



Creating the CEO Poverty Unit: An Evaluation Using the CPS ASEC

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ABSTRACT

The delineation of the poverty unit is an important first step in improving the measurement of poverty. In 2006, I was asked by the NYC Center of Economic Opportunity to carry out this task as part of an alternative measure of poverty they were developing for New York City. The American Community Survey (ACS), the data source used by CEO for its new measure, presented a challenge, particularly with regard to the way relationship is defined within the household. The concept of the minimal household unit (MHU), where relationships are inferred to define the smallest divisible family unit within households, has proven to be the ideal stepping stone toward the creation of the larger resource-sharing poverty unit.

This paper evaluates the accuracy with which these units are formed using the Annual Social and Economic Supplement from the Current Population Survey (CPS ASEC). This data set provides much richer household relationship data than the ACS does and therefore provides an opportunity to evaluate how well the inferred relationships created by the MHU methodology reproduce relationships that are known in the CPS ASEC. Findings show that despite the dearth of information regarding family formation in the ACS, the MHU methodology does a remarkable job of inferring relationship. More important, in the majority of cases examined, the inferences made with regard to relationship never *overestimated* the known relationship. With households growing more complex over time, particularly in NYC, the ability to clearly identify relationships becomes essential. In summary, the utilization of the MHU adds an important dimension to NYC's measurement of poverty.

Background

The inadequacies of the official U.S. poverty measure have been apparent among social scientists for many years. In 2006, the NYC Center for Economic Opportunity (CEO) was charged with the task of creating an alternative measure of poverty for New York City. Taking their lead from the National Academy of Sciences' (NAS) report on ways to improve the measure, CEO set out to create a poverty measure that is more realistic for NYC and therefore more useful for its policymakers.

One of the Academy's recommendations was to rethink the unit of analysis or the poverty unit. Poverty is generally discussed as a family characteristic based on the rationale that income-and resource-sharing occurs within families. For Census purposes, each household can contain only one primary family. This family can also include related subfamilies -- families that are related to but do not include the reference person. In addition there can also be what the Census defines as unrelated subfamilies, where no one is related to the reference person. Everyone in the household that is not part of a family, either the primary family or an unrelated subfamily, is considered to be an unrelated individual, whether they are living alone or with others. In a household with complex relationships, the official poverty measure would determine poverty for three different groups: members of a primary family, members of an unrelated subfamily, and each unrelated individual.

CEO adopted NAS's recommendation to expand the definition of the poverty unit to include cohabiting couples. According to the NAS: "Such couples typically pool resources, and many of them exhibit considerable stability, so it seems to make sense to treat them like married-couple families for purposes of poverty measurement."²

The American Community Survey (ACS) is the data source used by CEO for its new poverty measure. Early last decade, the Census Bureau launched the ACS, an annual survey that was meant to replace the long form from the Decennial Census, thus becoming the nation's primary source of socioeconomic data for all geographic areas.³ Using the ACS for this project, however, presented several challenges. With the exception of related subfamilies, relationship in the ACS is defined solely by the relationship of each household member to the reference person of the household. As a result, it is particularly difficult to establish relationships among persons within the household if they are independent of the reference person. Unlike the Current Population Survey (CPS), unrelated subfamilies are not identified. Also children of unmarried partners are only identifiable if they are listed as the child of the (unmarried) reference person.

To overcome this limitation, the household needed to be taken apart and reassembled into the appropriate units. This was done by inferring relationship based on other available data, such as age and marital status, on the ACS record. The methodology used to form these units, known as the minimal household unit (MHU), is the first step in the formulation of new poverty units. This methodology is discussed first, followed by an evaluation. Results and conclusions follow.

² National Research Council, Panel on Poverty and Family Assistance. *Measuring Poverty: A New Approach*. Constance F. Citro and Robert T. Michael, eds. Washington, DC: National Academy Press, p 302, 1995.

³ Currently, the ACS publishes single year data for all areas with populations of 65,000 or more.

The Minimal Household Unit

Researchers studying household/family composition have found the concept of a minimal household unit (MHU) to be useful.⁴ MHUs are defined as the smallest divisible family unit within households – couples with and without children and single adults with and without children. Jeffrey Passel has worked extensively on the creation of MHUs using Census data. CEO obtained his MHU program for the 2000 Decennial Census and modified it for the ACS.⁵

MHUs are created in the ACS data by inferring relationships among household members using the variables for relationship, marital status, age, sex, and placement on the roster, resulting in pointers that link persons together. An emphasis in this model is that the MHU is the smallest unit of “economic” decision-making. Thus the MHU lends itself well as a building block of the larger resource-sharing poverty unit. In addition, MHUs can be combined to form any number of units that are needed in the creation of CEO’s new poverty measure, such as the tax unit for the tax model, as well as for food stamps cases.⁶

MHU Methodology used by CEO

We start by defining MHUs as follows:

1. Couples -- with or without dependent children
2. Single adults -- with or without dependent children

An important feature of the MHU is its definition of dependent children (see box). In order to incorporate economic dependency into the MHU model, the definition of a child is expanded to include those 18-24 years who are believed to be dependent on or cared for by someone in the household.⁷ As discussed below, this has implications when comparing the unrelated subfamilies created using the MHU with those created by the Census, which defines a child as any person under the age of 18.

A dependent child is defined as:

- Under 18 years or
- 18-21 years and currently enrolled in high school or
- 18-24 years and currently enrolled in school and working part-time or
- 18-24 years and working part-time with wages less than one-half the poverty threshold for a person under 65 or
- 18-24 years with no wages

Another important note is that due to the paucity of data, relationships between relatives and nonrelatives in any given household can never be presumed. With the exception of unmarried

⁴J.F. Ermisch and Elizabeth Overton, “*Minimal Household Units: A New Approach to the Analysis of Household Formation*,” *Population Studies* 39, pp 33-54, 1985.

⁵ Jeffrey Passel, “*Editing Family Data in Census 2000 Public-Use Microdata Sample: Creating Minimal Household Units (MHUs)*,” Unpublished, Pew Hispanic Center, August 23, 2002.

⁶ Mark Levitan, et al, “*The CEO Poverty Measure: A Working Paper by the New York City Center for Economic Opportunity*,” August 2008.

⁷There were 225,800 18-24 year olds reclassified as dependent children using this definition.

partners, this is a hard and fast rule that applies to both the linking of children to parents and spouses to each other. Conceptually therefore, the MHU program divides the household into two groups: persons who are related to the reference person and those who are not related to the reference person before beginning the task of inferring relationship.

The following steps are taken to create these units:

1. Spouses are linked with each other either through their relationship with the reference person or because they are identified as spouses in a related subfamily.
2. Unmarried partners are linked to the reference person using the “unmarried partner” category of the relationship variable.
3. Other adults not related to the reference person are linked as married to each other if they report they are married, are of the opposite sex, are 18 years and older, and their age difference is less than 15 years.
4. Children related to the reference person as sons or daughters are linked with one or two parents using the relationship variable. Children in related subfamilies are linked to the parent(s) in their subfamily unit using the relationship variable for related subfamilies. Other dependent children who are related to the reference person but for whom no parent can be assigned, such as nephews or cousins, are assumed to be dependent on the householder and therefore put into the reference person’s MHU.
5. Children not related to the reference person are assigned next. The following inferences are made; children in the household are linked with a parent if the child is less than 15 but not more than 50 years younger than the adult. If more than one such adult is present in the household, the adult who is closest to the child’s order in the household roster is selected as the parent. These assumptions also apply in linking children to unmarried partners if these children have not already been identified as related to the reference person.
6. If no parent can be identified for the child, he or she will be put in the reference person’s MHU if the following conditions hold: the child is under 15 years of age and the reference person is at least 15 years older than the dependent child. If these conditions do not hold, those children who are 15 and older become single-person MHUs.⁸
7. Two possible “errors” in the ACS PUMS data are corrected: “Inverted” households where a minor child is the “head” of a household with non-elderly parents present; and households with unmarried partners where the actual partner appears to be someone other than the head.
8. A common MHU number is assigned to members of the same MHU in the household. A MHU relationship variable identifies the MHU head, spouse/partner, son/daughter, and other.⁹

Once the MHU is created, larger within-household units are formed by aggregating the appropriate MHUs to create a new variable called NEWFAM_TYPE. Each NEWFAM_TYPE is identified as one of the following:

1. Primary families which include the reference person of the household

⁸ This small group of remaining children will be assigned to a poverty unit on the basis of who in the household is most likely to claim them as a dependent for tax filing purposes.

⁹ Others include dependent children who are related to the reference person but are not the son or daughter of the reference person; examples are nephew/niece or cousin.

2. Related subfamilies
3. Unrelated subfamilies
4. Unmarried partner units
5. Unrelated individuals

From here the creation of the poverty unit is straightforward. There are three types that can exist within a single household unit, and they are constructed using NEWFAM_TYPE as follows:

1. Expanded primary families which include persons belonging to: primary families, related subfamilies, and unmarried partner units
2. Unrelated subfamilies
3. Unrelated individuals

Evaluation of the MHU

How well does this method work to identify household relationships? To answer this question, we turned to the Annual Social and Economic Supplement from the Current Population Survey (CPS ASEC). The CPS ASEC provides much richer household relationship data than the ACS does. There are pointers linking spouses and parents with children, and beginning in 2007 a cohabiter pointer was added, linking persons “living together,” providing even more information. With the exception of the cohabiter pointer, our MHU program creates a similar set of relationship pointers. The CPS ASEC therefore provides an opportunity to evaluate how well the inferred relationships created by the MHU program reproduce relationships that are known in the CPS ASEC.

To make this comparison, the variable NEWFAM_TYPE was recreated in CPS ASEC using two different methodologies. The first approach, analogous to the CEO method, runs the MHU program as written for the ACS on the CPS ASEC. This methodology will be referred to as the MHU methodology because the within-household units are being inferred via the MHU program. The second methodology writes a program that uses the relationship pointers in the CPS ASEC to create known within-household units and will be referred to as the pointer methodology. The focus of this comparison will be on unrelated subfamilies and unmarried partner units.

The MHU Methodology Using CPS ASEC

The first step in simulating NEWFAM_TYPE is to adapt the MHU program for the CPS ASEC. A number of variables needed to be modified. A crosswalk was created that made all of the relevant variables across the two data sets compatible. The expanded relationship category variable (PERRP) in the CPS was matched to the relationship variable (REL) in the ACS. Values for these two variables are shown in Table 1.

Table 1
 Crosswalk of the Relationship Variable in CPS ASEC and ACS
 U.S. 2008

CPS ASEC 2008 - PERRP		ACS 2008 - REL	
Code	Percent	Code	Percent
Total Persons	100.0	Total Persons	100.0
Reference total	39.1	0 Reference Person	38.2
1 With relatives		n/a	
2 Without relatives		n/a	
3 Spouse	19.5	1 Husband/Wife	18.8
4 Child	30.3	Total Sons Or Daughters	30.7
n/a		2 Biological	
n/a		3 Adopted	
n/a		4 Step Son/Daughter	
5 Grandchild	1.8	7 Grandchild	2.1
6 Parent	1.4	6 Father/Mother	1.2
7 Brother/sister	1.1	5 Brother/Sister	1.2
8 Other relative	1.9	Other Relative, total	2.2
n/a		8 Parent Inlaw	
n/a		9 Son/Daughter Inlaw	
n/a		10 Other Relative	
9 Foster child	0.1	14 Foster Child	0.1
Roomer/boarder, total	1.0	11 Roomer/boarder	0.5
17 With relatives		n/a	
18 Without relatives		n/a	
Housemate/roommate, total	1.9	12 Housemate/roommate	1.8
15 With relatives		n/a	
16 Without relatives		n/a	
Unmarried partner, total	1.6	13 Unmarried Partner	2.1
13 With relatives		n/a	
14 Without relatives		n/a	
Nonrelative, total	0.4	15 Other Nonrelative	1.0
10 With relatives		n/a	
12 Without relatives		n/a	

Note:

Persons in group quarters are removed from this analysis.

In the ACS 8,246,838 persons in institutional and noninstitutional group quarters were removed using the variable REL=16 or 17.

In the CPS ASEC, 170,534 persons were removed using the variable HRHTYPE=9 or 10

9=group quarters with actual families

10=group quarters with secondary individuals only

Variables that capture marital status also had to be modified. The A_MARITAL variable was adapted to correspond with the marital status variables in the ACS (MSP and MAR) (Table 2).

CPS ASEC 2008 - A-MARITL		ACS 2008 - MAR		ACS 2008 - MSP	
Code	Percent	Code	Percent	Code	Percent
Total Persons	100.0	Total Persons	100.0	Total Persons	100.0
1 Married-civilian spouse present	40.0	1 Married	39.7	1 Married, spouse present	37.5
2 Married - AF spouse present	0.2	n/a		n/a	
3 Married-spouse absent (exc separated)	1.1	n/a		2 Married, spouse absent	2.2
4 Widowed	4.8	2 Widowed	5.0	3 Widowed	5.0
5 Divorced	7.8	3 Divorced	8.5	4 Divorced	8.5
6 Separated	1.7	4 Separated	1.7	5 Separated	1.7
7 Never married*	44.3	5 Never married*	45.1	6 Never married*	45.1

*Includes persons under 15 years of age

There are a number of variables that directly translate, such as roster order which is SPORDER in ACS and PPPOS in CPS ASEC and the corresponding variable for SERIALNO in ACS is H_SEQ in CPS ASEC. Lastly, persons from group quarters are omitted from this analysis.¹⁰ Once the MHU is created, NEWFAM_TYPE is constructed using the same procedure that CEO used, as described in the section above.

The Pointer Methodology

The relationship pointer variables were used exclusively to form the within-household units.¹¹ A program was written that created the NEWFAM_TYPE variable by linking individuals together using these pointers. For example, if a child was linked to an unmarried partner, they were both flagged and later joined to the head of the household to form an unmarried partner unit. However, for unrelated children with no pointers, no attempt was made to assign them to a within-household unit. This differs from the MHU methodology where all dependent children are assigned to a MHU. As a result, in this analysis, creating the NEWFAM_TYPE variable using the pointer variables is not as sophisticated as the MHU routine and therefore the results are not exactly comparable.

¹⁰Using the HRHTYPE variable 170,534 persons were removed from this analysis. HRHTYPE=9 identifies persons in group quarters with actual families and HRHTYPE=10 identifies persons in group quarters with secondary individuals only.

¹¹ At first glance, it looks like the variable FTYPE in the CPS ASEC creates some of the same household/family units that the MHU program has simulated. This variable divides the household into primary families, nonfamily householders, related subfamilies, unrelated subfamilies, and secondary individuals. However, there are important differences. One example is the unrelated subfamily as defined by FTYPE includes unmarried partners with children, whereas the NEWFAM_TYPE has a unique code identifying unmarried partners and children.

In addition, the cohabiter pointer provides information that can never be inferred in the ACS. This pointer not only links unmarried partners to the reference person; it also links partners when neither of them is the reference person. As discussed above, there are insufficient data in the ACS to establish this relationship using the MHU methodology.

The Results

Table 3 shows the number of persons in unmarried partner and unrelated subfamily units using the two methodologies. Overall, the pointer methodology is able to capture 2.9 million more persons in these types of units than the MHU methodology; 3.2 million more persons in unmarried partner units and 311,300 fewer persons in unrelated subfamilies. The majority of this difference is due to the information provided by the cohabiter pointer that is only available in the CPS ASEC.

	MHU Methodology		Pointer Methodology		Difference	
	Unweighted	Weighted*	Unweighted	Weighted*	Unweighted	Weighted*
Number of Persons, total	11,717	16,484,846	13,510	19,363,516	-1,793	-2,878,670
Unmarried partner unit	11,168	15,668,051	13,184	18,858,061	-2,016	-3,190,010
Unrelated subfamily unit	549	816,795	326	505,455	223	311,340

*The weight used throughout this analysis is MARSUPWT

Table 4 illustrates the difference the cohabiter pointer makes in the ability to capture unmarried partner units. Without this pointer, the MHU methodology must rely solely on the ACS relationship variable category – unmarried partner of the reference person. The pointer methodology however is able to identify three additional types of relationships that the MHU methodology cannot: 1) “miscoded” married partners (2.4 million), such as roommates or other nonrelatives who identified themselves as connected to the reference person via the cohabiter pointer but are not coded as unmarried partner in the household relationship variable, 2) cohabiters who crossed over the relative/non-relative divide in the household, for example, the daughter of a reference person living with her boyfriend (727,200) and 3) persons who cohabit with someone in the household other than the reference person, such as two roommates (143,600).

Subtracting these persons from the total number estimated using the pointer methodology yields 15,581,800 persons living in unmarried partner units – a difference of 86,200 from the MHU-derived estimate of 15,668,100.

Table 4 Unmarried Partner Units - Two Methodologies U.S. 2008 CPS ASEC					
	Unmarried Partner Units				
	Total	Cohabitors linked to reference person		Cohabitors linked to others	
		Unmarried partner REL=10	"Miscoded" Unmarried partner**	Nonrelative cohabiters linked to	
			Relatives	Nonrelatives	
MHU Methodology					
Unweighted	11,168	11,168	na	na	na
Weighted*	15,668,051	15,668,051	na	na	na
Pointer Methodology					
Unweighted	13,184	11,088	1,510	487	99
Weighted*	18,858,061	15,581,828	2,405,436	727,243	143,554
Difference					
Unweighted	-2,016	80	na	na	na
Weighted*	-3,190,010	86,223	na	na	na

*The weight used throughout this analysis is MARSUPWT
**Includes roommates or other nonrelatives who identified themselves as connected to the reference person.

Turning to persons in unrelated subfamilies (Table 5), the MHU methodology estimated 816,800 persons in unrelated subfamilies compared to only 505,500 using the pointer methodology. It seems counterintuitive that the methodology using actual pointers estimates 311,300 fewer persons in unrelated subfamilies. However, over two-thirds (215,400 persons) of that difference can be accounted for by the additional information that is provided by the cohabiter pointer.

For example, if there is a cohabiter in the household that did not identify as an “unmarried partner” and the cohabiter has a child, the MHU methodology assumes the parent and child to be an unrelated subfamily. Using the pointer methodology on the other hand, the two cohabiters, along with their children, if any, will be linked together to form an “unmarried partner unit.” Without the cohabiter pointer in the ACS, unrelated subfamilies will be slightly overstated and unmarried partners with children understated.

Most of the remaining difference is due to how the two methodologies define children. Because the MHU methodology expands the definition of children to include “dependent” children who are 18 and older, more “children” will be captured, thereby increasing the number of persons in unrelated subfamilies.¹²

¹² The number of persons 18 and older who become dependent children in MHU-created unrelated subfamilies is about 24,000.

Table 5 Persons in Unrelated Subfamilies - Two Methodologies U.S. 2008 CPS ASEC		
	Unweighted	Weighted*
Number of Persons		
MHU Methodology	549	816,795
Pointer Methodology	326	505,455
Difference due to:		
Total	223	311,340
Unmarried partner units	171	215,383
Other	52	95,957
*The weight used throughout this analysis is MARSUPWT		

Summary

When it comes to the measurement of poverty, the importance of establishing the proper unit of analysis cannot be overemphasized. The absence of a CPS ASEC-type relationship pointer in the ACS is problematic and presents challenges for those using this data source to improve the measure of poverty. Despite the lack of information regarding family formation, CEO has concluded the MHU methodology does a remarkable job of inferring relationship. More important, in the majority of cases examined, the inferences made with regard to relationship never *overestimated* the known relationship. With households growing more complex over time, particularly in NYC, the ability to clearly identify relationships becomes essential. The utilization of the MHU contributes significantly toward this goal, thereby adding an important dimension to a new measurement of poverty.