

Using the American Community Survey to Implement a National Academy of Sciences-Style Poverty Measure: A Comparison of Imputation Strategies

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Abstract

Since the 1995 report of the National Academy of Sciences' Panel on Poverty and Family Assistance (NAS) on improving the poverty measure, the Census Bureau has conducted research on the report's recommendations using the Current Population Survey (CPS). The recently announced plan for Census to begin publication of a NAS-style Supplementary Poverty Measure (SPM) continues the Bureau's focus on national-level poverty rates derived from the CPS. In the years since the NAS report, however, the Census Bureau has fully implemented the American Community Survey (ACS), which is designed to provide poverty estimates for states and sub-state areas. We report on two research projects, one sponsored by the New York City Center for Economic Opportunity, another initiated by the Census Bureau, that explore how the ACS can be used to produce NAS-style poverty estimates. We compare the results of several different approaches to estimating the value of Food Stamp benefits and assigning housing assistance status. We conclude with some thoughts about the options for using the ACS to estimate a NAS-style SPM measure.

Key Words: Poverty Measurement, Imputation Techniques

1. Introduction

On March 2, 2010, the Commerce Department announced plans for the development of a Supplemental Poverty Measure (SPM) "that will use the best new data and methodologies to obtain an improved understanding of the economic well-being of American families and of how federal policies affect those living in poverty."¹ An Interagency Technical Working Group (Working Group) developed a roadmap on how to develop the Supplemental Poverty Measure drawing on the recommendations of a 1995 National Academy of Science (NAS) report and the extensive research on poverty measurement conducted over the past 15 years. The Census Bureau's statistical staff, with assistance from the Bureau of Labor Statistics and in consultation with other

¹http://www.commerce.gov/NewsRoom/PressReleases_FactSheets/PROD01_008963

appropriate federal agencies and outside experts, will be responsible for implementing the Working Group's recommendations. The Working Group's plan calls upon the Bureau to begin publishing the measure at the same time, and same level of detail, as the 2010 official poverty rates that it will report in the fall of 2011.²

The Working Group's plan assumes that the Bureau will use its Current Population Survey Annual Social and Economic Supplement (CPS) as the data source for measuring the family income used to determine poverty status. This will limit the geographic detail that the new measure can provide. Since the Census Bureau does not recommend using a single year of CPS data for state-level estimates for small states, it will be several years before reliable state-level SPM estimates will be published for all states.³ Because the CPS is not designed to provide data for sub-state areas, SPM estimates would not be available for cities, counties, or metropolitan areas, even on a multi-year basis. The March 2010 Working Group's plan for the Supplemental Poverty Measure did not discuss this issue.

This paper reports on two research projects, one sponsored by the New York City Center for Economic Opportunity (CEO), another initiated by the Census Bureau, that explore how a SPM or similar NAS-style poverty measure can be estimated using the Bureau's American Community Survey (ACS).⁴ Employing the ACS for the new poverty measure entails confronting the trade off between its large sample size and the incompleteness of the survey's income data; many of the items required to create a resource measure that corresponds to the SPM/NAS methodology are not covered by the ACS. Specifically, this paper explores methods that might be used to impute two of these missing items: the dollar value of food stamp benefits and whether or not a household receives housing assistance.

2. Background

The NAS/SPM poverty threshold is determined by taking a point in the distribution of the reference units' consumer expenditures on food, clothing, shelter, and utilities, plus a multiplier to account for miscellaneous expenses such as personal care, household upkeep, and non-work related travel.⁵ The reference unit threshold is subsequently adjusted for geographic differences in housing and utility costs and then is scaled for poverty unit size and composition. The income that is compared to the threshold includes after-tax cash and the cash-equivalent value of in-kind nutritional and housing benefits as well as deductions for non-discretionary expenses such as, work-related costs (commuting and child care), child support paid, and medical out-of-pocket expenditures.

The ACS, part of the 2010 Decennial Census Program, is the only source of small-area data on a wide range of important social and economic characteristics for all communities in the country. The ACS is sent each month to a sample of roughly 250,000 addresses in

² http://www.census.gov/hhes/www/poverty/SPM_TWGObservations.pdf

³ <http://www.census.gov/hhes/www/poverty/about/datasources/description.html>

⁴ We will refer to the new measure as the SPM/NAS.

⁵ Rather than recommending a specific point on the expenditure distribution or a specific multiplier, the NAS offered a range for each. The Working Group suggests the 33rd percentile and a multiplier of 1.2. In addition, it recommends a change in the reference family, from families with two adults and two children to all families with two children. The Working Group also suggested that different thresholds be established for homeowners with a mortgage, homeowners without a mortgage and renters.

the United States and Puerto Rico, or 3 million a year (about 2.5 percent of all residential addresses.) The Census Bureau uses the ACS to provide annual estimates of poverty rates based on the current, official poverty measure for states and sub-state areas with populations of more than 65,000. Estimates for smaller jurisdictions are available using three or five year averages. Given the size of the ACS sample and the quality of the estimates based on this data, the Census Bureau is increasingly encouraging the use of ACS (either single year or multiple-year) estimates for small geographies.⁶

The challenge for small area survey-based poverty estimates is how to construct the more complex resource measure required by the SPM/NAS-style poverty measure in the ACS. The ACS only provides data on pre-tax cash and whether someone in the household has received Food Stamps in the prior twelve months. Researchers who wish to create SPM/NAS-based poverty measures using the ACS must find ways to estimate payroll taxes, income tax liabilities and credits, the cash-equivalent value of in-kind nutritional and housing benefits, and the items that are deducted from family income (child support paid, work-related expenses, and medical out-of-pocket expenditures).

Although a few new questions might be added to the survey, this is a difficult process and its data collection method (the ACS is a self-administered, mail out, mail back survey) eliminates the possibility that the survey can cover all the needed items. Even if new questions were to be added to the ACS, there is a long lag between proposal of a new question and its appearance on the questionnaire.⁷ Some data elements will need to be estimated from other data sources. The next sections of this paper report on work by the Census Bureau and CEO to impute the value of food stamp benefits and participation in means-tested housing assistance programs. In order to provide comparable estimates, both sets of estimates are limited to the New York City sample of the ACS.

3. Estimating the Value of Food Stamp Benefits

Food Stamp benefits represent a significant income source for low-income families. In 2009, USDA reports national Food Stamp benefits of \$50 billion with average monthly participation of almost 34 million individuals. Due to the magnitude of the program, it is important that a poverty measure take into account these benefits.

3.1 Census Bureau Estimates of the Value of Food Stamp Benefits

For this project, the Census Bureau experimented with three different approaches to imputing the value of Food Stamps for households in the ACS that report receipt of the benefit: using program rules, a regression model and a predicted means match with the CPS. Because the value of the Food Stamp benefit per household was still asked in 2007, estimates from these three approaches are compared to reported values in the 2007 ACS.

3.1.1 Program Rules

Program rules were used to simulate a Food Stamp benefit calculation for each household reporting Food Stamp receipt in the ACS data set. The calculation uses reported

⁶For example, the document on the Census Website entitled “Description of Income and Poverty Data Sources,” advises data users to rely on the ACS data for single year poverty rate estimates at the state level. Poverty estimates from the CPS are advised only for national level and for year-to-year changes at the state level (using two-year averages).

⁷The process for adding questions to the ACS is described in the *ACS Design and Methodology Report* http://www.census.gov/acs/www/SBasics/design_meth.htm

household income and size but assumes that each household received food stamps for the entire 12 months. The basic formula for Food Stamp benefits is that the monthly benefit amount is set equal to the difference between the maximum benefit amount (based on the cost of the Thrifty Food Plan) minus 30 percent of “adjusted” income. Adjusted income is calculated by subtracting from gross income: 20 percent of earned income; a standard deduction (which currently ranges from \$141 to \$205 depending on family size); child care expenses; and excess shelter costs (currently capped at \$459 per month).⁸

3.1.2 Regression Model

A second approach uses a statistical regression model to predict the value of Food Stamp benefits for ACS households that report receipt of Food Stamps. The variables in the model are those common to the ACS and the CPS. The model uses Food Stamp benefits per household as the dependent variable with the log of household income, household size, number of children and state of residence as explanatory variables.

3.1.3 Predicted Means Match (PMM)

A predicted means statistical match⁹ was conducted by partitioning each data set by the number of people in the household (single person vs. multiple person household), whether or not the household included an elderly or disabled person and whether or not the household income was below the official poverty threshold. Within each cell, the donor was selected based on the predicted mean for Food Stamp benefits using the same regression model described in the previous method. For the matched cases, the average benefit per household member was moved from the CPS ASEC record to the corresponding ACS record. The per-household member amount was multiplied by the number of people in the household to get the household benefit amount.

3.1.4 Results

Two things should be born in mind in assessing the results of the three estimation strategies. One is that Census’ goal is to replicate what would have been reported at the household level in the ACS had respondents be asked to provide the value of Food Stamps received. The second is that Food Stamp receipt in the ACS and the value of the Food Stamp benefit in the CPS are reported at the level of the household. As discussed in the presentation of CEO’s work, below, a household does not necessarily conform to the Food Stamp program’s definition of a Food Stamp case. This is especially problematic for the method that uses program rules.

⁸ In order to simplify the benefit calculation for this exercise, this analysis assumed that all households were able to claim the maximum excess shelter deduction, the child care deduction was not used, all income was “earned” income and that the households received benefits for the full 12 months. The estimates from this approach could be improved by using ACS data to estimate actual amounts for these deductions rather than using the simplifying assumptions.

⁹ For examples of use of this statistical matching technique, see Stern, Sharon, “Valuing Housing Subsidies in a New Measure of Poverty: A Statistical Match of the American Housing Survey to the Current Population Survey, 2001 (<http://www.census.gov/hhes/www/povmeas/papers/jsm00comp.pdf>); Short, Kathleen, and O’Hara, Amy, Valuing Housing in Measures of Household and Family Economic Well-Being, 2008 (http://www.census.gov/hhes/www/housing/ahs/valuing_housing.pdf) and “O’Donnell, Sharon and Rodney Beard “Imputing medical out-of-pocket (MOOP) expenditures using SIPP and MEPS” (<http://www.census.gov/hhes/www/povmeas/papers/odonnell.beard.2009.pdf>).

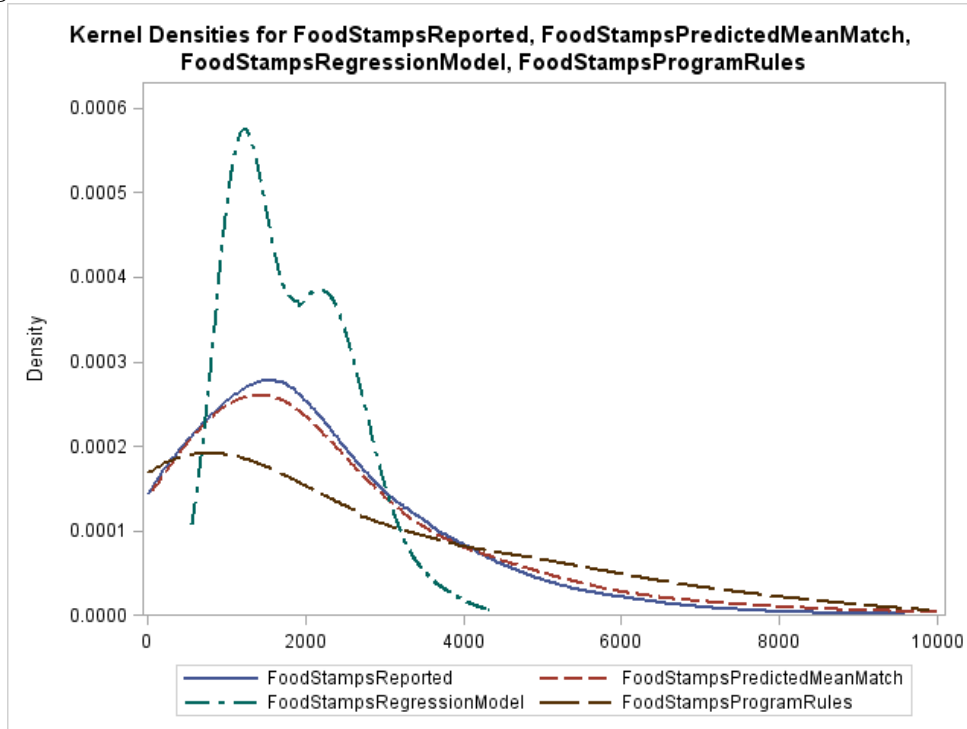
Table 1: Census Estimates of NYC Household Food Stamp Benefits: 2007

	N	Mean	SE	Median	SE	Sum (millions)	SE
CPS ASEC	204	\$2,004	114	\$1,608	109	\$847	81
ACS PUMS	3,264	\$2,073	33	\$1,787	13	\$840	21
Statistical Match	3,264	\$2,287	34	\$1,800	40	\$927	21
Regression model	3,264	\$1,845	13	\$1,727	53	\$748	14
Program Rules	3,264	\$2,397	50	\$1,498	51	\$972	28

Note: All estimates in current year dollars, not adjusted for inflation.

The Kernel Density plots in Figure 1 provide a visual comparison of the distributions using different imputation approaches for 2007.

Figure 1



3.2 CEO Estimation of the Value of Food Stamp Benefits

CEO's approach to estimating Food Stamp benefit levels is shaped by its decision to make use of New York City administrative data for imputing the value of Food Stamps received. Food Stamp participation in the ACS is reported at the household level (all persons living within a housing unit) which differs from a typical Food Stamp case (co-resident individuals who purchase and prepare food together). The distinction is evident in the data. In 2007, the mean membership of a New York City Food Stamp case was 1.85 persons, while the mean for ACS households reporting Food Stamp receipt was 2.87 (se=.033) members. CEO also addressed the underreporting of program participation. In

2007, for example, the ACS indicated that there were 405,475 (se=7,045) Food Stamp receiving households in New York City which is only 55 percent of the total number of cases found in the City's administrative database in that year.

CEO method for imputing the yearly value of Food Stamps thus entails three steps: (1) creating Food Stamp units; (2) estimating the value of yearly Food Stamp receipt; and (3) (partially) adjusting the number of Food Stamp cases in the ACS data to correct for underreporting.¹⁰

To create Food Stamp cases, CEO developed a program to divide ACS households into the maximum number of "Food Stamp units" that the program rules would allow by employing the Minimal Household Unit concept.¹¹ Using the Food Stamp unit rather than the ACS household increases the estimated number of Food Stamp cases in the 2007 ACS from 405,475 (se=xx,xxx) to 584,913 (se=11,498) (76.0 percent of the administrative number). It also more accurately reproduces the distribution of cases by their size. Using the household as the unit of analysis, only 29.7 percent (se=.81) of the Food Stamp receiving households in the 2007 ACS were one-person households; while 55.0 percent (se=.70) of the CEO-created Food Stamp units are composed of one person.

Once commensurable units have been created, CEO compiled administrative data on Food Stamp cases in New York City from the Human Resources Administration's internal database.¹² The administrative dataset contained demographic information about the Food Stamp case-heads and families, as well as relevant budget information such as household income and monthly Food Stamp payments. Using this data, CEO developed a regression model using the demographic characteristics present in both the administrative and ACS datasets in order to predict the yearly value of Food Stamp payments of families in New York City. The regression model was then used to impute Food Stamp values through a predictive means match (PMM).

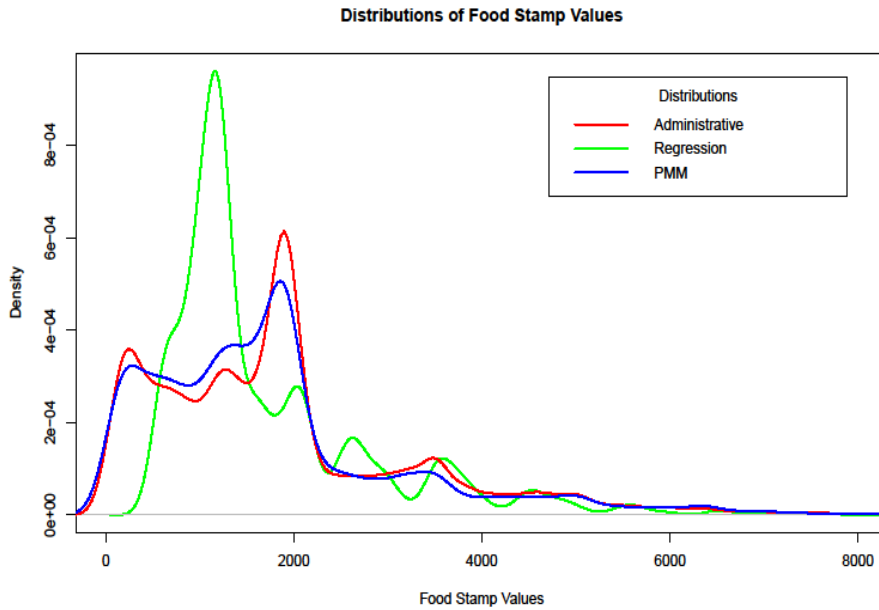
The advantage of using PMM rather than simply using the regression-based estimated values is that the method does a better job at preserving the actual distribution of Food Stamp values. Regression estimates accurately capture the mean and aggregate values of the distribution, but yield considerably less variation than seen in the actual data. This is unsurprising, given the fact that regressions are designed to model means, rather than full distributions. Figure 2 provides the kernel density plots for annual value of Food Stamps received using the CEO regression model, CEO's predicted means match, and the New York City administrative data.

¹⁰ A more complete description of this work can be found in Center for Economic Opportunity, "The CEO Poverty Measure, 2005-2008." 2010.

¹¹ Passel, Jeffrey. "Editing Family Data in Census 2000 Public-Use Microdata Samples: Creating Minimal Household Units (MHUs)." August 2002.

¹² The data included all cases in New York City that were active for any period between July 2006 and June 2007, a total of 769,303 cases. June was chosen since it represents the mid-point in the ACS rolling sample, helping to ensure the administrative data was comparable to the ACS data. 2007 was used to test and calibrate the food stamp adjustment because it was the last year for which self-reported food stamp values were present in the ACS.

Figure 2



Given the gap between the number of Food Stamp cases in the administrative data and the number of cases in the ACS households reporting Food Stamp receipt, CEO decided to assign participation in the Food Stamp program to some of the apparently eligible units that did not report receipt. Because Food Stamp participation is highly correlated with participation in other income support programs, such as Public Assistance (PA) and Supplemental Security Income (SSI), CEO assigned Food Stamp values to individuals who were eligible for Food Stamps and reported PA or SSI receipt, but did not report Food Stamp receipt.¹³ Adding these cases increased the number of Food Stamp units from 584,913 to 651,597, 85 percent of the administrative count of 769,303. (See Table 2 below).

Since the 2007 ACS asked about the value of Food Stamp benefits, we can compare the results for the value of Food Stamps using the PMM against the report value from the ACS.

Table 2: Comparison of ACS Reported, NYC Administrative, & CEO Estimated Food Stamp Values, 2007

	Administrative	ACS Reported		CEO Estimate	
		Estimate	SE	Estimate	SE
Food Stamp Cases*	769,303	405,475	7,045	651,597	11,188
Mean Value Per Case	\$1,809	\$2,073	\$33	\$1,846	\$31
Median Value Per Case	\$1,646	\$1,787	\$13	\$1,632	\$13
Sum of Food Stamp Value (millions)	\$1,392.00	\$840.40	\$21	\$1,202.80	\$23

* Case in the ACS Reported Column refers to households

¹³ “Eligible” is defined using the SNAP program rules as citizen or legal resident for five years or more with a gross income less than or equal to 130 percent of the official poverty line.

4. Imputing Housing Assistance Status

While the total value of housing assistance provided by the federal government is more modest than the total value of Food Stamp benefits, the receipt of housing assistance can significantly impact the ability of a given household to afford basic necessities. Like Food Stamp benefits, housing assistance was one of the in-kind benefits specifically mentioned in the 1995 NAS panel report as an item to be included in family resources.

Two estimation steps are required to take into account housing assistance in a SPM/NAS poverty measure using ACS data. First, because the ACS does not include a question on housing assistance, it is necessary to assign housing assistance status to household in the survey. Second, one must estimate the value of that housing assistance. This paper examines only the first of the two steps.

4.1 Census Bureau Imputation of Housing Assistance Status

4.1.1 Program Rules

Program rules can be used to determine which households would be income eligible for one or both of the major HUD programs. Generally, the federal housing assistance programs are not entitlement programs and there are many more households eligible for assistance than the number of households receiving assistance. HUD sets the lower income limits for admission into public housing at 80 percent of median income for the county or metropolitan area in which a household resides. The Housing Choice Program (Section 8) sets eligibility at 50 percent of the median income for the county or metropolitan area in which the family resides, but by law, a public housing authority must provide 75 percent of its voucher to applicants whose incomes do not exceed 30 percent of the area median income.

The strategy used in this analysis assigns housing assistance to those eligible households paying relatively low rent for their household size.¹⁴ This strategy is based on the assumption that households report out-of-pocket rent expenditures rather than providing the amount of rent received by the landlord.¹⁵ This assumption may not be correct for households participating in the housing voucher program. Housing assistance could be assigned randomly to the income eligible households, but this would run the risk of assigning housing assistance to households reporting rent payments not consistent with receiving housing assistance.

¹⁴ In this analysis, housing assistance is assigned to those income eligible households whose reported gross rent is less than 67 percent of the housing portion of the 2008 NAS threshold. Since we do not know the SPM thresholds for renters nor the precise geographic adjustment that will be used for New York City, this analysis used \$1,304 as the housing portion of the NYC threshold. This was calculated by taking 44 percent of the \$27,043 2008 NAS FCSU Threshold (with principal payments) and using a factor of 31.5 percent to adjust for New York City's higher housing costs. Note that this is not the same threshold used by CEO.

¹⁵ The ACS asks respondents to report "the monthly rent for this house, apartment, or mobile home." The ACS Instruction Guide instructs respondents to report "the rent agreed to or contracted for, even if the rent for your house, apartment, or mobile home is unpaid or paid by someone else." Residents of public housing projects would be expected to report their out-of-pocket rent. Recipients of housing assistance vouchers should report the amount their landlord receives including the amount paid through housing assistance, but it is unclear whether or not respondents understand the question in this way.

4.1.2 Regression Model

A logit regression model was used to predict housing assistance status using variables that are found on both the CPS and the ACS. The probability of living in subsidized housing was estimated for each ACS household using the parameters derived from estimating the model using CPS data. Five years of CPS ASEC data for New York State (2005-2009) were pooled for the model which included as explanatory variables: family type (single parent with child or married couple with child), household size, whether or not the household reported receipt of public assistance or SNAP benefits, the log of household income and characteristics of the head of the household: race, ethnicity, educational attainment, age, and citizenship.¹⁶ A dummy variable was used to capture the impact of living in New York City.

4.1.3 Predicted Means Match

A third approach uses a predicted means statistical match to match ACS households to CPS ASEC households. The logit model from the regression model was used to estimate the likelihood of housing subsidy receipt for each household and this was used in the statistical match as the distance function. In conducting the statistical match, the samples were first partitioned by presence of an elderly household member, citizenship of the household head, whether the household received Food Stamp benefits, whether or not the household included a single parent with a child, whether or not the household head had a high school education or less, and whether or not the household was located in New York City.

Table 3: Comparison of Census Housing Assistance Estimates

	<u>CPS ASEC</u>		<u>Program Rules</u>		<u>Regression Model</u>		<u>Predicted Means Match</u>	
	Value	SE	Value	SE	Value	SE	Value	SE
Total Households (thousands)	389	32.0	377	6.0	379	7.0	373	7.0
CHARACTERISTICS:								
Single Parents with Children	34.4	2.2	30.7	0.9	36.2	0.9	29.8	1.1
Married Couples with Children	6.1	0.9	17.6	0.7	3.4	0.4	7.8	0.5
Non-Hispanic White	11.7	2.0	13	0.7	8.4	0.5	32.4	0.9
Non-Hispanic Black	42	2.9	31.1	1.0	39.8	0.9	28.4	0.9
Hispanic	40.9	3.1	46.5	1.0	48.5	0.9	31.3	1.0
Non-Hispanic Other	5.5	1.8	9.4	0.6	3.3	0.4	7.9	0.6
High School Education or Less	74.9	1.8	77	0.9	85.2	0.7	57.5	1.2
Elderly	30.8	3.4	28.8	0.8	41.4	1.0	29.8	0.9
Citizen	85.5	1.7	81	0.9	88.1	0.6	87.8	0.7
Receive Public Assistance	14.3	1.3	9.1	0.6	15.2	0.8	12.3	0.7
Receive Food Stamps	50	2.3	48.6	1.1	83.5	0.7	31.8	0.9

¹⁶ This model is very similar to the model used by New York State Office of Temporary and Disability Assistance (NYS OTDA) in their NAS-style poverty estimates.

4.2 CEO Adjustment for Housing Status

CEO uses a single poverty threshold for homeowners, with and without a mortgage, and renters. A “housing status” adjustment is made to family resources to account for the advantage that households living in “non-market rate” housing units (such as participants in means-tested housing assistance programs, tenants in rent-regulated apartments, and home owners free and clear of a mortgage) have over households that are paying “market rate” for their shelter.

The ACS does not provide any information about whether the household resides in a public housing development, receives a means-tested rental subsidy, lives in a rent-controlled apartment, or is paying a market-rate rent. In order to assign a housing status to renters (and determine their out of pocket housing expenses), CEO matches renter households in the ACS to renter households in the New York City Housing and Vacancy Survey (HVS). The HVS is a survey conducted every three years by the U.S. Census Bureau. The survey provides a representative sample of roughly 18,000 households in the City and collects detailed information on demographic as well as housing-related issues.¹⁷ Most important from the perspective of estimating the CEO housing adjustment, it identifies renters’ housing status and provides data on what renters who receive a rent subsidy actually pay out-of-pocket for their housing.

To assign housing status and out-of-pocket payments, CEO matches HVS renter households (n=11,932) to ACS renter households (n=15,343) if they share the following characteristics: 1) neighborhood;¹⁸ 2) presence of earned income; 3) composition of the household; 4) household size -adjusted household income; 5) race/ethnicity of the household head; 6) contract rent; and 7) whether or not the household head is 65 years of age and above. Focusing on those renters who are benefiting from means-tested housing programs, the table indicates that 11.8 percent of renter households in the HVS were living in public housing and 9.5 percent were living in private housing with a rental subsidy. The corresponding shares in the ACS are 10.9 percent and 10.0 percent, respectively.^{19,20}

¹⁷ More information is available at: www.census.gov/hhes/www/housing/nychvs/2002/overview.html.

¹⁸ The ACS Public Use Microsample Areas and the HVS Sub-Borough Areas are both designed to approximate New York City’s Community Districts.

¹⁹ Standard errors for the HVS data were computed using formulas provided by the Census Bureau. They are available at: http://www.census.gov/hhes/www/housing/nychvs/2008/S&A_2008.pdf. Standard errors for ACS estimates use replicate weights. The difference in the share of renters in public housing in the two data sets was statistically significant at the .05 confidence level. The apparent difference in the share of renters with tenant-based subsidies was not statistically significant.

²⁰ These housing status categories are mutually exclusive. First, households are characterized by whether they live in a public housing development (regardless of whether they are receiving other forms of housing assistance). Second, households are categorized by whether they receive means-tested, tenant-based subsidies. Note that these categories account for participation in New York State and City programs as well as federal ones.

Table 4: Comparison of Households Receiving Housing Assistance in CEO Match & HVS Donor File

	CEO MATCH ACS/HVS		HVS	
	Value	SE	Value	SE
Total Households	413,593	7,386	436,860	10,116
Percent in Public Housing	10.9%	0.268	11.8%	0.371
Percent with Tenant-Based Subsidy	10.0%	0.246	9.5%	0.337
CHARACTERISTICS:				
Single Parents with Children	31.7	0.9	28.6	1.12
Married Couple with Children	9.7	0.5	9.6	0.73
Non-Hispanic White	16.5	0.7	17	0.93
Non-Hispanic Black	33.7	0.9	38.2	1.21
Hispanic	43.9	0.9	40.1	1.22
Non-Hispanic Other	5.9	0.4	4.7	0.53
Elderly	26.4	0.8	24.6	1.07
Receive Public Assistance	9.4	0.6	12.7	0.83

5. Comparing Census and CEO Estimates

Prior sections have compared Census and CEO Food Stamp and housing assistance estimates imputed to the ACS sample against the data in the respective donor files. Here we compare Census and CEO estimates against each other. The contrast provides some insight into differences that would emerge between an effort by the Census Bureau to provide ACS-based SPM/NAS poverty rates for state and sub-state areas and efforts by researchers who would have ready access to local data.

5.1 Food Stamps

Census goal was to use CPS to estimate what ACS respondents would have reported had they been asked to provide information on the value of Food Stamps received by the household. CEO’s goal was to estimate the value of Food Stamp receipt per Food Stamp unit in a manner that would approach the aggregate value of Food Stamp benefits provided by administrative data. Comparing results in Table 9 indicates what would be expected to emerge from these two different goals and methods. The CEO approach yields lower benefit levels per unit, because its units have fewer members. But the CEO approach creates many more Food Stamp units than Food Stamp receiving households. The difference between benefit level per unit and number of units does not balance out because the Food Stamp program assumes economies of scale in the cost of food; a household composed of two Food Stamp units would usually receive a larger total benefit level than the benefit level if all its members were in one unit. This generates the higher level of aggregate benefits City-wide evident in the CEO estimates.²¹

²¹ Only a small part of the greater sum of Food Stamp benefits in the CEO estimate is due to its upward adjustment for non-reporting.

Table 5: Comparison of Census and CEO Estimates of Household Food Stamp/SNAP Benefits: 2007

	<u>N</u>	<u>Mean</u>	<u>SE</u>	<u>Median</u>	<u>SE</u>	<u>Sum</u> <u>In Millions</u>	<u>SE</u>
Statistical Match	3,264	\$2,287	34	\$1,800	40	\$927	21
Regression model	3,264	\$1,845	13	\$1,727	53	\$748	14
Program Rules	3,264	\$2,397	50	\$1,498	51	\$972	28
CEO Estimates	3,757	\$2,523	31	\$1,880	13	\$1,176	23

5.2 Housing Assistance

Both Census and CEO rely on survey data, but there is ample reason to believe that housing data in the surveys are not of equal quality. The CPS asks respondents “whether they are residing in a public housing project that is owned by a local housing authority or other public agency.” Rather than relying on self-reported information about residence in public housing, the housing units in the HVS sample are identified as public housing by a match of their addresses to New York City and State administrative data. The HVS does rely on respondents for information about their receipt of tenant-based subsidies, such as Section 8 housing vouchers, but it does so in a more thorough manner than the CPS.²²

Table 6: Comparison of Census Bureau and CEO Housing Assistance Estimates

	<u>Total</u>	<u>SE</u>
Predicted Means Match to CPS ASEC	373,481	7,472
Regression Model	379,322	7,199
Program Rules	377,464	6,125
CEO Match to NYC HVS	413,593	7,386

6. Conclusion

The SPM or any NAS-style poverty measure employs a far more complex definition of resources than the pre-tax cash income used in the official poverty measure. If the ACS is going to be used to generate annual state and sub-state poverty estimates with this methodology, many of the additional resource items will need to be estimated via imputation techniques. This paper has examined several strategies for estimating the value of Food Stamp benefits and participation in housing assistance programs, two important elements in the SPM/NAS resource measure. For Food Stamp benefits the Census research has shown that the estimates using either a regression model or the predicted mean match are reasonably close to the Food Stamp benefit amounts reported in the 2007 ACS and the estimates from the CPS for New York City. Either of these methods could also be used to estimate a number of the data elements missing from the ACS, are now covered by the CPS, including child support paid, medical out-of-pocket

²² The HVS questionnaire is available at <http://www.census.gov/hhes/www/housing/nychvs/2008/questionnaire.pdf>.

expenses, child care paid, and LIHEAP. For housing assistance, this project has shown that either a logit model or a predicted mean statistical match can be used to estimate whether or not a household receives housing assistance. A similar approach could be used to employ the CPS for estimates of which ACS households receive WIC benefits and Free or Reduced Price School Lunches. (One element that has not been explored in this research project is the need for a national ACS-based tax model.)

Unless there is strong evidence that data from other nation-wide surveys are superior to that on the CPS for these items, the case for using the CPS as the donor file for “wholesale” estimates of the missing resource items is clear. Imputations for the missing resources from one data source might exhibit more internal consistency than those that use several different surveys. There is also the consistency that would derive from using the source of U.S.-wide poverty estimates (CPS) to inform state and local poverty estimates.

New York City’s CEO and other local researchers have shown that the wealth of local data that can improve SPM/NAS-based poverty estimates for their jurisdictions.²³ Unfortunately, the Census Bureau will be forced to use the lowest common denominator data that is available in a timely fashion for all jurisdictions. A framework for the future could be that the Census Bureau would develop wholesale estimates. State and city jurisdictions could then engage in retail, by availing themselves of local data sources to meet local needs and interests.

One remaining issue is whether, or to what extent the ACS questionnaire can be revised in ways that would reduce the need for, or make, imputations more accurate. Given the protracted timeline for adding questions to the ACS, in the short run this is not an option. In the longer run, if questions were to be added it would be important to prioritize these additions. Imputations needed to provide a resource SPM/NAS measure typically must answer two questions: which families are participating in a program, receiving a form of income, or making certain payments and what is the value of this resource item. Answers to the whether or not questions are the hardest to impute and may create less respondent burden than “how much” questions; these would be easiest to include in ACS. Among the possibilities, programs or expenses with the greatest impact on the SPM/NAS resource measure should be prioritized.

The development of methods to estimate non-cash resources in the ACS should entail both the consideration of new questions in the survey in conjunction with further refinement of imputation methods. Beginning in the fall of 2011, the Census Bureau will be providing the nation with a new, and more informative, measure of poverty in the U.S. Its usefulness would be considerably enhanced if the measure was available at a local level. The work in this paper suggests that the goal of providing SPM/ACS poverty measures via the ACS would not only be desirable; it is feasible.

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²³ State-level estimates for Minnesota, New York, and Wisconsin have been created by the Urban Institute, New York State Office of Temporary and Disability Assistance, and the University of Wisconsin’s Institute for Research on Poverty, respectively.

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References

- Citro, Constance F. and Robert T. Michael. 1995. *Measuring Poverty: A New Approach*. National Research Council, National Academy Press, Washington, DC.
- Hisnanick, John J., Tracy Loveless, and John Chesnut. 2007. "2006 American Community Survey Content Test Report H.6, Evaluation Report Covering Receipt of Food Stamps FINAL REPORT." http://www.census.gov/acs/www/AdvMeth/content_test/H6_Food_Stamps.pdf
- Iceland, John. Rapporteur. 2005. *Experimental Poverty Measures: Summary of a Workshop, Planning Group for the Workshop to Assess the Current Status of Actions Taken in Response to Measuring Poverty: A New Approach*, National Research Council, National Academy Press, Washington, DC.
- New York City Center for Economic Opportunity. 2010. "The CEO Poverty Measure, 2005-2008." http://www.nyc.gov/html/ceo/downloads/pdf/ceo_poverty_measure_v5.pdf
- New York City Center for Economic Opportunity. 2008. "The CEO Poverty Measure." http://www.nyc.gov/html/ceo/downloads/pdf/final_poverty_report.pdf
- O'Donnell, Sharon and Rodney Beard. 2009. "Imputing medical out-of-pocket (MOOP) expenditures using SIPP and MEPS." <http://www.census.gov/hhes/www/povmeas/papers/odonnell.beard.2009.pdf>
- Passel, Jeffrey. 2002. "Editing Family Data in Census 2000 Public-Use Microdata Samples: Creating Minimal Household Units (MHUs)."
- Short, Kathleen, Thesia I Garner, David Johnson, and Patricia Doyle. 1999. *Experimental Poverty Measures: 1990 to 1997*. U.S. Census Bureau, Current Population Reports, Series P60-205. Washington DC.
- Short, Kathleen, and Amy O'Hara. 2008. *Valuing Housing in Measures of Household and Family Economic Well-Being*. http://www.census.gov/hhes/www/housing/ahs/valuing_housing.pdf
- Stern, Sharon. 2001. "Valuing Housing Subsidies in a New Measure of Poverty: A Statistical Match of the American Housing Survey to the Current Population Survey, 2001." <http://www.census.gov/hhes/www/povmeas/papers/jsm00comp.pdf>