Valuing Housing Subsidies in a Measure of Poverty in the Survey of Income and Program Participation

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The official definition of poverty dates back more than 30 years to the early 1960's. There is general agreement that the underlying concepts of the current measure do not adequately reflect reality any longer. The Committee on National Statistics of the National Research Council investigated the underlying concepts and measurement methods in depth. This led to the release of a report containing a set of recommendations about envisioned changes to the current poverty definition. Proposed changes focused on three major areas: the poverty thresholds, the measurement of resources, and data sources.

The panel recommended a resource measure that represents disposable money and near-money resources. This paper deals with the measurement of a specific type of resource, the monetary benefit arising from living in public or subsidized housing. We will examine various methods of accounting for housing subsidies in a new measure of poverty using data from the 1991 Survey of Income and Program Participation (SIPP).

The Census Bureau currently estimates housing subsidies in the Current Population Survey to provide an estimate of the subsidy effect on poverty. We will begin by adapting this measure to SIPP data. We will then explore alternatives to this measure. Alternatives include various methods of determining the recipiency unit and of simulating subsidy amounts. We then examine the effect on poverty rates using theses methods. Mean and aggregate subsidy amounts are compared for the purpose of selecting the 'best' method.

METHODS

We will look at the following five methods of calculating housing subsidies:

Current Method - This method employs the current method of calculating subsidy amounts based on data from the 1985 American Housing Survey (AHS) and matching them to families in the SIPP.

Household Method #1 - This method uses the current census method of calculating subsidy amounts based on data from the 1985 AHS. It matches subsidy amounts to families using the updated method of calculating the number of bedrooms.

Household Method #2 - This method uses regression coefficients based on 1993 AHS data to impute household subsidy amounts. The imputation method for the number of bedrooms is identical to that in household method#1 above.

Household Method #3 - Same as Method #2 above except a differently specified regression.

Fair Market Rents - The last method uses Fair Market Rents (FMRs) to value housing subsidies.

The Current Census Measure

The Census Bureau has been valuing housing subsidies since 1979. Poverty estimates which take account of housing subsidies in measuring resources have been published annually using the Current Population Survey (CPS).[1] This current method has 3 basic steps

1)Model market rents
2)Calculate subsidy amounts
3)Match subsidy amounts to each family

1.)Model Market Rents

The current method uses the 1985 AHS and estimates monthly housing costs for non-subsidized renters[2] in two-bedroom apartments as a function of four indicators. Their monthly housing cost, the dependent variable, includes both rent and utility costs. The four independent variables are:

-- full baths (dummy variable in which 1 means 2 or more baths),

-- presence or absence of three kitchen appliances: refrigerator, dishwasher and garbage disposal (dummy variable in which all must be present to have a code of 1, absence of any one of these appliances results in a code of 0),

-- presence of any of four problems: hole(s) in wall(s), hole(s) in floor, peeling paint, rats, (dummy variable in which presence of any one of these yields a code of 1 and absence of all yields a code of 0),

-- index of satisfaction with community services: police, hospital, public transportation, and shopping, (a response of yes or don't know for each of these services adds 1 to the index).

Separate regressions are run for each four regions, Northeast, Midwest, South, and West. The regression coefficients are then applied to the housing characteristics of subsidized renters[3] in the relevant region, yielding market values of housing costs for subsidized renters.

2.) Calculating subsidy amounts

Renters are asked during the interview about their actual rent paid. Average subsidy amounts for two-bedroom apartments in each of the four regions can therefore be calculated as the difference between the average estimated market value and average rent paid.

3.) Matching subsidy amounts to families

The next step is to match families to subsidy amounts. This is done by assigning subsidy amounts to families for which householders have indicated that they are living in public housing or pay lower rent because the government pays part of the cost. These renters are divided into three income categories with separate subsidy amounts for each category. The income categories were between $6,000 and $9,999 and above $10,000.

A family can belong to one of three bedroom categories, depending on family size and composition: two bedrooms (the base group), or less or more than two bedrooms. The current method is therefore based on a region-income-bedroom matrix of 36 different subsidy amounts.

Number of bedrooms

Our current method imputes the number of bedrooms based on the composition of the primary family and related subfamilies. The following steps describe this method.

-- Select the primary family and related subfamilies from the household.

-- -- The head of the primary family is assigned one bedroom, to be shared with a potential spouse.

-- One bedroom is assigned for every two children under the age of six.

-- One bedroom is assigned for every two persons over the age of six of the same sex.

-- If there is only one child under the age of six, the child shares a bedroom with any same sex person over six.

-- If there is an odd number of children under the age of six (and more than one), the extra child is assigned own bedroom.

-- If there is an odd number of persons over the age of six, the extra person is assigned own bedroom.

-- Unrelated subfamilies are assigned one bedroom, regardless of family size.

-- A primary individual is assigned own bedroom.

-- Secondary individuals are assigned zero bedrooms.

The imputed number of bedrooms then translates into a family subsidy amount depending on family income . In subsequent years, the valuation of subsidies was updated to reflect changes in the cost of housing.[4]

Household Method # 1

This method differs from our current method only in the way bedroom size is calculated.[5] We again use 1985 data from the AHS.

Improved imputation of the number of bedrooms

The currently used method of calculating the number of bedrooms may be criticized on a number of grounds. First, it probably overestimates the allowable number of bedrooms. It is possible for one person in the household to use the living room as their sleeping quarters. A family can thus choose to either move into a currently available unit with one person sleeping in the living room or to wait for a unit with an extra bedroom to become available.

Second, the number of bedrooms should be a function of household composition as opposed to family composition. The assignment of one bedroom to each unrelated subfamily, regardless of size, does not reflect reality. Since the official poverty measure is family based, the Census bedroom routine is also family based to facilitate measuring the impact of housing benefits on poverty.

Third, the Census routine does not assign all married couples their own room. Married couples in unrelated subfamilies, for instance, had to share their bedroom with any number of potential children. Likewise, married couples in related subfamilies were not assigned their own bedroom, but were treated like any other family members of different sex. Our methods try to correct these problems.

We arrive at the number of bedrooms based on the household composition rather than the family composition. Household housing benefits are then prorated to arrive at family benefits essential for poverty estimation. The following steps characterize this procedure.

-- The householder is assigned one room, to be shared with a potential spouse.

-- Each married couple in the household is assigned an own room.

-- The number of bedrooms is estimated conservatively in that an "extra" person is not assigned a bedroom but rather is assumed to sleep in the living room. At most one person can sleep in the living room. For instance, if there is one "extra" male and one "extra" female over the age of six, one of the two can sleep in the living room and the other is assigned a bedroom.

The number of bedrooms translates into a household subsidy amount depending on region and household income. The household subsidy amount, in turn, translates into a family subsidy amount by prorating by the number of persons in the family relative to the number of persons in the household.

Household Method # 2

We now estimate a new model of monthly costs of nonsubsidized renters of two-bedroom units for the four regions. The model is based on newer data from the 1993 AHS. The new model includes a broader range of explanatory variables than the one currently used, and many of the variables are continuous, rather than dichotomous. Number of bedrooms and income are entered explicitly into the equation, as well as a variable representing income squared, presuming a nonlinear relationship between monthly cost and income.

Other variables, include characteristics of the unit, appliances, housing problems, and a large set of geographic indicators. These indicators attempt to define housing markets in a much more precise way than the region indicators used in the current methods. As with the current method, the estimated coefficients are then applied to subsidized renters to arrive at an estimate of their unit's market value.

A new approach to calculating subsidy amounts

Instead of calculating subsidy amounts as the difference in average market values and average actual costs we now calculate subsidy amounts for each person as the difference between the unit's market value and it's actual cost to the renter based on survey response. This vector of estimated subsidies is then regressed on the number of bedrooms the family is eligible for, income and income squared, and the geographic indicators to capture 'housing markets'. All of the variables in the regression are available in the SIPP, and the estimated coefficients from the AHS data are then used in the SIPP to predict subsidy amounts for families.

Table 1 shows the mean values of subsidies as calculated from the 1993 AHS. For units indicated as subsidized, we predict an average of $477 per month market rent. On average, renters of these units report paying $259 per month. The resulting average subsidy amount we calculate to be $230 per month.

Table 1	
Reported monthly cost, predicted monthly cost, and estimated subsidy amounts: mean values	
monthly cost	$259
predicted monthly cost	$477
subsidy	$230

Household Method # 3

This method differs from the previous method only in the specification of the model that regresses calculated subsidy amounts on the number of bedrooms, income, and geographic variables. Specifically, we expand our geographic indicators by dividing the nation into 52 housing markets, compared to 21 markets in the previous method.

FMR Method

The Department of Housing and Urban Development (HUD) has developed FMRs for the purpose of determining rental subsidies for eligible households in 341 metropolitan areas and in 2,416 counties outside metropolitan areas. These FMRs are set at the 45th percentile of the rent distribution of two-bedroom apartments in a given area. Section 8 renters pay 30 percent of their net countable income towards a rental amount that cannot exceed the Fair Market rent for this area. The balance is the subsidy amount.

Since the relevant geographic identifiers are available in SIPP, we are able to match the HUD FMRs to our 1991 SIPP file. We took the following steps to adapt FMRs for our purpose of estimating subsidy amounts in SIPP and the effect on poverty.

-- Impute the number of bedrooms as in our household methods.

-- Estimate the household subsidy by subtracting 30% of household income from the fair market rent.

-- Adjust the household subsidy for relative family size to arrive at the family subsidy.

Fair Market Rents are generally considered to be ill-suited to this application because they are often set quite high. It is believed that FMRs are often set higher than the going market rent for a particular unit in order to motivate landlords to participate in the program. Thus, we expect subsidy amounts based on this method to be higher than those based on other methods. Our expectation is that these estimates will represent an upper bound on our valuation of housing subsidies.

In addition to some problems with FMRs in general, there is a drawback of using FMRs in the way outlined above. While we do collect information on rent paid in the SIPP, we have not used it here to calculate the actual subsidy amount. Instead, we estimate the subsidy as the difference between the FMR and 30 percent of net countable income. This procedure tends to overestimate subsidy amounts. The size of the bias is not known, since we do not have information on the difference between Fair Market Rents and actual rent paid by residents in subsidized housing.

RESULTS

This paper presents the results of five methods of valuing housing subsidies. The methods are used to impute subsidy values in the SIPP and then we calculate various statistics by which we compare the methods. We compare aggregate subsidy amounts from the methods to benchmarks from HUD on expenditures on housing programs. We look at average monthly subsidies as calculated by each method. And finally we look at the effect on poverty rates using the different methods and the incidence of poverty on various population groups.

Aggregate Expenditures

The SIPP 1991 panel yields estimates of 14 million persons who lived in households which reported receiving housing subsidies for one or more months in calendar year 1991. Five million households reported a subsidy in January of 1991. This estimate is slightly higher than the 4.6 million households receiving assistance at the beginning of fiscal year 1991, as reported by the Congressional Budget Office based on data provided by HUD. As can be seen in Table 2, aggregate expenditures on housing subsidies vary greatly by estimation method. Data obtained from HUD suggest a target aggregate expenditure of $14.2 billion in 1991. The current Census method yields aggregate annual expenditures of $9.8 billion, and the household methods yield expenses of $8.7, $15.4, and $15.0 billion, respectively. The FMR method yields an annual total of 15.1 billion. The lowest estimate of aggregate subsidies is from the household method #1. This method differs from the current method in the way it assigns bedroom eligibility to families. It results in even lower total subsidies than the current method. The highest level of subsidy values are obtained using Household Method #2, one of the methods which uses a model to predict subsidy amounts.

Table 2 Aggregate Expenditures: 1991 (In Billions)	
Current method	9.8<
household method#1	8.7
household method#2	15.4
household method#3	15.0
FMR method	15.1

Mean subsidy levels

Table 3 shows the average monthly subsidies of persons (not families or households) who received subsidies for one or more months during 1991. These estimates are obtained by calculating the subsidy amount per family and than dividing that amount by the number of persons in the family. Household method #1 results in the lowest subsidy value while using FMRs gives a substantially higher subsidy amount.

Table3 Average monthly subsidies: 1991 (in Dollars)	
Current method	71.5
household method#1	62.80
household method#2	113.6
household method#3	110.8
FMR method	132.7

Effects on poverty

Adding housing subsidies to income has a negative impact on poverty. The current Census method of estimating subsidies lifts 1.3 million people out of poverty and lowers the poverty rate by 0.6 percentage points from 12.1

percent to 11.5 percent. The FMR method lifts 2.1 million people out of poverty and decreases the poverty rate to 11.2 percent.

Table4 The Effect of Housing Subsidies on Poverty: 1991			
Numbers in 1,000	No. Poor	Rate	Marg. Eff No. Poor
Base poverty	29,766	12.1	
Current method	28,437	11.5	1,329
household method#1	28,625	11.6	1,141
household method#2	28,007	11.3	1,759
household method#3	27,933	11.3	1,833
FMR Subsidy	27,622	11.2	2,144

Table 5 shows the effects of incorporating measures of housing subsidies into a measure of poverty by demographic characteristics. Adding housing subsidies to family income to determine poverty status affects subgroups differentially. Moreover, the impact of the FMR method relative to the other methods differs by subgroup. For example, the elderly population as measured in the SIPP for 1991 has a poverty rate of 9 percent. Including housing subsidies as income reduces the poverty rate to 7.1 percent, a 21 percent decline. But this difference is similar regardless of the method used. On the other hand, the poverty rate for children was 19.6 percent, and valuing housing subsidies using the current method only reduces the poverty rate by 0.4 percentage points, a 2 percent reduction. Using FMRs to value subsidies, however, has a larger impact on the poverty rate for children. This method reduces the child poverty rate by one percentage point, a 5 percent reduction. Similar differential effects are noticeable for other groups as well. The FMR method causes a reduction in poverty similar to the other methods in the South and Midwest, but a relatively larger reduction in the West and Northeast.

Most notably we see that the method selected matters for children and nonelderly adults, for persons living in the Northeast and West, and for Blacks and Hispanics more than for Whites. These differential effects may be due to the different family compositions or geographic differences in housing values as captured by the different methods.

	Base	Current method	household method#1	household method#2	household method#3	FMR Subsidy
TABLE 5 The Effect of Housing Subsidies, by Characteristics, 1991						
AGE						
Kid	19.6	19.2	19.3	18.9	18.8	**18.6**
Adult	9.3	9.0	9.0	8.8	8.8	**8.7**
Elderly	9.0	7.1	7.1	7.0	7.1	**6.9**
REGION						
NE	11.7	10.7	10.7	10.4	10.4	**10.0**

MW	9.1	8.7	8.7	8.5	8.4	**8.5**
South	15.1	14.8	14.8	14.8	14.7	**14.7**
West	11.2	10.7	10.9	10.4	10.4	**10.1**
RACE						
White	9.3	8.9	8.9	8.8	8.8	**8.7**
Black	29.0	27.5	27.9	27.0	26.8	**26.5**
Hispanic	27.6	26.9	26.9	26.4	26.3	**26.2**

Comparison with the CPS

Employing similar estimation techniques using the CPS instead of the SIPP yields similar results. A description of this application is in (Eller and Naifeh, 1997). While the analysis presented for the CPS is presented for 1993, the relative results are comparable (see table 6). For example, in that analysis aggregate housing subsidies using the current method are $10.7 billion for 1993, $16.6 billion using FMRs to value subsidies, and $12.2 and $12.5 billion using the regression models.

Average CPS subsidy amounts are higher than SIPP subsidy amounts since the former are household based while the latter are person based. However, monthly subsidy amounts have a similar relationship in the CPS as in the SIPP. The largest comparable subsidy valuation results from the FMR method, $247 per month in 1993. The lowest amount results from our current method, $160. The regression method amounts are midway between these two, $181 and $186 per month.

Table 6 also shows the effect on poverty rates of including the variously-valued subsidy amounts. As with SIPP the resulting poverty rates do not differ much for all persons across the methods shown here. The largest difference results from the use of FMRs to value housing subsidies.

Table 6 Housing Subsidies in the CPS: 1993			
	Aggregate ($billions)	Mean Subsidy (dollars)	Poverty Rate
Current	10.7	160	14.7
Method 2	12.2	181	14.6
Method 3	12.5	186	14.6
FMR	16.6	247	14.3

While the relative differences across methods are the same for the SIPP and the CPS there are important differences across the surveys. The SIPP counts less than full year receipt of housing subsidies, while the CPS does not. On the other hand, the SIPP reports more persons receiving subsidies than we find in the CPS.

CONCLUSIONS

In this paper we have described and presented several different methods of imputing values for housing subsidies to families in the 1991 panel of the SIPP. We have included these various imputed values in a measure of income or resources for the purpose of determining the effect on poverty status. We have shown that the methods used to impute the amounts vary in the effect on poverty estimates and that the effect may differ for different subgroups. The FMR method, while the easiest to employ, yields upper bound estimates on housing subsidies. Generally, however, the methods differ from one another by only small amounts and all the methods compare quite reasonably to available benchmarks.

There remain research areas to be explored. One important direction not yet undertaken is to use the reported amounts of rent paid by householders who report receiving rent assistance in the SIPP. Rather than using 30 percent of income to represent the amount paid by householders we would use the actual reported rent. While a

preliminary examination of these data suggest underreporting may be a problem, it is difficult to assess at this point the usefulness of these data.

In addition, it will be important to assess the behavior of the various methods in different panels of the SIPP. The current surveys, at different points in a decade, have difficulty with changes in geographic indicators. This is particularly true for indicators of metro areas by size. Of course, these variables are important in the models presented here. Further investigation needs to be done into the effect of these changes.

1. This method and the new alternative methods used here are described in more detail the paper, " Valuing Housing Subsidies in a New Measure of Poverty in the Current Population Survey", Naifeh and Eller.

2. Renters who reported that they did not live in public housing, did not receive state local assistance with housing costs and did not report their income for purposes of setting rent were classified as unsubsidized renters.

3. Subsidized renters were those who either reported living in public housing, or receiving state or local assistance with housing costs.

4. The update ratio is formed by the Bureau of Labor Statistic's Consumer Price Index (CPI) residential rent index for the target year divided by the corresponding index for the base year.

5. The Urban Institute suggested this alternative bedroom imputation method.