.60 | 77.38 | 0.04 | 52.80 | 0.15 | 1.38 * | 7.10 * |
| Work Expenses | 76.10 | 0.20 | 46.00 | 0.60 | 77.38 | 0.04 | 52.77 | 0.15 | 1.28 * | 6.77 * |
| Child Care | 6.30 | 0.10 | 4.40 | 0.20 | 4.87 | 0.02 | 2.25 | 0.04 | -1.43 * | -2.15 * |
| MOOP | 94.00 | 0.10 | 83.00 | 0.50 | 93.17 | 0.03 | 78.09 | 0.12 | -0.83 * | -4.91 * |
| Mean Amount | | | | | | | | | | |
| variable | CPS ASEC | | | | ACS | | | | Difference | |
| | All ¹ | SE ² | Officially Poor ³ | SE ² | All ⁴ | SE ² | Officially Poor ⁵ | SE ² | All | Officially Poor |
| SNAP | 2,922 | 33.10 | 3,384 | 49.40 | 2,643 | 5.53 | 2,800 | 8.33 | -280 * | -584 * |
| School Lunch | 410 | 4.00 | 792 | 10.50 | 363 | 1.14 | 829 | 3.48 | -47 * | 37 * |
| WIC | 505 | 1.40 | 505 | 2.20 | 681 | 1.88 | 699 | 3.37 | 176 * | 194 * |
| Housing Assistance | 4,560 | 91.70 | 5,473 | 117.20 | 4,483 | 18.32 | 5,391 | 25.13 | -77 | -82 |
| LIHEAP | 400 | 6.70 | 416 | 10.00 | 392 | 1.12 | 395 | 1.64 | -8 | -21 * |
| EITC | 2,075 | 18.60 | 2,368 | 37.00 | 1,952 | 4.98 | 2,225 | 10.24 | -123 * | -143 * |
| Federal Tax Before Credits | 10,572 | 108.00 | 2,055 | 146.40 | 10,350 | 25.21 | 1,501 | 42.28 | -222 * | -554 * |
| FICA | 4,978 | 20.90 | 1,057 | 19.90 | 4,770 | 5.55 | 873 | 4.27 | -208 * | -184 * |
| Work Expenses | 1,832 | 4.40 | 1,123 | 10.00 | 2,142 | 2.34 | 1,175 | 4.28 | 310 * | 52 * |
| Child Care | 5,032 | 81.20 | 2,085 | 121.00 | 5,939 | 15.73 | 2,718 | 43.25 | 907 * | 633 * |
| MOOP | 3,957 | 34.50 | 1,865 | 95.40 | 4,447 | 4.08 | 2,052 | 5.83 | 490 * | 187 * |
| Aggregate Amount (billions) | | | | | | | | | | |
| variable | CPS ASEC | | | | ACS | | | | Difference | |
| | All ¹ | SE ² | Officially Poor ³ | SE ² | All ⁴ | SE ² | Officially Poor ⁵ | SE ² | All | Officially Poor |
| SNAP | 37.60 | 0.63 | 24.20 | 0.52 | 40.40 | 0.13 | 22.80 | 0.11 | 2.80 * | -1.40 * |
| School Lunch | 9.40 | 0.12 | 3.90 | 0.08 | 8.00 | 0.03 | 3.80 | 0.02 | -1.40 * | -0.10 |
| WIC | 1.80 | 0.04 | 0.90 | 0.04 | 2.10 | 0.02 | 1.00 | 0.01 | 0.30 * | 0.10 * |
| Housing Assistance | 20.20 | 0.72 | 15.40 | 0.63 | 18.10 | 0.14 | 13.90 | 0.14 | -2.10 * | -1.50 * |
| LIHEAP | 1.80 | 0.05 | 0.90 | 0.03 | 1.60 | 0.01 | 0.80 | 0.01 | -0.20 * | -0.10 * |
| EITC | 40.20 | 0.51 | 15.80 | 0.35 | 41.20 | 0.14 | 16.40 | 0.10 | 1.00 * | 0.60 * |
| Federal Tax Before Credits | 918.80 | 9.70 | 4.30 | 0.34 | 882.50 | 2.33 | 3.00 | 0.09 | -36.30 * | -1.30 * |
| FICA | 473.20 | 2.16 | 9.30 | 0.22 | 458.10 | 0.60 | 9.30 | 0.06 | -15.10 * | 0.00 |
| Work Expenses | 174.40 | 0.57 | 9.90 | 0.18 | 205.70 | 0.25 | 12.60 | 0.07 | 31.30 * | 2.70 * |
| Child Care | 39.70 | 0.85 | 1.70 | 0.13 | 35.90 | 0.17 | 1.20 | 0.03 | -3.80 * | -0.50 * |
| MOOP | 465.10 | 4.00 | 29.70 | 1.58 | 514.20 | 0.55 | 32.50 | 0.13 | 49.10 * | 2.80 * |

¹ There were 125.1 million resource units in the 2011 CPS ASEC.

² Standard errors obtained using replicate weights (Fay's Method).

³ There were 19.2 million resource units classified as officially poor in the 2011 CPS ASEC.

⁴ There were 124.1 million resource units in the 2010 ACS PUMS

⁵ There were 20.3 million resource units classified as officially poor in the 2010 ACS PUMS

Source: U.S. Census Bureau, 2010 American Community Survey Public Use Microdata Sample File and the Current Population Survey, 2011 Annual Social and Economic Supplement. For information on confidentiality protection, sampling error, nonsampling error and definitions, see <www.census.gov/hhes/www/p60_239sa.pdf> and <http://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/ACS_Accuracy_of_Data_2010.pdf>

Table 4. Percentage of People with Resources Below SPM Poverty Threshold by Survey: 2010

| | CPS ASEC | SE ¹ | ACS | SE ¹ | Difference | |
|-----------------------------------|----------|-----------------|------|-----------------|------------|---|
| All people | 16 | 0.2 | 16.7 | 0.1 | 0.6 | * |
| Age | | | | | | |
| Under 18 | 18.2 | 0.3 | 18.8 | 0.1 | 0.6 | * |
| 18 to 64 | 15.2 | 0.2 | 16.1 | 0.1 | 0.9 | * |
| 65 years and older | 15.9 | 0.3 | 15.3 | 0.1 | -0.6 | * |
| Type of Unit | | | | | | |
| In married couple unit | 9.9 | 0.2 | 9.9 | 0.1 | 0.0 | |
| In female householder unit | 29 | 0.5 | 31.2 | 0.1 | 2.2 | * |
| In male householder unit | 22.7 | 0.5 | 25.3 | 0.1 | 2.6 | * |
| In new SPM unit | 21 | 0.7 | 20.8 | 0.2 | -0.2 | |
| Race and Hispanic Origin | | | | | | |
| White | 14.3 | 0.2 | 13.7 | 0.1 | -0.6 | * |
| White, not Hispanic | 11.1 | 0.2 | 11.5 | 0.1 | 0.4 | * |
| Black | 25.4 | 0.6 | 27.2 | 0.2 | 1.8 | * |
| Asian | 16.7 | 0.8 | 18.4 | 0.2 | 1.7 | * |
| Hispanic (any race) | 28.2 | 0.6 | 27.8 | 0.2 | -0.4 | |
| Nativity | | | | | | |
| Native born | 14.7 | 0.2 | 15.4 | 0.1 | 0.7 | * |
| Foreign born | 25.5 | 0.5 | 25.3 | 0.2 | -0.2 | |
| Naturalized Citizen | 16.8 | 0.5 | 17.0 | 0.2 | 0.2 | |
| Not a citizen | 32.4 | 0.7 | 31.9 | 0.2 | -0.5 | |
| Tenure | | | | | | |
| Owner | 9.7 | 0.2 | 9.7 | 0.0 | 0.0 | |
| Owner/mortgage | 8.3 | 0.2 | 8.5 | 0.1 | 0.2 | |
| Owner/no mortgage/rent free | 13.3 | 0.3 | 14.3 | 0.1 | 1.0 | * |
| Renter | 29.4 | 0.4 | 31.0 | 0.1 | 1.6 | * |
| Region | | | | | | |
| Northeast | 14.5 | 0.4 | 14.3 | 0.1 | -0.2 | |
| Midwest | 13.1 | 0.3 | 13.7 | 0.1 | 0.6 | * |
| South | 16.3 | 0.3 | 17.6 | 0.1 | 1.3 | * |
| West | 19.4 | 0.4 | 19.7 | 0.1 | 0.3 | |
| Health Insurance Coverage | | | | | | |
| With private insurance | 7.5 | 0.1 | 8.4 | 0.0 | 0.9 | * |
| With public, no private insurance | 31.7 | 0.5 | 32.4 | 0.1 | 0.7 | |
| Not insured | 30.7 | 0.5 | 30.4 | 0.1 | -0.3 | |

¹ Standard errors obtained using replicate weights (Fay's Method).

* Statistically different from zero at the 90 percent confidence interval

Source: U.S. Census Bureau, 2010 American Community Survey Public Use Microdata Sample File and the Current Population Survey, 2011 Annual Social and Economic Supplement. For information on confidentiality protection, sampling error, nonsampling error and definitions, see <www.census.gov/hhes/www/p60_239sa.pdf> and <http://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/ACS_Accuracy_of_Data_2010.pdf>

Table 5. Effect of Excluding Individual Elements on SPM Rates: 2010

| | ALL PERSONS | | | | | CHILDREN | | | | |
|-----------------------------------|-------------------|------|---------|------|------------|----------|------|---------|------|------------|
| | CPS | | ACS | | Difference | CPS | | ACS | | Difference |
| | Percent | s.e. | Percent | s.e. | | Percent | s.e. | Percent | s.e. | |
| Research SPM | 16.0 | 0.18 | 16.7 | 0.06 | 0.6 * | 18.2 | 0.31 | 18.8 | 0.10 | 0.6 * |
| EITC | 18.0 | 0.18 | 18.9 | 0.06 | 0.9 * | 22.4 | 0.32 | 23.5 | 0.12 | 1.1 * |
| SNAP | 17.7 | 0.19 | 18.2 | 0.06 | 0.5 * | 21.2 | 0.32 | 21.5 | 0.11 | 0.3 |
| Housing Subsidy | 16.9 | 0.18 | 17.4 | 0.06 | 0.5 * | 19.5 | 0.32 | 19.9 | 0.10 | 0.4 |
| School Lunch | 16.4 | 0.18 | 17.0 | 0.06 | 0.6 * | 19.0 | 0.31 | 19.6 | 0.10 | 0.6 * |
| WIC | 16.1 | 0.18 | 16.7 | 0.06 | 0.6 * | 18.3 | 0.31 | 19.0 | 0.10 | 0.7 * |
| LIHEAP | 16.1 | 0.18 | 16.7 | 0.06 | 0.6 * | 18.3 | 0.31 | 18.9 | 0.10 | 0.6 * |
| Federal Income Tax Before Credits | 15.6 | 0.18 | 16.3 | 0.06 | 0.7 * | 17.9 | 0.31 | 18.6 | 0.10 | 0.7 * |
| FICA | 14.6 | 0.17 | 15.0 | 0.05 | 0.4 * | 16.3 | 0.30 | 16.7 | 0.09 | 0.3 |
| Work Expenses | 14.5 | 0.18 | 14.8 | 0.05 | 0.3 * | 16.2 | 0.30 | 16.2 | 0.09 | 0.0 |
| MOOP | 12.7 | 0.17 | 12.9 | 0.05 | 0.2 | 15.4 | 0.30 | 15.6 | 0.10 | 0.2 |
| EITC | 1.9 | 0.07 | 2.2 | 0.02 | 0.3 * | 4.2 | 0.15 | 4.66 | 0.06 | 0.5 * |
| SNAP | 1.5 | 0.06 | 1.6 | 0.02 | 0.1 * | 3.0 | 0.14 | 2.69 | 0.04 | -0.3 * |
| Housing Subsidy | 0.8 | 0.05 | 0.8 | 0.01 | -0.1 | 1.3 | 0.09 | 1.08 | 0.02 | -0.2 * |
| School Lunch | 0.3 | 0.03 | 0.3 | 0.01 | 0.0 | 0.8 | 0.07 | 0.80 | 0.02 | 0.0 |
| WIC | 0.0 | 0.02 | 0.1 | 0.00 | 0.1 * | 0.1 | 0.02 | 0.20 | 0.01 | 0.1 * |
| LIHEAP | 0.0 | 0.02 | 0.1 | 0.00 | 0.1 * | 0.1 | 0.03 | 0.07 | 0.01 | 0.0 |
| Federal Income Tax Before Credits | -0.5 | 0.04 | -0.4 | 0.01 | 0.1 * | -0.3 | 0.04 | -0.24 | 0.01 | 0.1 * |
| FICA | -1.5 | 0.06 | -1.7 | 0.02 | -0.2 * | -1.9 | 0.10 | -2.19 | 0.03 | -0.3 * |
| Work Expenses | -1.7 | 0.06 | -1.8 | 0.02 | -0.2 * | -2.0 | 0.10 | -2.62 | 0.04 | -0.6 * |
| MOOP | -3.3 | 0.08 | -3.7 | 0.02 | -0.4 * | -2.8 | 0.10 | -3.26 | 0.04 | -0.5 * |
| | | | | | | | | | | |
| | NONELDERLY ADULTS | | | | | ELDERLY | | | | |
| | CPS | | ACS | | Difference | CPS | | ACS | | Difference |
| | Percent | s.e. | Percent | s.e. | | Percent | s.e. | Percent | s.e. | |
| Research SPM | 15.2 | 0.19 | 16.1 | 0.06 | 0.9 * | 15.9 | 0.34 | 15.3 | 0.07 | -0.6 * |
| EITC | 16.7 | 0.19 | 17.8 | 0.06 | 1.1 * | 16.1 | 0.34 | 15.4 | 0.07 | -0.7 * |
| SNAP | 16.5 | 0.20 | 17.4 | 0.06 | 0.9 * | 16.8 | 0.35 | 16.2 | 0.07 | -0.6 * |
| Housing Subsidy | 15.9 | 0.19 | 16.6 | 0.06 | 0.7 * | 17.1 | 0.36 | 16.3 | 0.07 | -0.8 * |
| School Lunch | 15.4 | 0.19 | 16.3 | 0.06 | 0.9 * | 16.0 | 0.34 | 15.3 | 0.07 | -0.7 * |
| WIC | 15.3 | 0.19 | 16.1 | 0.06 | 0.8 * | 15.9 | 0.34 | 15.3 | 0.07 | -0.6 * |
| LIHEAP | 15.3 | 0.19 | 16.1 | 0.06 | 0.8 * | 16.0 | 0.33 | 15.4 | 0.07 | -0.6 * |
| Federal Income Tax Before Credits | 14.7 | 0.18 | 15.6 | 0.06 | 0.9 * | 15.7 | 0.34 | 15.2 | 0.07 | -0.5 |
| FICA | 13.7 | 0.18 | 14.4 | 0.05 | 0.7 * | 15.6 | 0.34 | 14.9 | 0.07 | -0.7 * |
| Work Expenses | 13.7 | 0.18 | 14.3 | 0.05 | 0.6 * | 15.6 | 0.34 | 14.9 | 0.07 | -0.7 * |
| MOOP | 12.4 | 0.18 | 12.9 | 0.05 | 0.5 * | 8.6 | 0.24 | 8.2 | 0.06 | -0.4 * |
| EITC | 1.5 | 0.05 | 1.7 | 0.02 | 0.2 * | 0.2 | 0.03 | 0.1 | 0.01 | 0.0 |
| SNAP | 1.2 | 0.05 | 1.3 | 0.01 | 0.0 | 0.8 | 0.07 | 0.9 | 0.02 | 0.1 |
| Housing Subsidy | 0.7 | 0.03 | 0.6 | 0.01 | -0.1 * | 1.2 | 0.10 | 1.0 | 0.02 | -0.1 |
| School Lunch | 0.2 | 0.02 | 0.2 | 0.01 | 0.0 | 0.0 | 0.01 | 0.0 | 0.00 | 0.0 |
| WIC | 0.0 | 0.01 | 0.1 | 0.00 | 0.0 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 * |
| LIHEAP | 0.1 | 0.01 | 0.0 | 0.00 | 0.0 * | 0.1 | 0.02 | 0.1 | 0.01 | 0.0 |
| Federal Income Tax Before Credits | -0.6 | 0.04 | -0.5 | 0.01 | 0.1 * | -0.3 | 0.04 | -0.1 | 0.01 | 0.1 * |
| FICA | -1.5 | 0.07 | -1.7 | 0.02 | -0.2 * | -0.3 | 0.05 | -0.4 | 0.02 | -0.1 |
| Work Expenses | -1.5 | 0.06 | -1.8 | 0.02 | -0.3 * | -0.4 | 0.05 | -0.4 | 0.01 | -0.1 |
| MOOP | -2.8 | 0.07 | -3.2 | 0.02 | -0.4 * | -7.3 | 0.26 | -7.1 | 0.05 | 0.2 |

¹ Standard errors obtained using replicate weights (Fay's Method).

* Statistically different from zero at the 90 percent confidence interval

** Details may not sum to totals because of rounding.

Source: U.S. Census Bureau, 2010 American Community Survey Public Use Microdata Sample File and the Current Population Survey, 2011 Annual Social and Economic Supplement. For information on confidentiality protection, sampling error, nonsampling error and definitions, see <www.census.gov/hhes/www/p60_239sa.pdf> and <http://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/ACS_Accuracy_of_Data_2010.pdf>

Appendix: Regression Results

Housing Assistance (logit)

| Variable | Estimate | Standard Error | Significance |
|---------------------------------------|----------|----------------|--------------|
| Intercept | -2.3767 | 0.16 | *** |
| Single parent with child (dummy) | 0.9891 | 0.0649 | *** |
| Husband and wife with child (dummy) | 0.1936 | 0.0905 | ** |
| High School or less education (dummy) | 0.5962 | 0.0366 | *** |
| Household member above 65 (dummy) | 1.1698 | 0.0458 | *** |
| US Citizen (dummy) | 0.5924 | 0.0667 | *** |
| Household size of two (dummy) | -0.9139 | 0.0512 | *** |
| Household size of three (dummy) | -1.2715 | 0.0757 | *** |
| Household size of four (dummy) | -1.3203 | 0.0862 | *** |
| Household size of five (dummy) | -1.4077 | 0.1036 | *** |
| Household size of six (dummy) | -1.4297 | 0.1147 | *** |
| Welfare receipt (dummy) | 0.5164 | 0.0694 | *** |
| SNAP receipt (dummy) | 1.8242 | 0.0393 | *** |
| Log of household income | -0.1142 | 0.00756 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

Child Care (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|--|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | -5.149 | 0.2878 | *** | -0.4994 | 0.0193 | *** |
| Number of children with age between 0 and 2 | 0.214 | 0.0333 | *** | 0.3097 | 0.0019 | *** |
| Number of children with age between 3 and 5 | 0.5911 | 0.0296 | *** | 0.4615 | 0.0017 | *** |
| Number of children with age between 6 and 11 | -0.0194 | 0.024 | | 0.0331 | 0.0015 | *** |
| Number of children with age between 12 and 15 | -0.4352 | 0.0349 | *** | -0.0045 | 0.0026 | * |
| Reside in Midwest (dummy) | 0.2261 | 0.0515 | *** | -0.276 | 0.0031 | *** |
| Reside in South (dummy) | 0.0784 | 0.0479 | | -0.257 | 0.0029 | *** |
| Reside in West (dummy) | 0.0775 | 0.0527 | | -0.1742 | 0.0031 | *** |
| Log of family income | 0.372 | 0.0276 | *** | 0.3522 | 0.0018 | *** |
| Hours of work | 0.0323 | 0.00464 | *** | 0.0622 | 0.0003 | *** |
| Hours of work squared | -0.0329 | 0.00563 | *** | -0.0698 | 0.0004 | *** |
| Number of additional adults in family | -0.5318 | 0.0301 | *** | -0.0804 | 0.002 | *** |
| High school education (dummy) | -0.3594 | 0.08 | *** | -0.089 | 0.0067 | *** |
| Some college or Associate degree (dummy) | 0.1404 | 0.0425 | *** | -0.0566 | 0.0031 | *** |
| Bachelor's degree (dummy) | 0.2141 | 0.0491 | *** | 0.107 | 0.0033 | *** |
| Masters degree or more (dummy) | 0.4963 | 0.0599 | *** | 0.163 | 0.0036 | *** |
| Married (dummy) | -0.9168 | 0.0617 | *** | -0.3394 | 0.0102 | *** |
| Welfare receipt (dummy) | -0.3037 | 0.1104 | *** | -1.6176 | 0.0088 | *** |
| Share of total earnings earned by member with lower earnings | 1.8511 | 0.1421 | *** | 0.3283 | 0.004 | *** |

*** p<0.01, ** p<0.05, * p<0.1.

LIHEAP (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|-------------------------------|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | -4.3046 | 0.1804 | *** | 6.2956 | 0.1423 | *** |
| Household size | -0.0974 | 0.0185 | *** | 0.061 | 0.0116 | *** |
| Log of household income | -0.0643 | 0.00878 | *** | -0.026 | 0.0075 | *** |
| Welfare receipt (dummy) | 0.3084 | 0.0674 | *** | 0.0853 | 0.0419 | ** |
| Medicare | 0.4927 | 0.0439 | *** | -0.0814 | 0.0346 | ** |
| Children in household (dummy) | 0.5264 | 0.058 | *** | -0.0848 | 0.0418 | ** |
| Single person (dummy) | 0.336 | 0.0519 | *** | -0.1769 | 0.0402 | *** |
| Renter (dummy) | 0.2639 | 0.0388 | *** | -0.0872 | 0.0283 | *** |
| Full time worker (dummy) | -0.9152 | 0.0589 | *** | -0.0651 | 0.0475 | |
| No work (dummy) | 0.2194 | 0.0455 | *** | 0.0188 | 0.0332 | |
| SNAP receipt (dummy) | 2.6366 | 0.041 | *** | 0.0059 | 0.0307 | |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

Subsidized Lunch (logit)

| Variable | Estimate | Standard Error | Significance |
|---|----------|----------------|--------------|
| Intercept | 0.329 | 0.1636 | ** |
| Household head age | 0.00179 | 0.00133 | |
| Household head female (dummy) | 0.0258 | 0.0273 | |
| Household head education high school through Associate Degree (dummy) | -0.3325 | 0.0444 | *** |
| Household head education Bachelor's Degree or more (dummy) | -0.6795 | 0.0487 | *** |
| Household head not married (dummy) | 0.3018 | 0.0321 | *** |
| Log of household income | -0.0324 | 0.0112 | *** |
| Number of children with age between 5 and 10 | 0.2896 | 0.02 | *** |
| Number of children with age between 11 and 13 | 0.4319 | 0.0244 | *** |
| Number of children with age between 14 and 18 | 0.1738 | 0.0206 | *** |
| SNAP receipt (dummy) | 0.6147 | 0.0495 | *** |
| Welfare receipt (dummy) | 0.3595 | 0.0968 | *** |
| Medicaid (dummy) | 0.5213 | 0.0339 | *** |
| Household head does not work (dummy) | -0.2272 | 0.0367 | *** |
| Household head works part time (dummy) | -0.058 | 0.033 | * |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

Free or Reduced Lunch (logit)

| Variable | Estimate | Standard Error | Significance |
|---|----------|----------------|--------------|
| Intercept | 10.2014 | 0.3792 | *** |
| Household head age | -0.00314 | 0.00191 | |
| Household head female (dummy) | 0.3029 | 0.0419 | *** |
| Household head education high school through Associate Degree (dummy) | -0.7416 | 0.0542 | *** |
| Household head education Bachelor's Degree or more (dummy) | -1.5681 | 0.0724 | *** |
| Household head not married (dummy) | 0.4025 | 0.0444 | *** |
| Log of household income | -1.0333 | 0.0313 | *** |
| Number of children with age between 5 and 10 | 0.2222 | 0.0279 | *** |
| Number of children with age between 11 and 13 | 0.1335 | 0.0344 | *** |
| Number of children with age between 14 and 18 | 0.1018 | 0.0294 | *** |
| SNAP receipt (dummy) | 1.7159 | 0.0593 | *** |
| Welfare receipt (dummy) | 0.7564 | 0.1282 | *** |
| Medicaid (dummy) | 1.054 | 0.0421 | *** |
| Household head does not work (dummy) | 0.1842 | 0.053 | *** |
| Household head works part time (dummy) | 0.3054 | 0.048 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

SNAP (genmod)

| Variable | Estimate | Standard Error | Significance |
|---|----------|----------------|--------------|
| Intercept | 7.5038 | 0.0705 | *** |
| Number of people in the household | 0.1339 | 0.0038 | *** |
| Log of household total income | -0.0413 | 0.0029 | *** |
| Receipt of public assistance (dummy) | 0.1565 | 0.0196 | *** |
| Presence of persons age 65 or older (dummy) | -0.1292 | 0.0213 | *** |
| Presence of children in the household | 0.2294 | 0.0267 | *** |
| Single person | -0.3702 | 0.0396 | *** |
| Whether anyone in household receives Medicaid (dummy) | 0.1219 | 0.0233 | *** |
| Household head works full time/full year (dummy) | -0.1103 | 0.0219 | *** |
| Household head did not work last year (dummy) | 0.1112 | 0.0176 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

WIC (logit)

| Variable | Estimate | Standard Error | Significance |
|---|----------|----------------|--------------|
| Intercept | -2.6606 | 0.2326 | *** |
| Household head age | -0.0175 | 0.00222 | *** |
| Household head female (dummy) | -0.1088 | 0.0505 | ** |
| Household head education High school through Associate Degree (dummy) | -0.1481 | 0.0527 | *** |
| Household head education Bachelor's Degree or more (dummy) | -0.8646 | 0.0914 | *** |
| Household head not married (dummy) | -0.0307 | 0.051 | |
| Log of household income | -0.0243 | 0.0145 | * |
| Household size | -0.0748 | 0.0174 | *** |
| Number of children with age between 0 and 5 | 1.3529 | 0.0305 | *** |
| SNAP receipt (dummy) | 0.7394 | 0.0507 | *** |
| Welfare receipt (dummy) | 0.1724 | 0.0753 | ** |
| Medicaid (dummy) | 1.407 | 0.0566 | *** |
| Household head does not work (dummy) | -0.1041 | 0.0605 | * |
| Household head works part time (dummy) | 0.1622 | 0.0549 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included.

MOOP Insured Families—Premium Amounts (genmod)

| Variable | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|--|-------------------|-------------------------|-----------------------|
| Intercept | 6.6965 | 0.0021 | *** |
| Number of adults in family | 0.1287 | 0.0003 | *** |
| Number of persons in family | 0.0373 | 0.0001 | *** |
| Household head age squared | -0.0156 | 0.0001 | *** |
| Household head age squared | 0.0003 | 0 | *** |
| Log of family income | 0.114 | 0.0001 | *** |
| Family covered by private insurance (dummy) | 0.6888 | 0.0003 | *** |
| Family covered by employer insurance (dummy) | 0.0685 | 0.0012 | *** |
| One person family (dummy) | -0.2183 | 0.0005 | *** |
| Two person family (dummy) | -0.1695 | 0.0003 | *** |

*** p<0.01, ** p<0.05, * p<0.1.
State fixed effects are included only for genmod estimates.

MOOP Families—Other Spending (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|--|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | -0.3991 | 0.2246 | * | 5.6161 | 0.0018 | *** |
| Family size | -0.0582 | 0.0141 | *** | 0.1024 | 0.0001 | *** |
| Household head age | -0.0275 | 0.0114 | ** | -0.0039 | 0.0001 | *** |
| Household head age squared | 0.000139 | 0.000132 | | 0.0003 | 0 | *** |
| Number of adults in family | -0.0815 | 0.0354 | ** | 0.217 | 0.0002 | *** |
| Log of family income | -0.1475 | 0.00762 | *** | 0.1234 | 0.0001 | *** |
| Family covered by private insurance (dummy) | 0.106 | 0.0993 | | 0.3148 | 0.0004 | *** |
| Family covered by employer insurance (dummy) | -0.103 | 0.1839 | | -0.0052 | 0.0009 | *** |
| Family covered by public insurance (dummy) | 1.0463 | 0.0456 | *** | -0.2713 | 0.0004 | *** |
| Family not covered by any health insurance (dummy) | 1.0183 | 0.0471 | *** | -0.0349 | 0.0003 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.

MOOP insured Elderly Individuals – premiums (genmod)

| Variable | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|-------------------------------|-------------------|-------------------------|-----------------------|
| Intercept | 9.1273 | 0.024 | *** |
| Family size | -0.0193 | 0.0002 | *** |
| Household head age | -0.0542 | 0.0006 | *** |
| Household head age squared | 0.0004 | 0 | *** |
| Medicaid (dummy) | 1.0293 | 0.007 | *** |
| Medicare (dummy) | -0.029 | 0.0007 | *** |
| Medicaid and Medicare (dummy) | -1.2378 | 0.0071 | *** |
| Log of family income | 0.0776 | 0.0002 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.

MOOP Elderly Individuals – other spending (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|-------------------------------|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | 1.7147 | 2.549 | | 5.1287 | .0237 | *** |
| Family size | 0.155 | 0.0132 | *** | -.0300 | .0002 | *** |
| Household head age | -0.072 | 0.0683 | | .0252 | .0006 | *** |
| Household head age squared | 0.000594 | 0.000454 | | -.0002 | .0000 | *** |
| Medicaid (dummy) | 0.034 | 0.308 | | -.4295 | .0049 | *** |
| Medicare (dummy) | -0.6981 | 0.0577 | *** | .0922 | .0007 | *** |
| Medicaid and Medicare (dummy) | 0.7199 | 0.3117 | ** | .1463 | .0050 | *** |
| Log of family income | -0.1505 | 0.00989 | *** | .1356 | .0002 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.

MOOP Insured Unrelated Individuals - premiums (genmod)

| Variable | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|---------------------------------------|-------------------|-------------------------|-----------------------|
| Intercept | 6.2629 | .0024 | *** |
| Age | .0333 | .0001 | *** |
| Age squared | -.0003 | .0000 | *** |
| Covered by public insurance (dummy) | -.0416 | .0008 | *** |
| Covered by private insurance (dummy) | .0406 | .0006 | *** |
| Covered by employer insurance (dummy) | .5633 | .0006 | *** |
| Log of family income | .0364 | .0001 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.

MOOP Insured Unrelated Individuals - Other MOOP Expenditures (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|---------------------------------------|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | .9482 | .1828 | *** | 5.6277 | .0027 | *** |
| Age | -.0994 | .00924 | *** | .0331 | .0001 | *** |
| Age squared | .000895 | .000113 | *** | -.0001 | .0000 | *** |
| Covered by public insurance (dummy) | .1842 | .0690 | *** | .5157 | .0006 | *** |
| Covered by private insurance (dummy) | -.2777 | -.0664 | *** | .3527 | .0007 | *** |
| Covered by employer insurance (dummy) | .1717 | .0507 | ** | .0263 | .0007 | *** |
| Log of family income | -.0690 | .00827 | *** | .0101 | .0001 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.

MOOP Individuals with NO Premiums- Other MOOP Expenditures (logit and genmod)

| Variable | Estimate (logit) | Standard Error (logit) | Significance (logit) | Estimate (genmod) | Standard Error (genmod) | Significance (genmod) |
|-------------------------------|------------------|------------------------|----------------------|-------------------|-------------------------|-----------------------|
| Intercept | 0.5277 | 0.1242 | *** | 6.5957 | 0.0033 | *** |
| Age | -0.0389 | 0.00645 | *** | 0.0297 | 0.0001 | *** |
| Age squared | 0.000302 | 0.00008 | *** | 0 | 0 | *** |
| Medicaid (dummy) | 0.1279 | 0.034 | *** | -0.5112 | 0.0009 | *** |
| Medicare (dummy) | -0.4349 | 0.0679 | *** | -0.0185 | 0.001 | *** |
| Medicaid and Medicare (dummy) | 0.2063 | 0.0949 | ** | 0.2283 | 0.0017 | *** |
| Log of family income | -0.0383 | 0.00449 | *** | -0.0788 | 0.0001 | *** |

*** p<0.01, ** p<0.05, * p<0.1. State fixed effects are included only for genmod estimates.