

The "Family/Couple/Household" Unit of Analysis in Poverty Measurement

John Iceland, U.S. Census Bureau*
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* Direct all correspondence to John Iceland, HHES Division, Bldg 3 Rm 1472, U.S. Bureau of the Census, Washington, DC 20233-8500, jiceland@census.gov. This paper does not reflect the official views of the U.S. Census Bureau. It reports the results of research and analysis undertaken by Census Bureau staff, and has undergone a more limited review than official Census Bureau publications. It is released to inform interested parties of research and to encourage discussion.

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Abstract

The unit of analysis used in poverty measurement continues to receive critical scrutiny. The debate revolves around what is the most appropriate unit-- the family, the household, or some other entity. This analysis discusses the existing options and offers a conceptually more refined alternative: the "family/couple/household" (FCH) unit, which assumes income pooling among family members, including cohabiting couples, but not among non-relatives, and takes into account the benefits from economies of scale for all household members. Poverty rates are estimated using alternative definitions. Overall, empirical results show modestly lower poverty rates when household-level economies of scale are taken into account. The difference is largest for persons living in nontraditional household arrangements, such as cohabitators and non-family members.

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Introduction

The unit of analysis used to measure poverty continues to receive critical scrutiny. The debate revolves around what is the most appropriate unit-- the family, the household, or some other grouping. Using the family as the basic unit, as in the official poverty measure, suffers from two substantive problems. First, unrelated individuals, such as roommates, boarders, and lodgers, are treated as if they have the same economic needs as those living alone, despite their much lower housing costs. Second, cohabiting couples and any of their children are treated as if they did not pool resources at all.

The rapid growth in the number of cohabiting couples and people living in non-traditional housing arrangements (Casper and Bryson 1998; Casper and Cohen 2000) has magnified the effect of these problems. While there is a growing consensus that cohabitators should be treated more like other families in poverty measurement (Citro and Michael 1995), it is less clear whether other unrelated individuals in a household should be considered part of a single unit. There is little evidence on the issue of whether such people actually pool their income and share resources. Yet even if unrelated people in a household do not share resources, they still benefit from lower housing costs associated with living with others (i.e., economies of scale).

This analysis addresses the weaknesses of using the official family definition, the cohabiting couple definition (which ignores household economies of scale), and the household definition (which assumes extensive resource sharing among non-family members) by proposing the *family/couple/household* (FCH) unit of analysis. In essence, this method assumes income pooling among family members, including cohabitators, but not among non-relatives, and takes into account the benefits from economies of scale for all household members. The FCH unit of analysis can be implemented by using an experimental poverty measure recommended by a National Academy of Sciences (NAS) Panel on Poverty and Family Assistance (Citro and Michael 1995).

Using data from the 1998 Current Population Survey (CPS), this analysis presents results on poverty rates using four alternative units of analysis: the official family, the cohabiting couple, the household, and the FCH. While some studies have calculated poverty rates using the first and either the second and/or third units of analysis (Bauman 1999; Manning and Lichter 1996), this paper introduces the fourth. Furthermore, only a few studies have applied the new-- and improved-- experimental measure of poverty to look at poverty among different family types and household arrangements (e.g., Citro and Michael 1995; Hernandez 1998; Iceland et al. forthcoming; Short et. al. 1999).

Family Structure and the Sharing of Resources

Most people would agree that official statistics should take into account the realities of changes in society. Over the past few decades there has been a growing number of people in cohabiting relationships (Bumpass and Raley 1995; Bumpass and Sweet 1989; Smock 2000). The percentage of marriages preceded by cohabitation

rose from about 10% of those marrying between 1965 and 1974, to 56% of those marrying between 1990 and 1994 (Bumpass and Lu 1999; Bumpass and Sweet 1989). Furthermore, an increasing proportion of children are born into and raised by cohabiting couples. As of 1990, 13 percent of children live in households with a parent residing with an unmarried partner (Manning and Lichter 1996).

Also, more generally, many people continue to live in households with non-family members, such as housemates (Casper and Bryson 1998). Consequently, some argue that these cohabiting couple families and/or households should be considered a single unit because persons living in them benefit from economies of scale, and many also share resources (Citro and Michael 1995). For example, an unmarried partner's income may allow one to engage full-time in child care rather than market work (Manning and Lichter 1996). Treating unrelated individuals who are living with others like those who are living alone involves making a judgement that every unmarried/unpartnered person is entitled to live alone. Perhaps if they had more money, some of them would, but setting such residential privacy at the same level as a basic need for food, clothing, and shelter seems unwarranted.

Assuming there is some agreement that unmarried partners and/or unrelated individuals in a household should not be treated as if they lived alone, some issues remain unresolved. First, most would agree that there should be some stability in arrangements for a group of persons to be considered a unit. Some research on this issue by Bauman (1999) and Hernandez (1998) suggests that there is a moderate degree of stability in the cohabiting and household units-- a majority of both types of arrangement last for over half a year. This favors considering *either* cohabiting persons or households as the appropriate unit in poverty measurement.

A second issue that remains unclear is the extent to which people share resources in various types of units (Citro and Michael 1995). At the very least, people in larger households benefit from economies of scale, and this argues for adopting a more inclusive unit of analysis. However, due to lack of good data, there is little research which directly examines the extent of resource sharing within households. Bauman's study (1999), which uses an indirect method, suggests that while there is some resource sharing, non-family members, as traditionally defined, unsurprisingly share less. The NAS Panel on Poverty and Family Assistance concluded that cohabiting couples, but not unrelated individuals, should be treated as a unit in poverty measurement, and that more research should be conducted on resource sharing in various household types (Citro and Michael 1995). Barring other research that indicates *extensive* resource sharing among non-family members within households, these findings indicate the need for adopting a unit of analysis which takes into account the benefits of economies of scale families receive when living in larger households (e.g., cheaper rent), but not one which assumes that the income earned by one family in the household is at the disposal of another. Before describing the details of constructing the alternative unit of analysis, I briefly discuss relevant poverty measurement issues, focusing on the NAS recommendations for measuring poverty which permits the use of the FCH unit of analysis in poverty measurement.

Measuring Poverty

The current official poverty measure, originally adopted in 1965, consists of a set of thresholds for families of different sizes and composition which are compared to a family resource measure to determine a family's poverty status. Basically, the thresholds represent the cost of a minimum diet multiplied by three to allow for expenditures on other goods and services. Family resources are defined as gross cash income.

There is growing consensus that the way poverty is currently measured in the United States is outdated and could use further refinement (Citro and Michael 1995; Ruggles 1990). The poverty measures presented here are based on the work of the 1995 National Academy of Sciences (NAS) panel on Poverty and Family Assistance, which published a report with a series of recommendations for improving the official poverty measure (Citro and Michael 1995).

The panel recommended several changes to the measurement of family resources and the construction of poverty thresholds. Under the experimental poverty measure, a family's resources are defined not just in terms of gross cash income, but rather as the value of cash income plus the value of near-money benefits that are available to buy the goods and services that are covered by the new thresholds, minus non-discretionary expenses. Near-money benefits include the following: food stamps, housing subsidies, school lunch subsidies, home energy assistance, and the Earned Income Tax Credit. Expenses subtracted include: income and payroll taxes (including capital gains/losses estimates), child care and other work-related expenses, and medical out-of-pocket costs.¹

Poverty thresholds under the experimental poverty measure are constructed in a more refined manner than under the current official measure. Experimental poverty measure thresholds are represented by a dollar amount for food, clothing, shelter, and utilities, as well as a small amount to allow for other needs (e.g., household supplies, personal care). A threshold is developed for a reference family type consisting of two adults and two children using Consumer Expenditure Survey data. The thresholds used here are set at the midpoint of the ranges recommended by the NAS panel. The reference family threshold is then adjusted, using an equivalence scale, to reflect the needs of different family sizes and types. Further adjustments to the thresholds are made to reflect geographic differences in housing costs (Short et al. 1999).

The panel's recommendations on thresholds, and in particular "equivalence scales," are of special relevance to the issue of the unit of analysis. The equivalence scale recommended by the NAS panel has two parameters. One parameter reflects that children consume less on average than adults- roughly 70 percent as much on average, according to the panel. The other parameter reflects economies of scale available to larger families by adding a decreasing amount to the poverty threshold for each additional family member. The thinking behind this is that a four-person family typically does not need twice as much for money for housing, food, and transportation as a two-person family.

One problem with the current official poverty measure is that it contains only an implicit equivalence scale, as thresholds for families of different sizes and types were originally constructed simply based on some rough empirical observations of what families of different sizes and types consumed (using data collected in the mid-1950s). In short, having an explicit equivalence scale which takes into account household size and composition, as in the experimental poverty measure, is a key element in constructing the FCH unit of analysis, as described in detail in the following section.

Defining Alternative Units of Analysis

Four alternative units of analysis are discussed here: the official family, the cohabiting couple family, the household, and the proposed FCH. The first three units represent viable alternatives discussed in the NAS panel's report (Citro and Michael 1995), and the fourth addresses conceptual weaknesses inherent in the first three.

The official family currently used in poverty measurement basically consists of persons related to one another by birth, marriage, or adoption. This definition includes siblings and other kin. According to this definition, there may be multiple families within a household.²

In the "cohabiting couple" unit of analysis, families in households where no person is identified as an unmarried partner are defined as in the official family measure. However, in households where a person *is* identified as an unmarried partner, the householder's family and the unmarried partner's family are combined into a single unit with pooled resources and a different threshold based on the size and composition of the combined unit.

The third unit of analysis-- households-- consists of all persons who occupy a housing unit. So in addition to family members and cohabiting couples, this unit includes all housemates, roommates, boarders, and foster children who share the housing unit.³

When using any of the three units of analysis described above, poverty is calculated by comparing the unit's aggregate resources to the unit's threshold. The threshold used depends on the number of adults and children in the unit.

The fourth unit of analysis-the FCH-- basically involves using the poverty threshold corresponding to the *household's* size and composition, and multiplying it by the ratio of each *family's* (including cohabitants) size to the household's size.⁴ To calculate poverty status, one would then compare a family's income-family as defined in the cohabiting couple unit-- to this threshold. In other words, the procedure basically uses a threshold which takes account of household economies of scale (by using information about household size and composition), but then takes the family's share of that overall threshold and compares it to the family's income to determine poverty status.

Below is a mathematical description of the equivalence scale. The NAS two-parameter scale is defined as:

$$(a + p*c)^F$$

where $p=.7$, and $F=.7$, a =number of adults in family, and c =number of children in family.

In contrast, the NAS FCH unit two-parameter scale can be stated as:

$$(ha + p*hc)^F * ((a+p*c)/(ha + p*hc))$$

where $P=.7$, and $F=.7$, a =number of adults in family including cohabitants, c =number of children in family, ha =number of adults in household, and hc = number of children in household.⁵

Following is an example which illustrates both the implementation and the implications of using alternative units of analysis. It shows the application of the two-parameter scale, and resulting poverty thresholds and poverty statuses, using the four units of analysis (see Table 1).

The table shows a simulation of a household containing four people: Individual 1 (observation 1) is the householder, who cohabits with another person (observation 2), who has a child (observation 3); observation 4 is a boarder. Under the current official measure of poverty, there are three units in this household (observation 1 alone, observations 2 and 3, and finally observation 4). Under the cohabiting unit of analysis, there are two units (observations 1-3, and observation 4). Under the household unit of analysis there is just one unit.

According to the family unit of analysis, the unit threshold is estimated by applying the two-parameter equivalence scale to units of one, two, and one individuals, respectively to the reference family (i.e., two adults and two children) threshold of \$15,998. Under the cohabiting unit of analysis, the threshold is estimated by applying the two-parameter scale to two units-one containing two adults (the householder and the cohabitor) and one child, and the other unit containing just one adult. The threshold for the household unit of analysis is calculated by applying the two-parameter equivalence scale to a unit containing three adults and one child.

Finally, under the FCH unit of analysis, the threshold for the two units under this definition (one containing two adults and one child and the other containing one adult) is calculated by applying the FCH two-parameter equivalence scale to units of three people and one individual, respectively, to the housing and utilities portion of the reference family threshold of \$15,998. The FCH equivalence scale is applied only to the housing and utilities portion of the complete food, clothing, shelter, and utilities (FSCU) threshold because these are the main elements which people in households benefit from economies of scale. The share of the FSCU threshold allocated to housing and utilities is 44 percent (Short et al., pg. C-1), or \$7,039. The standard NAS two-parameter equivalence scale is applied to the other 56 percent of the threshold for each of the two units.⁶ Unit incomes are calculated by simply summing the income over the members of each unit, and poverty is then calculated by comparing the unit income to the unit threshold. Note that observations 2 and 3, who are the cohabitor and her child, are poor under the official family definition, but not under the cohabiting family definition (and other definitions), that is when their resources are pooled with those of the householder. Also note that while observation 4 (the boarder) is poor under the family or cohabiting family definition, she is no longer poor in the FCH unit of analysis because her threshold is lower. Her poverty threshold is lower because we assume, under this unit of analysis, that although she may not share her income with others or receive money from them, she still benefits from the economies of scale of living with other people (e.g., her rent is probably lower than if she were living alone).

The question still remains: how much does using different units of analysis really matter? I use 1998 CPS data (which contains information on income for the 1997 calendar year) to estimate poverty rates with different units of analysis.

Poverty Rate by Unit of Analysis

Table 2 shows 1997 poverty rates by units of analysis using the NAS poverty measure described above. The poverty rate using the official family unit of analysis was 15.4 percent in 1997. As expected, the more inclusive the unit of analysis, the lower the poverty rate. The poverty rate when using the FCH unit, at 14.7 percent, falls between the cohabiting couple unit (14.9 percent) and the household unit (14.0 percent).⁷

Chart 1 provides more detail of the effect of moving to more inclusive units of analysis by family type. Doing so has virtually no effect on married couples, most of whose household situations do not change when the units are defined differently. Estimated poverty rates for single-parent male-householder families go down slightly, from 15.2 percent to 15.0 percent when the FCH unit of analysis is adopted, indicating that people in male-householder families slightly benefit from economies of scale when living in larger units. Among female-householder units, poverty rates decline slightly from 34.1 percent under the official unit to 33.9 percent under the FCH unit, indicating a modest change by taking further economies of scale into account.

Cohabiting couple families are obviously particularly affected by moving away from the official family unit of analysis. When using the official family unit, the NAS poverty rate for those in cohabiting couple families was 31.8 percent in 1997. Under the FCH unit of analysis, when the incomes of the unmarried partners are pooled, the poverty rate is nearly halved, to 16.7 percent. For children of cohabiting couples, the difference is even more dramatic. The poverty rate declines from 47.1 percent under the official unit of analysis definition to 24.7 percent using the FCH unit of analysis. These estimates under the FCH unit of analysis are similar to those under the cohabiting couple and household ones.

Finally, the poverty rate for unrelated individuals goes down under the FCH unit of analysis definition from 21.0 percent under the official family to 19.9 percent, indicating a modest effect of household economies of scale. This is higher than the 16.4 percent poverty rate under the household unit of analysis.

Another way to examine who is most affected by using different units of analysis is to look at the effect by a person's relationship to the householder. Table 3 indicates that the effect of using a more inclusive unit of analysis is smallest for persons who are identified as core household members-householders, spouses, children, and other relatives of the householder. Poverty rates for these persons tend to change little because they often live in households where they are part of the only family unit present. The poverty rate for the reference person is 14.7 percent when using the official family unit of analysis, slightly less at 14.2 percent when using the cohabiting couple unit, 14.1 percent with the FCH unit, and finally 13.8 percent when using the household unit.

However, we observe, as expected, a substantial effect of using more inclusive units of analysis on persons identified as unmarried partners, non-relatives, housemates, roomers, and boarders. For example, the poverty rate for unmarried partners with families declines from 47.9 percent when using the official family unit of analysis to 15.9 percent when using the FCH unit. This is slightly lower than the 17.5 percent who are poor when using the cohabiting unit of analysis. While poverty rates for unmarried partners are considerably lower when using any of the more inclusive units of analysis, their poverty rates are still higher than the overall poverty rate, mainly because family resources among unmarried couples tend to fall short of family resources in married-couple families (e.g., Manning and Lichter 1996).

For people who are identified as housemates, roommates, or boarders, their poverty rate is 30.9 percent when using the official family definition. When using the FCH definition, the estimated poverty rate falls to 27.8 percent, indicating that such people clearly benefit from household economies of scale. Poverty estimates among

housemates/roommates/boarders are even lower under the household unit of analysis, 13.5 percent; again, this unit of analysis assumes that all people within households extensively share their resources.

Conclusion

This analysis presents poverty rates using four alternative units of analysis: the official family, the cohabiting couple, the household, and finally the "family/couple/household" (FCH) which addresses the weaknesses of the other three methods. In essence, this conceptually more refined method assumes income pooling among family members, including cohabiting couples, but not among non-relatives, and takes into account the benefits from economies of scale for all household members.

Overall, empirical results show modest differences in poverty rates when using the FCH unit of analysis. In general, estimated poverty rates are lower when using more inclusive units of analysis which assume greater pooling of resources and are more affected by economies of scale. The difference is largest for persons living in nontraditional household arrangements, such as cohabitators and non-family members. There is a particularly large effect on the rates for children of cohabiting couples.

More research on the degree of resource sharing would more definitively resolve the debate as to which unit of analysis should be chosen for measuring poverty. However, without further evidence indicating extensive resource sharing among non-family members such as housemates and boarders, the FCH unit of analysis is the conceptually most refined, and appropriate, unit for poverty measurement.

Footnotes

1. Some of the NAS Panel's recommendations are not implemented here because necessary data (or model estimates) are not available. In particular, the CPS contains no data on child support payments made by the payer, or the value of benefits received under the Woman, Infants, and Children nutritional supplement (WIC) program and the school breakfast program.
2. Note that while a "family" in Census Bureau publications refers specifically to a unit with two or more people related by blood, adoption, or marriage, a "family" with regard to the family poverty unit of analysis can also consist of a single unrelated individual. That is, even though these individuals are not a "family," per se, they are counted as a separate unit for the purposes of poverty measurement.
3. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied as separate living quarters. Separate units are those in which the occupants live separately from any other people in the building and which have direct access from the outside of the building or through a common hall.
4. As will be described shortly, the FCH two-parameter equivalence scale is actually only applied to the housing and utilities portion of the threshold, because this is the portion which people benefit from economies of scale; the standard NAS equivalence scale is applied to the rest of the threshold.
5. The FCH unit of analysis can also be used with other equivalence scales. For example, the three-parameter scale described by Betson (1996) and implemented in the U.S. Census Bureau report (Short et al. 1999) is defined as:
two-adult only: 1.41
for single-parent families: $(a + .8 + p*(c-1)) F$
for other families: $(a+p*c) F$
where $p=.5$, and $F=.7$, a =number of adults in family, and c =number of children in family.
The FCH three-parameter scale can thus be defined as:
two-adult only: $1.41 * (a/ha)$
for single-parent families: $((ha + .8 + p*(hc-1)) F) * (((a+.8+p*(c-1)) / (ha+.8+p*(hc-1)))$
for other families: $((ha+p*hc) F) * (((a+p*c)/(ha+p*hc)))$
where $p=.5$, and $F=.7$, a =number of adults in family, c =number of children in family, ha =number of adults in household, and hc =number of children in household.
6. For example, the poverty threshold for the unit of one person (observation 4) in the FCH unit of analysis is computed in the following way: $FCH \text{ threshold} = ((0.44*\$15,998*((3+0.7*1)^{0.7})/((3.4)0.7))*((1+0.7*0)/(3+0.7*1)))$
 $(0.56*\$15,998*((1+0.7*0)^{0.7})/((3.4)0.7)) = \$5,882$. Note that the denominator $(3.4)^{0.7}$ refers to the reference family size, with two adults equaling one unit each and the children equivalent to 0.7 units each. Thus, the equivalence scale is applied by multiplying the reference family threshold by the ratio of the unit size to the reference family size (as defined by the equivalence scale).
7. The current official poverty rate, which is based on the official family unit but does not contain the changes recommended by the NAS panel, was 13.3 percent in 1997.

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(Click on the image above to zoom in)
Table 2. Poverty Rates by Unit of Analysis, 1997

Unit of Analysis	Poverty Rate
Official family	15.4
Cohabiting couple	14.9
Family/Couple/Household (FCH)	14.7
Household	14.0

Source: author's tabulations of 1998 March CPS supplement data.

Note: poverty rates based on the National Academy of Sciences poverty measure.

Chart - Poverty Rates for People by Family Type and Unit of Analysis, 1997

Table 3. Poverty Rates by Unit of Analysis and Relationship to Householder, 1997

Relationship to Householder	Official Family	Cohabiting Couple	Family/Couple/Household (FCH)	Household
Overall	15.4	14.9	14.7	14.0
Reference person	14.7	14.2	14.1	13.8
Spouse	8.7	8.7	8.7	8.6

Child	17.1	16.8	16.8	16.4
Other relative	20.5	20.8	20.8	20.5
Non-relative with relatives	50.9	34.5	31.1	18.3
Non-relative without relatives	39.9	40.2	35.7	16.8
Unmarried partner with relatives	47.9	17.5	15.9	15.7
Unmarried partner without relatives	27.4	13.9	13.9	14.7
Housemate/roommate/boarder	30.9	31.3	27.8	13.5

Source: author's tabulations of 1998 March CPS supplement data.

Note: poverty rates based on the National Academy of Sciences poverty measure.