Valuing Housing Subsidies in a New Measure of Poverty:

A Statistical Match of the American Housing Survey

to the Current Population Survey

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This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

Introduction

The National Academy of Science's Panel on Poverty and Family Assistance analyzed the methods, concepts, and definitions currently used to determine the official poverty level from the March Supplement of the Current Population Survey (CPS.) In addition, the Panel investigated the possible effects of implementing their recommendations for changes to the poverty concept and the measurement methods. The Panel then released their recommendations for improvements to the official measurement of poverty in three main areas: the concept of a threshold, the definition of resources, and the adjustments necessary for geographic and family size equivalence.

In the area of resources, the Panel recommended that the value of noncash benefits be added to a family's resources for the determination of the family's poverty status. Although the CPS March Supplement does release an estimate on the monetary value of the housing subsidy, the procedure used to produce those estimates has several shortcomings. For instance, the estimates are based on 1985 American Housing Survey (AHS) data, which are then updated for inflation using the Consumer Price Index (CPI.) This paper will describe a new method for valuing housing subsidies and compare it to several other methods, including the method used to create the subsidy values currently released with the CPS March Supplement.

While the Panel did not offer a definitive alternative to the current method for estimating the value of housing subsidies, they did suggest several key elements that should be present in any such method which are not presently part of the Census Bureau's procedures. One element is an adjustment for the value of housing subsidies to reflect the local price level. Despite evidence in the real estate market that housing prices vary between housing markets, the present method distinguishes only between the four Census regions, Northeast, Midwest, South and West.

These and several related issues were the subject of a paper originally presented at the Joint Statistical Meetings in 2000, "Valuing Housing Subsidies: A Revised Method for Quantifying Benefits in a New Measure of Poverty". In that paper[1] potential solutions to these ongoing issues were proposed and the results evaluated against the current method.

[1] An abbreviated version of this paper is published with the Annual Proceedings. The full version is available from the U.S. Census Bureau web site as a working paper, www.census.gov/hhes/poverty/povmeas/papers.html.

The general methodology of this companion paper is to evaluate a new technique for valuing housing subsidies which addresses several of the shortcomings with the approach used in Stern 2000. The method detailed here differs from the previous one in several key ways.

- First, the set of uniquely identified Metropolitan Statistical Areas in the first stage is limited to 50, a group which should be stable over time, allowing for repeatability of the proposed procedure.
- Second, the statistical match is a predicted mean match, which eliminates several problems, including the problem of identifying which match is the best out of a set of replicates.
- Third, the statistical match is designed to find the market value of rent for households in the CPS. This rent can then be used to value the subsidy. In previous work, the value of the subsidy was put on the household record in the CPS.

The background section will briefly review the current method and a few of the alternatives analyzed in previous works by Naifeh and Eller 1997 and Stern 2000. The methods section will separately detail the hedonic housing cost method used to estimate the value of market rent for subsidized renters in the AHS and the predicted mean match used to transfer these estimates to households in the CPS. The evaluation section will explore the impact of this new procedure on the distribution of the monetary value of subsidies and on the final poverty distribution, focusing specifically on a practical, repeatable procedure which can be incorporated easily into CPS processing. The final section will address proposals for additional analysis and conclusions.

Background

The Current Population Survey March Supplement, the source for official poverty measurement, is a nationally representative sample of households. Because this survey asks detailed income and program participation questions, it is a rich source for determining poverty under the current definition. However, experimental poverty measures which include non-cash benefits as resources cannot be determined from the CPS alone. Specifically, the value of housing subsidies integrally relies on characteristics of the housing unit which are not available on the CPS. However, the CPS does identify people living in two types of subsidized housing. The first type is public housing, in which housing units are owned and operated by local housing authorities. The second type includes privately owned housing units which are rented at a reduced cost with reimbursement of the discount to the owner from a

federal, state, or local government program, such as the Section 8 program sponsored by the Department of Housing and Urban Development (HUD.)

The Census Bureau is currently using the AHS, a nationally representative sample of housing units, as the source of information on the housing subsidies. Because the two surveys have different purposes and different designs, using the information from one survey in the analysis of the other includes inherent difficulties, including different geographic representation and few common variables. Despite these obstacles, the AHS is a natural choice for the process of estimating housing subsidy values due to its extensive detail of the housing characteristics. The AHS identifies subsidized housing units in a more detailed fashion than the CPS. Furthermore, the AHS renters report the amount of rent and utilities they pay. As a result, the reported characteristics of the unit can be used to predict what the market value of the unit would be if the unit were unsubsidized. Finally, the value of the market rent can be used to estimate a subsidy from the difference between the estimated market value and the amount paid by the renter[2].

The current Census Bureau method uses the 1985 AHS as the source of subsidy value information. In a method explained in detail in Stern 2000 and Naifeh and Eller 1997, a simple regression of unsubsidized two-bedroom units on a small set of characteristics is used to predict the mean monthly rent for two bedroom units by region. The mean rental amount paid for subsidized renters in each region is then subtracted from the mean predicted monthly rent to determine the mean subsidy amount for a two-bedroom unit. Given adjustments for number of bedrooms and income of the households, a 36 cell matrix determines a subsidy amount appropriate for a given set of characteristics. Each year the subsidy values are updated for inflation using the Consumer Price Index Residential Rent Index. Each family in the CPS is assigned a subsidy from the table according to its own family income, number of bedrooms, and region.

One additional element in this method (and most of the methods described) is that the CPS does not collect information about the number of bedrooms in the unit. As a result, the current method includes a complicated method for imputing the number of bedrooms based on the composition of the primary family and the related subfamilies. The aim of this procedure is to associate a family with the number of bedrooms for which they would be eligible under some standard housing subsidy programs.

[2] HUD programs subsidize the "monthly cost" of the unit, rent plus utilities.

Naifeh and Eller (1997) made efforts to revise certain key elements. In their work, they took several new approaches to the modeling of market rents in the AHS and the method for matching AHS subsidies to the CPS including the method by which the number of bedrooms is imputed on the CPS. The changes to the modeling of market rents included a reformulation of the equation for estimating the market value of a subsidized rental unit. This approach modeled rents, for all units, as a function of characteristics of the unit and the household and geographic identifiers. They also investigated an approach to assigning the AHS subsidies to the families in the CPS. They estimated a model in which the AHS housing subsidies are the dependent variable determined by the following independent variables: the number of bedrooms for which a family was eligible, family income, family income squared, and the metropolitan area size categories. The coefficients from this model were applied to the families in the CPS to predict the relevant subsidy amount.

The ultimate goal of the Stern 2000 study was to improve the estimates which were consistently low according to the amount HUD reports having spent on housing initiatives. The revisions suggested in that paper focus on two main areas: the hedonic housing equation used to calculate a market rent for subsidized households and the statistical match as a method of assigning an estimated subsidy value to families in the CPS. Below is a short summary of the methods presented, the details are available in the paper.

The first revision suggested in the paper was focused on the procedure for estimating the market rent on the AHS. The basic equation was a standard hedonic housing price equation in semi-log form with the rent paid as the dependent variable and the set of characteristics on the unit and neighborhood as the independent variables. Whereas Naifeh and Eller used region, metropolitan status, and size of city to represent the differences between housing markets, Stern sought to identify places individually.

To reveal which locations had a significant impact on housing prices, a set of geographic area dummy variables was created for the analysis. In order to determine which geographic areas were significant in explaining housing market variation, the equation was estimated repeatedly using a stepwise procedure. At the outset, all 236 metropolitan statistical areas in the US were possibilities for inclusion as an indicator of differences in the housing market. One geographic variable at a time was added to the model which included all the structural characteristics until no additional improvements to R-squared could be made. Further, the geographic variables were tested jointly and independently with F-tests to assure that the set of geographic indices was significant.

Once the subset of 148 metropolitan areas was chosen, the model was estimated in its final version. The coefficients on the geographic dummy variables are the incremental difference in the rental price between a unit in a particular MSA and a unit that is either not in an MSA or is in an MSA whose rental price is not significantly different from non-MSA units. The market value of subsidized rental units was predicted using the estimated coefficients for non-subsidized rental units. The value of the subsidy was calculated as the difference between the predicted market rent and reported amount of rent paid.

The second revision concerned the method for assigning subsidies to the CPS based on the AHS. The procedure investigated was a statistical match of households between the two surveys. Unlike an exact match of a particular unit across two data sources, in a statistical match, each record from one data source is matched with a record from a second data source, where the matched record represents a similar unit. The general procedure used for the statistical match was to identify a cohort variable and then to define the distance function.

In this application of a statistical match, the fair market rents were used to construct a cohort variable. Since the FMRs are chosen as the 40th percentile of the rental price distribution for an apartment with a specific number of bedrooms, they serve in this analysis as a proxy for general rental price level in a specific area. Using cluster analysis on the FMR data, the resulting 14 distinct groups were called CLUSTER in that analysis. Since the FMR data includes a rental amount for every location either MSA or county in the US, clustering the areas into groups by FMR grouped together locations with similar rental prices.

The distance function included variables common to both surveys: the number of people in the household, the number of children in the household, household's MSA, state, marital status of the householder, senior citizen status of householder, race of householder, and the sex of householder. The evaluation sections showed that all the statistical matches did reasonably well. The distribution of subsidies on the CPS was a reasonable facsimile of the original distribution. However, the analysis was incomplete since it could not show statistically which match was the best.

Finally, Naifeh and Eller 1997 and Stern 2000 compare the results using these experimental methods to a fair market rent approach. This process benefits from the extensive work already conducted by the Department of Housing and Urban Development (HUD). Each year HUD publishes a list of fair market rents (FMRs), which are essentially estimates of the 40th percentile rent in the relevant local housing market. These rents are set for the

purpose of administering the Section 8 Housing Assistance Payments Program.[3] Consequently, it is a natural extension to use these rents to estimate the value of the housing assistance in the CPS by subtracting 30 percent of a family's income from the appropriately chosen FMR.

Although this method is described in detail in the earlier works, a review of the background will reinforce their usefulness for the purposes described here. Base market rents are calculated separately for each bedroom size category. To determine these with statistical reliability for every geographically unique housing market, HUD starts with the most recent Decennial (1990) Census data. For the largest metropolitan areas, HUD updates the rents intercensally using the AHS. For other FMR areas, HUD uses random digit dialing telephone surveys in conjuncture with trending factors based on the CPI to update the rents with statistical accuracy. The result of all this work is FMRs for every metropolitan area and every non-metropolitan county in the United States updated yearly.

The appeal of this approach is three-fold. First, the methods used to establish these rents are consistent with standard housing economic and statistical principles. Second, HUD has published these rents for all geographic areas, eliminating the problem of small sample size when using the AHS national sample alone. Third, since the local housing authorities administering Section 8 and other programs use the FMRs to set the amounts for vouchers, then any effort to estimate the value of vouchers would do well to use the same source of market rent information. As a result, this paper uses the FMR technique as a comparison to the methods below.

A New Direction

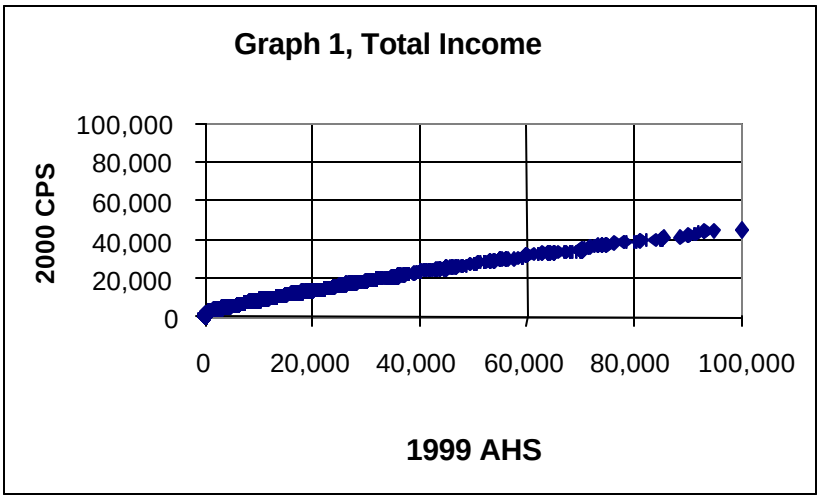
Although using fair market rents in the manner described above has intuitive appeal and statis tical support, it is not without controversy. HUD has argued that these rents do not attempt to estimate a market value for a subsidized housing unit, and are therefore not optimal for that purpose. Consequently, the Census Bureau is still exploring alternatives.

Model-based methods have several problems that need additional investigation. For example, the subsidy models estimated using the AHS data have low statistical explanatory power, therefore applying the estimated coefficients to the CPS raises questions about the predicted values. In addition, some of the models previously used

[3] Families in the Section 8 Certificate program pay 30 percent of their adjusted income in rent. The housing authority pays the remainder: rent charged less the amount paid by the tenant. The maximum allowable rent for a unit of a given size is the fair market rent. Details on HUD programs are available on the web site, www.hud.gov.

attempt to use size of city and region to identify the geographic differences in prices. This method, proposed as a way to include location without violating confidentiality, assumes that size of place is what makes cities similar in housing market. Finally, the inclusion of income in the model raises a concern, because the income is measured differently in the two surveys.

The systematic differences in income in the AHS and the CPS are exhibited in Graph 1. The graph is showing all the household incomes from the subsidized renters in both surveys. The observations of income are simply sorted in ascending order and matched lowest to lowest through highest to highest between the two surveys. It is a crude way of demonstrating that due to sampling and measuring differences, the distribution of income is different. Specifically, the CPS shows lower income levels than the AHS. As a result, any model based on AHS income and applied to CPS to predict rents will have a downward bias.



As explained in the methods and the evaluation sections, the predicted mean statistical match approach as implemented here addresses many of the concerns with the straight model-based approaches. For example, the match puts the value of the market rent on the CPS rather than the estimated subsidy. While the market rent is also correlated with income, the relationship between income and subsidy is maintained even when the model for predicted market rent omits income.

Method of Estimating Market Rent on the CPS

Changes to the model which predicts market rent on the AHS

The standard hedonic price equation derived in Stern 2000, applied to the AHS unsubsidized renters, is used here with one important revision. Since a primary concern of this work is consistency across time and repeatability, the list of metropolitan areas included as regressors in the first stage equation is limited to 50. Appendix A gives the full list of included variables and their coefficient estimates from the first stage model. No adverse effects resulted from the change to the set of geographic variables. As expected, the R-squared is lower: it was 0.3823 in the Stern 2000 model and is now 0.351. The newer coefficient estimates vary slightly in magnitude, but none changed sign and all remain significant.

As in the Stern 2000 procedure, the estimated coefficients are applied to the characteristics of the subsidized renters, creating a predicted monthly cost. To reduce confusion with the model used later, these costs will be called the market value of monthly costs, which is rent plus utilities. Table 1 shows some summary statistics about subsidized households in the AHS.

Table 1. Statistics on AHS Subsidized Households

	Market Value of Monthly Costs	Reported Monthly Costs	30% of Household Income
Mean	$614	$488	$506
Maximum	2,004	5,934	17,000
75th percentile	718	664	625
Median	587	405	300
25th percentile	476	203	162
Minimum	274	2	0

Changes to the statistical match procedure

In a major divergence from previous works, including Naifeh and Eller 1997 and Stern 2000, this new procedure does not estimate a subsidy amount on the American Housing Survey. Previously researchers tried to capitalize on the difference between reported rent paid and estimated market rent on the AHS and use that estimated subsidy amount in some method to estimated subsidies on the AHS. However, the differences between how income is measured in these surveys makes any model or statistical match which uses them suspect. And at the same time, the correlation between subsidy amount and income is too high to be ignored in these methods. The resulting approach is one in which market rents are statistically matched between the two surveys. After rents are assigned, the estimated subsidy on the CPS is calculated as the difference between market rent and 30% of household income.

The statistical match between the subsidized units in the CPS and the AHS is based on characteristics found in both data sets. The match between these two data sets was done on a household record level, the unit of measurement for which the AHS has the best information.

Unlike the statistical matching used in Stern 2000, the predicted mean method does not involve a cohort variable or a distance function. In the first stage a regression model estimates coefficients in the relationship between the shared characteristics and the market rent on the AHS. Once market rents are modeled in the AHS, the model is used to predict market value of subsidized rental units in both the AHS and CPS. In the second stage, the predicted values are statistically matched.

An important element in the model which predicts market rent on the AHS and the CPS is the involvement of geographic areas. All the geographic entities represented in the data sets were grouped according to the appropriate two bedroom Fair Market Rent. The resulting clusters assure that areas with the same level of housing prices are treated as having a similar housing market. For example, Cluster 1 includes all the geographic areas with very low rents. At the other end of the scale, Cluster 14 includes all geographic areas with the very high rents, like New York City. The estimates from this model are shown in Table 2. The parameters were used to find the predicted market rent on both the AHS and the CPS file, the basic matching key of the statistical match.

Table 2, Estimated Coefficients on the Model of Market Rents in the AHS

Dependent Variable: Market Rent
R-square=0.4998

	Estimate	Standard Error
Constant/Intercept	424.43	18.65
Number of Persons in Household	35.32	2.75
Percent of the Household Who are Children	-36.81	13.69
Is the householder 65 years old or over	-43.20	7.29
Is the householder married	30.16	7.43
Is the householder male	2.31	6.02
Cluster 2 [4]	-21.69	25.79
Cluster 3	1.52	20.02
Cluster 4	17.22	20.83
Cluster 5	16.17	19.90
Cluster 6	31.50	19.49
Cluster 7	53.74	19.86
Cluster 8	79.91	20.11

[4] Cluster 1, the group of areas with the lowest housing prices, is the omitted category.

Table 2, Estimated Coefficients on the Model of Market Rents in the AHS Dependent Variable: Market Rent R-square=0.4998		
	Estimate	Standard Error
Cluster 9	144.44	19.69
Cluster 10	150.34	19.63
Cluster 11	190.50	21.05
Cluster 12	224.90	23.64
Cluster 13	265.12	19.11
Cluster 14	493.59	21.11

Once values for market rent are attached to household in the CPS, subsidy amounts are calculated by subtracting 30 percent of household income as describe above for the FMR calculations.

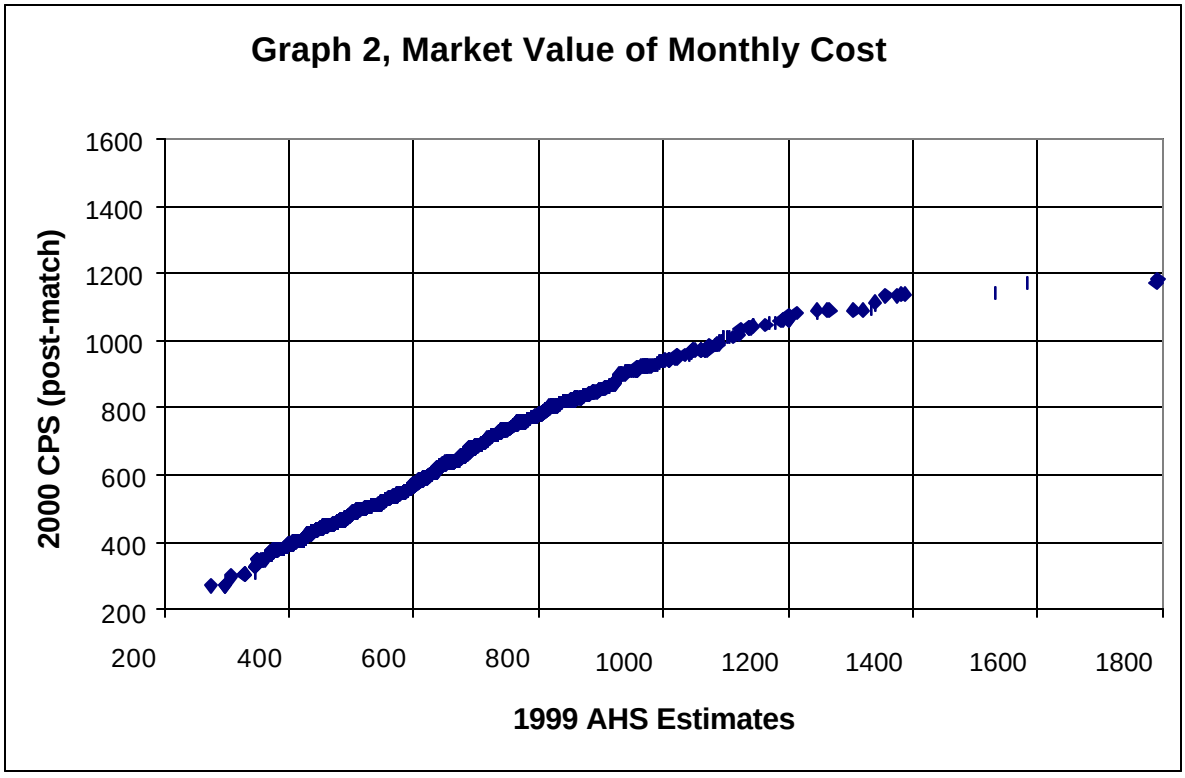
No change to the application of Fair Market Rent

Finally, this paper also includes subsidies calculated with the fair market rent method. The use of FMR was implemented in the same general manner as in the Naifeh and Eller paper. Each CPS family was assigned the appropriate FMR based on the family's number of bedrooms[5]. The subsidy is equal to the FMR less 30 percent of the family's income. For reasons described in the background section, the FMR method is a solid alternative to the other methods and should continue to be examined as an option.

Evaluation of Methods

In order to evaluate the predicted mean match between the AHS and the CPS, Graph 2 shows the distribution of the market value for rent in the CPS versus the market value of rent on the AHS. Table 3 reports summary statistics on the distributions of the market rent on the AHS compared to the CPS.

[5] Since the CPS respondents are not asked about the number of bedrooms in the unit, post-CPS processing includes a technique for estimating the number of bedrooms based on family, not household, composition. For more information on this process, see Naifeh and Eller. In their work, they explain the current method and produce and test several alternatives to this technique.



The graph shows that the predicted mean statistical match does a reasonable job replicating the distribution of the market value of monthly costs, especially in the lower price range.

Table 3, Statistics on Market Rent for Subsidized Households		
	AHS	CPS
Mean	$614	$588
Maximum	2,004	2,004
75th percentile	718	706
Median	587	554
25th percentile	476	460
Minimum	274	274

Table 4 compares the subsidies that could be calculated on the AHS to those derived from the market rents on the CPS resulting from the predicted mean statistical match. The CPS subsidies are slightly higher, but result in lower aggregate subsidy value. Several conflicting elements contribute to this difference. First the AHS subsidy estimates were based on the market rent less the reported rent paid. Table 1 showed that the reported rent paid is often lower than 30 percent of household income, the proxy used on the CPS. The second factor is that the market rents are generally lower in the CPS, as demonstrated in Table 3.

Table 4, Statistics on Household Level Housing Subsidies

	AHS	CPS
Monthly Subsidies:		
Mean	$240	$303
Maximum	1,304	1,544
75th percentile	411	431
Median	219	283
25th percentile	0	155
Minimum	0	0
Aggregate yearly subsidy (in 000s)	16,821,660	16,161,084

To compare the FMR method to the others, Table 5 reports some characteristics of the distributions at the family level. The household level subsidies from the first methods are scaled down by the number of people in the family relative to the number of people in the household. The term families includes primary families, unrelated subfamilies, and unrelated individuals. Each person in a household is included in a family unit either alone or in combination with others in the household to whom the person is related.[6]

Table 5, Statistics on Family Level Housing Subsidies in the CPS

		Unrestricted		Capped at 44.3% of the Poverty Threshold	
	Current Method	Predicted Mean Match	Fair Market Rent	Predicted Mean Match	Fair Market Rent
Monthly Subsidies:					
Mean	$175	$283	$336	$247	$280
Maximum	397	1,330	1,728	923	1,189
75th percentile	240	414	484	320	392
Median	159	263	306	263	295
25th percentile	109	118	149	117	149
Minimum	66	0	0	0	0
Aggregate yearly subsidy (in 000s)	9,961,260	16,166,688	19,178,724	14,079,516	15,994,608

This table clearly shows that the fair market rent method estimates larger subsidy values than the other two methods. Because the proxy for amount paid by the renter, 30 percent of income, is the same in both methods, the

[6] Note that the universe of Table 5 is limited to families in the poverty universe. Given how subsidies are scaled to the family size, this will result in some of the subsidy value being lost. As an example, a household includes a family of 4 plus an unrelated individual under the age of 15. The family of 4 is assigned four-fifths of the value of the housing subsidy. The unrelated individual is assigned one-fifth of the housing subsidy. In the calculation of the distribution of household level subsidies in Table 4, this sample household contributed one subsidy which is the sum of the two family unit level subsidies. However, the poverty universe does not include unrelated individuals under 15 years old. Therefore, the distribution of subsidies in the poverty universe will include only the scaled subsidy from the family of four in the sample household.

main reason subsidies are higher using the FMR method is that the rental amounts assigned using the FMR method are higher. For example, the mean monthly cost on the CPS using a predicted mean match is $588. Using the Fair Market Rent method the mean monthly cost is $622.[7]

This table also shows the effect of putting a limit on the maximum subsidy that will be added to resources. In this case the value of the housing subsidy will not to exceed the amount of money in the poverty threshold which is presumed to be housing expenses. The cap was set at 44.3% of the relevant poverty threshold. While the cap is binding in a share of cases under both methods, the net effect is to bring the distribution of subsidies under the two methods closer together.

Although the Stern 2000 paper used 1999 CPS and this research is using 2000 CPS, some brief comparisons should be made to show how the results differ between the two. The two main differences in approach were as follows. First, the original statistical match used the distance function approach and this research used the predicted mean statistical match. Second, and equally importantly, in this research the variable which was considered missing for the purpose of the analysis was a value for market rent not the value of the subsidy. As a result, the market rent was assigned to the households on the CPS in the present work . Combined, these two changes narrowed the gap between the FMR method and the statistical match method.

A look at the unrestricted subsidy estimates illustrates this point. In the Stern 2000 paper, the FMR method produced a mean monthly subsidy of $349. In contrast, the highest mean monthly subsidy which was obtained in any of the replicates of the statistical match was $248. The difference between the two estimates was far less in Table 5, where the estimated subsidies were $336 and $283 respectively.

To complete the analysis of the effects of adding subsidies as resources to poverty measurement, poverty rates were calculated using the official definition of poverty with one modification. The monetary equivalent for the housing subsidy under each alternative method was added to the family's resources.

Table 6 demonstrates how these different methods can affect the poverty rate, when the rate is calculated using a single modification to the official definition, the addition of subsidies to resources.

Table 6, Comparing 1999* Poverty Rates		
	Percent in Poverty	Number in Poverty (in 000)

[7] Future work will revisit the subject of the bedroom imputation method which may be driving this result.

Official Poverty Definition	11.8%	32,258
Add value of subsidy to income:		
Current Method	11.4	31,096
Predicted Mean Match of Market Rent	11.1	30,390
FMR Method	10.9	29,896
*Using March 2000 CPS, 1999 AHS, 1999 FMRs		

While all the different methods lower poverty rates, they do not appear to have a differential impact on certain population subgroups of interest. Table 7 gives poverty rates for selected segments of the population. These rates show that certain portions of the population, such as seniors and people living in families with a female household with no spouse present, will experience slightly lower poverty rates under the modified poverty definition.

Table 7, 1999 Poverty Rates for Specific Population Groups

	Seniors	Northeast	West	Female House-holder*
Official Poverty Definition	9.7%	10.9%	12.6%	30.4%
Add value of subsidy to income:				
Current Method	8.7	10.0	12.2	29.4
Predicted Mean Match of Market Rent	8.5	9.7	12.1	28.2
FMR Method	8.6	9.3	11.8	27.2

*Using March 2000 CPS, 1999 AHS, 1999 FMRs
*People living in families with a female householder, no spouse present.

The method used to evaluate subsidies does not seem to have an impact on the characteristics of people with income below the poverty level. For example, under the current definition of poverty, 37.5% of the people in poverty are children. With the value of subsidies added to the resources of the family, the percent varies between 37.6% and 38.1%. Table 8 gives some characteristics of the people in poverty.

Table 8, Characteristics* of People in Poverty

	Children	Seniors	Female	South
Official Poverty Definition	37.5%	9.8%	57.2%	38.%
Add value of subsidy to income:				
Current Method	38.1	9.1	56.9	39.4
Predicted Mean Match of Market Rent	38.0	9.2	56.8	39.5
FMR Method	37.6	9.3	56.6	39.9

*Using March 2000 CPS, 1999 AHS, 1999 FMRs
*Percent of the people in poverty who are children under 18 years old, seniors over 64 years old, female, or living in the South.

Finally, the poverty rates for the subsidized population are significantly impacted by these three different methods for calculating the value of the subsidy. Without a doubt, the methods which estimate higher rents will

result in higher subsidy values and lower poverty rates. This can be seen in Table 9, where the poverty rate varies from 60.7% under the official definition to 39.2% where a FMR method subsidy is added to resources.

Table 9, Poverty Rates for People Living in Subsidized Housing				
	All People	Seniors	Female	South
Official Poverty Definition	60.7%	38.2%	61.3%	72.7%
Add value of subsidy to income:				
Current Method	51.1	9.5	50.6	63.0
Predicted Mean Match of Market Rent	43.9	6.2	43.5	55.4
FMR Method	39.2	7.4	38.4	54.6
*Using March 2000 CPS, 1999 AHS, 1999 FMRs				

In addition Table 9 demonstrates that the impact is not the same across subgroups. Notice that the poverty rate among people aged 65 and over is lowest using the predicted mean match method than any of the other methods. In contrast, overall poverty rate, the rate for females, and the rate for people living in the South is lowest using the FMR method.

Conclusions

Only 4.25% of the people in the 2000 CPS lived in subsidized housing. As a result, any changes to poverty measurement concerning the value of subsidized housing will have only a small effect on poverty rates. However, the different methods for valuing these subsidies have a strong impact on the poverty status of people within that population.

The two methods discussed in this paper and contrasted with the method currently used by the Census Bureau both result in marginally lower rates for all of the subgroups examined. The strongly identifiable differences appear in the analysis of the distribution of those subsidies and the resulting poverty rates of the subsidized population.

Appendix A - Hedonic Housing Price Estimation in the American Housing Survey

Dependent Variable: Log of monthly cost, rent plus utilities.
Model R-square: 0.3510

Variable	Parameter Estimated	Standard Error	T-Stat
Constant	5.96855	0.02654	224.902
Number of bathrooms	0.13962	0.01068	13.068
Number of bedrooms	0.05250	0.00874	6.004
Age of dwelling	-0.00465	0.00070	-6.611
Age of dwelling squared	0.00003	0.00001	4.199
One unit detached - y/n	0.00332	0.01141	0.291
One unit attached - y/n	0.02002	0.01259	1.590
Mobile home - y/n	-0.22290	0.02209	-10.091
Unit has a deck - y/n	0.00795	0.00867	0.918
Unit has air conditioning - y/n	0.08735	0.00975	8.961
Unit has a fireplace - y/n	0.08745	0.01225	7.136
Unit has a carport or garage - y/n	0.08089	0.00895	9.033
Unit has three major appliances: refrigerator, garbage disposal, dish washer.- y/n	0.13880	0.01045	13.287
Unit has one room	-0.23414	0.03679	-6.364
Unit has two rooms	-0.13985	0.02477	-5.646
Unit has four rooms	-0.06761	0.01206	-5.604
Unit has five rooms	0.06126	0.01119	5.475
Unit has six or more rooms	0.12700	0.01646	7.717
Anchorage AK MSA	0.30130	0.06907	4.362
Atlanta GA MSA	0.17056	0.03708	4.600
Atlantic City NJ MSA	0.50034	0.12487	4.007
Austin TX MSA	0.23262	0.04221	5.511
Baltimore MD MSA	0.13337	0.03816	3.495
Bergen-Passaic NJ PMSA	0.60359	0.05274	11.445
Boston MA PMSA	0.53575	0.03188	16.805
Bridgeport-Milford CT PMSA	0.50316	0.11198	4.493
Chicago IL PMSA	0.35330	0.02311	15.290
Columbus GA-AL MSA	-0.34129	0.07996	-4.268
Denver CO PMSA	0.25071	0.04498	5.574
Detroit MI PMSA	0.11254	0.03175	3.544
Dutchess County NY PMSA	0.42212	0.10926	3.864
Fort Lauderdale-Hollywood-Pompano Beach FL PMSA	0.23730	0.05243	4.526
Hartford CT PMSA	0.31239	0.05890	5.304
Honolulu HI MSA	0.46086	0.07196	6.404
Jersey City NJ PMSA	0.52981	0.05100	10.388
Lancaster PA MSA	0.43835	0.10917	4.015
Lawrence-Haverhill MA-NH PMSA	0.48124	0.11412	4.217
Los Angeles-Long Beach CA PMSA	0.30207	0.01684	17.942
Madison WI MSA	0.30024	0.07708	3.895
Mansfield OH MSA	-0.45751	0.11673	-3.920
Miami-Hialeah FL PMSA	0.24113	0.03425	7.040
Middlesex-Somerset-Hunterdon NJ PMSA	0.58349	0.06942	8.405
Minneapolis-St. Paul MN-WI MSA	0.31725	0.03899	8.136
Monmouth-Ocean NJ PMSA	0.44689	0.07193	6.213

Variable	Parameter Estimated	Standard Error	T-Stat
Nassau-Suffolk NY PMSA	0.61990	0.04849	12.785
New Haven-Meriden CT MSA	0.36453	0.10051	3.627
New York NY PMSA	0.53881	0.01680	32.069
Newark NJ PMSA	0.47731	0.04105	11.629
Oakland CA PMSA	0.48057	0.03488	13.779
Orange County CA PMSA	0.42480	0.03217	13.206
Philadelphia PA-NJ PMSA	0.26359	0.02843	9.273
Portland ME MSA	0.33449	0.09384	3.564
Portland OR PMSA	0.17819	0.03857	4.620
Portsmouth-Dover-Rochester NH-ME MSA	0.33791	0.09113	3.708
Providence RI PMSA	0.21992	0.04939	4.452
Rochester NY MSA	0.25596	0.05398	4.742
Salinas-Seaside-Monterey CA MSA	0.40402	0.07626	5.298
San Diego CA MSA	0.38269	0.03041	12.586
San Francisco CA PMSA	0.68822	0.03631	18.952
San Jose CA PMSA	0.66924	0.04630	14.455
Santa Cruz CA PMSA	0.63934	0.08872	7.206
Seattle WA PMSA	0.31694	0.03339	9.491
Springfield MO MSA	-0.51067	0.09548	-5.348
Stamford CT PMSA	0.71054	0.10458	6.794
Trenton NJ PMSA	0.41662	0.11237	3.708
Ventura CA PMSA	0.40704	0.06688	6.086
Washington DC-MD-VA MSA	0.37376	0.02690	13.896
Worcester MA MSA	0.35683	0.10126	3.524

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