Alternative Geographic Adjustments of U.S. Poverty Thresholds: Impact on State Poverty Rates

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Abstract

The National Academy of Sciences (NAS) Panel on Poverty and Family Assistance recommended that the poverty thresholds be adjusted for differences in the cost of housing across geographic areas using data from the decennial census. The Census Bureau currently adjusts the NAS experimental poverty thresholds using data from the U.S. Department of Housing and Urban Development's Fair Market Rents. Two new alternative sources for geographic adjustment are now available: median gross rental cost estimates from the American Community Survey and Regional Price Parities estimated by the Bureau of Economic Analysis using CPI survey and American Community Survey housing cost data. This paper will examine the impact of these two new geographic cost adjustment methods on state poverty rates using the NAS experimental poverty measure and data from the 2008 Current Population Survey Annual Social and Economic Supplement.

1. INTRODUCTION

In the United States, the poverty thresholds used to calculate the annual official poverty count vary by family size and composition but are the same whether a family lives in rural Mississippi or Manhattan. While the need for geographic adjustments to the poverty thresholds has been discussed in almost every review of poverty measurement in the United States, gaining consensus on the way to make these adjustments is more difficult. This paper will explore the feasibility of making geographic adjustments using two new data sources: a housing cost index developed from responses to the American Community Survey (ACS) and new research from the Bureau of Economic Analysis (BEA) which estimates Regional Price Parities (RPPs) for all of the United States.[1]

1.1 Background

In the 40 years since the U.S. Bureau of the Budget (predecessor of the Office of Management and Budget) designated the Orshansky poverty thresholds (with certain revisions) as the federal government's official statistical definition of poverty, there have been numerous studies of the official poverty measure and many of these have focused on the question of adjusting the thresholds to reflect geographic differences in the cost of living.[2] For example, the Education Amendments of 1974 mandated a report on the

[1] All statements in this report have undergone statistical testing, and all comparisons are significant at the 90-percent confidence level unless otherwise noted.

[2] The poverty thresholds were originally developed in 1963-1964 by Mollie Orshansky of the Social Security Administration. In May 1965, the U.S. Office of Economic Opportunity adopted Orshansky's poverty thresholds as a working or quasi-official definition of poverty. In August 1969, the U.S. Bureau of the Budget designated the poverty thresholds as the federal government's official statistical definition of

poverty measure and the final U.S. Department of Health, Education and Welfare report (1976) explained that "because of Congressional interest in the subject (geographic cost-of-living differences), as noted in section 823 of the Education Amendments of 1974, as well as because of concern about the problem among technicians, this study directed considerable effort in an analysis of possibilities for incorporating such differences in a poverty measure" (p. 81-82). The report concluded:

> "There may be cost-of-living differences between regions, and among urban, suburban, and rural areas, but the extent and nature of these differences is difficult to identify accurately. Existing sources of data which are both accurate at the state and local level and available on a timely basis cannot provide a reliable proxy measure of poverty. Because cost-of-living differences across areas are not satisfactorily measured by existing data and because there is no agreement on the methodology for making such an adjustment, no geographic adjustment in the poverty threshold is made in the report" (pp. xxiii).

Patricia Ruggles (1990) comprehensively reviewed the critiques of the official measure and described the advantages and disadvantages of numerous reform proposals. While she did not propose a specific geographic cost adjustment mechanism, she did conclude:

> "Considering the magnitude of the price differentials seen across regions, a strong case can be made for some adjustment of the poverty thresholds to take account of these differences" (p. 84).

> "In general, adjustments are appropriate where the evidence implies that fewer errors would be introduced into the system by the adjustment than would be corrected by it. Although this book opposes most new complications to our system of poverty thresholds, the evidence for real differences in price levels across regions has become too compelling to ignore" (p. 86).

The General Accounting Office (GAO) (1995) was asked to "provide information about the statistical data requirements that would be needed to adjust for geographic differences in living costs." GAO asked 15 experts to review 12 different methodologies. The conclusion of the GAO report was not any more optimistic than the 1976 HEW report. "In the collective view of the experts we asked to assess these methodologies, the long-standing problems involved in identifying a method to adjust poverty measurement for geographic differences in COL have not been resolved; data and conceptual problems have prevented any adjustment in the past and continue to do so today" (p. 3).

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poverty. For a complete history of the poverty thresholds, see Gordon M. Fisher, "The Development and History of the Poverty Thresholds," Social Security Bulletin, Vol. 55, No. 4, Winter 1992, pp. 3-14.

1.2 National Academy of Sciences Panel on Poverty and Family Assistance

The GAO study coincided with the work of a panel of the National Academy of Sciences (NAS) whose comprehensive study of the poverty measure was released in 1995 (Citro and Michael, 1995). This study also looked at the question of geographic adjustment of the thresholds and concluded that:

> "Evidence of cost-of-living differences among geographic areas — such as between metropolitan and nonmetropolitan areas — suggests that poverty thresholds should be adjusted accordingly, but inadequate data make it difficult to determine appropriate adjustments" (p. 8).

The NAS panel recommended that as a "first and partial step" the thresholds be indexed to reflect variations in housing costs across the country and that further research be conducted to develop refined methods and data by which to adjust the poverty thresholds more accurately for geographic cost-of-living differences for housing and other goods and services.

The NAS panel made a number of specific recommendations regarding the first and partial step of adjusting the thresholds to reflect variations in housing costs. These included:

- Data from the decennial census should be used to develop a housing cost index;
- The housing cost index should be developed to cover several population size categories of metropolitan areas in each of the nine geographic census divisions;
- The U.S. Department of Housing and Urban Development (HUD) methodology for developing fair market rents (FMRS) should be used to construct the index;
- The index should only be applied to the portion of the threshold that represents housing costs – 44 percent;
- Research should be conducted to update the index between the decennial censuses.

The NAS panel developed an index using data from the 1990 census. Following the methodology used by HUD to establish FMRs, the index was based on the 45th percentile of the distribution of rents for two-bedroom apartments that had complete plumbing facilities, kitchen facilities, and electricity and in which the occupant had moved within the last five years. Index values were developed for each of the 341 metropolitan areas in the country and for nonmetropolitan areas within each state. The panel then grouped the metropolitan areas into six population size categories within each of the nine census regions and aggregated the nonmetropolitan areas by region and recomputed the index values.[3]

[3] In order to test this decision to employ regional groupings, the panel compared the set of indexes developed for each of the metropolitan areas to indexes grouped by state (with a metropolitan area and nonmetropolitan area value for each state) and indexes grouped by the nine census divisions. The panel

The NAS panel report's discussion of geographic cost adjustment concludes with the following caveat:

> "The proposed procedure should not be viewed as the last word on the issue of adjusting poverty thresholds for area differences in the cost of living, but rather a modest step in the right direction" (p. 199).

1.3 Census Bureau Geographic Adjustment Approaches

In 1999, the researchers at the Census Bureau and BLS applied the NAS panel recommendations to CPS data to produce an alternative set of poverty estimates for 1990 to 1997. (Short, Garner, Johnson and Doyle, 1999). The report included tables showing poverty rates by geographic region but not by state. The analysis found that when the thresholds were adjusted for geographic differences in housing costs, poverty rates were higher in the Northeast and the West and for people living in suburbs.

In a Census Bureau working paper, "Where We Live: Geographic Differences in Poverty Thresholds," Short (January 2001) reviewed the three-year average state-specific poverty rates for 1992 using the geographic adjustment methodology from the 1999 report. Short described four major shortcomings of the NAS panel's geographic adjustment methodology. First, the data used to construct the index was from the 1990 census and therefore could only be updated every ten years. Second, the regional groupings used to construct the index produced some unexplained results given the wide variation in housing costs within geographic divisions. For example, there were higher poverty rates than expected in Maine and lower poverty rates than expected in Connecticut. Third, the suggested methodology did not control for housing quality across areas. Fourth, the index recommended by the NAS panel used geographic groupings that created confidentiality problems for release of microdata files.

Short proposed an alternative methodology for making geographic adjustments which addressed some of these shortcomings and applied this method to CPS data for 1997. Her primary recommendation was to replace the outdated housing cost data from the 1990 census with the 1999 HUD FMRs. While acknowledging the limitations of the FMRs, Short concluded that because the FMR estimates were current and available for all 341 metropolitan areas as well as for 2,416 counties outside metropolitan areas, using the FMRs to construct an index was the best alternative. Rather than group the housing cost data by regions and population size categories, Short utilized cluster analysis to group all areas into 15 clusters by housing costs. She compared the results of this cluster analysis to the results using an average metropolitan area and nonmetropolitan area amount for

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found that the regional indexes produced the index with the smallest share of the population having an index that differed by more than 20 percent from the index produced using the more specific geographies. It further concluded that using the more geographically specific indexes was not desirable because of the limited sample size in smaller metropolitan areas.

each state and found that the results were similar. Subsequent annual Census Bureau estimates of experimental poverty measures have used the FMR-based methodology.

Since the index addresses only differences in housing costs, the index is applied to only 44 percent of the threshold. This produces a fixed-weight interarea price index with two components – housing and all other goods and services – in which the price of other goods and services is assumed not to vary. The estimate of 44 percent came from the Consumer Expenditure survey tabulations of expenditures for two-adult/two-child families. For families at the 35th percentile of the distribution of spending on food, housing and clothing, housing represented 44 percent of total expenditures assuming miscellaneous expenditures are set at 15 percent of the food, housing and clothing amount.

In addition, the index is normalized to keep the national average index equal to one. The raw index numbers are divided by the national average index number so that the national average of the new index is equal to one. Table 1 provides a summary of the index based on 2007 FMRs.

While the FMR-based methodology was able to overcome some of the shortcomings of the methodology recommended by the NAS panel, this methodology has its own set of limitations. HUD estimates FMRs for use in the Section 8 low-income housing program and does not support their use for comparing housing costs across localities.[4] The FMR index measures only differences in rental housing costs and therefore implicitly assumes that there are not significant geographic differences in the cost of other basic necessities. Using just two housing cost estimates for each state can misrepresent the cost of living in states where there are multiple metropolitan areas with large differences in the cost of living. For example, in New York, the FMR-based methodology uses the same regional cost adjustment for Buffalo as for New York City, despite large differences in their respective housing costs.

2. ALTERNATIVE ADJUSTMENT METHODOLOGIES

Several new developments provide an opportunity to reconsider the methodology used to implement geographic adjustments in the Census Bureau's NAS-based alternative poverty measures. The full implementation of the American Community Survey (ACS), as a replacement for the decennial census long form, provides detailed data on housing

[4] In her January 2001 paper, Short lists the following eleven reasons given by HUD for not supporting the use of FMRS to adjust a poverty threshold: (1) FMRs are only developed for use in section 8 certificate and voucher program; (2) they measure rents not total costs; (3) they use gross rents of recent movers; (4) only major metropolitan areas are checked using Random Digit Dialing surveys; (5) rental markets are volatile; (6) for 99 large areas, rents are adjusted using CPI rent and utility factors. While only available for 32 Consolidated Metropolitan Statistical Areas (CMSAs), they are applied to all Primary Metropolitan Statistical Areas (PMSAs) within the CMSAs; (7) there are updates of rent for small areas with Random Digit Dialing procedures that may result in generalizations of rent changes not applicable to all individual areas; (8) the percentile standard is not consistent over time (the 50th percentile from 1975 to 1983, the 45th percentile from 1985 to 1994, and the 40th percentile starting in 1995); (9) the percentile measure is administratively determined and not based on measurement criteria; (10) the treatment of nonmetropolitan areas has changed over time; (11) in 1996 a state minimum FMR was instituted.

costs that can be updated each year. In addition, researchers at the Bureau of Economic Analysis (BEA) and the Bureau of Labor Statistics (BLS) have released an expanded set of interarea price indexes that now provide regional price parities for all parts of the United States. These two developments are related in that the BEA/BLS indexes use ACS data to expand their interarea price indexes beyond major metropolitan areas.

2.1 American Community Survey

ACS data has been used to create a simple geographic cost of living index based on 2007 gross rental costs (Bishaw, 2009). Following the grouping methodology used by the Census Bureau in its experimental poverty measures series, Bishaw assigns each household one of 99 locations based on the state and whether or not the household is in a metropolitan area. (The District of Columbia, New Jersey and Rhode Island have all their population in metropolitan areas.) The geographic cost index for each location is the median gross rent for that location divided by the national median gross rent. Like the FMR-based index, this index is then normalized to set the national average at 1.00 and applied to the 44 percent of the threshold assumed to represent shelter and utility costs. Table 1 provides a summary of this index.

There are several concerns with the ACS-based index. First, the median gross rent represents the midpoint of the rental distribution regardless of the size of the unit. The median rent in one geographic location might represent the rent for a studio or one bedroom apartment while the median rent in another geographic location may represent the rent for a two or three bedroom unit. Second, the ACS index does not control for differences in housing quality. While the FMR index limits data to rental units that meet minimum HUD standards for participation in the Section 8 program, the ACS indexes developed by Bishaw include all rental units, regardless of quality. Since housing quality varies by geographic area, for geographic areas with a higher incidence of substandard rental units, the ACS methodology may underestimate the cost of decent housing. If substandard units were excluded from the distribution, the median rent would be higher. Third, the ACS-based index, like the FMR-based index, represents only differences in housing costs for renters and does not reflect differences in housing costs for homeowners.

2.2 Regional Price Parities

Hedonic modeling is an alternative method for developing geographic cost indexes which is discussed in both the 1995 GAO report and the NAS panel report. In particular, both reports noted the existence of the BLS interarea indexes for the 30 largest metropolitan areas (Kokoski, Cardiff, and Moulton, 1999). The NAS panel did not recommend the use of these indexes because they were not available for all areas. In 2005 and 2006 Bettina Aten from BEA, in a joint project with BLS, estimated RPPs for 38 large metropolitan and nonmetropolitan urban areas of the United States for 2003 and 2004. These 38 areas coincided with the area definitions for which BLS produces the CPI, and represented about 87 percent of the population. In November 2008, Aten and D'Souza published estimates for portions of the United States outside the BLS areas (Aten and D'Souza, 2008). Since this index represents geographic differences in the

prices of goods for the entire consumer basket of goods and services, it is applied to the entire threshold.[5] Table 1 provides a summary of this index.

The complete set of RPPs were developed using a combination of individual price observations used in the CPI and housing cost estimates from the ACS. CPI price observations were analyzed using hedonic regression models that took into account differences in the characteristics of the items to obtain price levels for each item in each geographic area. These individual price levels were then aggregated into major categories and into an overall price level using the consumer expenditure weights per item per area.

To extend the index beyond the 38 areas for which CPI survey data exists to other counties outside metropolitan areas, the authors used data on housing costs from the ACS. Specifically, they used data on housing characteristics to estimate hedonic regressions with the characteristics of the rented and owned housing stock in each state, including the number of rooms, bathrooms, age and type of housing unit, as well as their mortgage status. This was done separately for renters and owners with the final housing costs levels estimated as an average of the two weighted by the proportion of owners and renters in each county. The relationship between the housing costs and the overall price levels for counties outside metropolitan areas was modeled based on the relationship between these two factors in metropolitan areas.

The RPP index was normalized using the same method used for the other two indexes. The index numbers were divided by the national average index number to ensure that the national average of the index utilized would be equal to 1.0.

2.3 Comparison of the Three Cost Indexes

As shown in Table 1, the RPP index has a much larger range between the minimum and maximum values than either the FMR or the ACS indexes. This larger range is partially because the RPP index is applied to the entire poverty thresholds while the FMR and ACS indexes are applied only to the housing portion of the thresholds. For all geographies, the RPP range is almost twice that of ACS index. For metropolitan areas, the range of the RPP index is almost double the range for the ACS index. For counties outside metropolitan areas, the range for the RPP index is 50 percent greater than the range for the ACS index and the FMR index. Metropolitan areas of West Virginia are the lowest cost areas on all three indexes. The cost of living in metropolitan areas in Hawaii ranked first for the ACS and RPP indexes and second for the FMR index. For areas outside metropolitan areas, Massachusetts is most expensive according to the FMR and the RPP indexes and second most expensive using the ACS index. For areas outside metropolitan areas, the least expensive state shifts from Louisiana using the FMR index to North Dakota using the ACS index to Arizona using the RPP index.

[5] The BEA/BLS index includes items that are not included in the NAS Panel thresholds – education, recreation and medical but these three combined represent only 18 percent of the index.

Some of the ranking differences from one index to another are striking. For example, counties outside metropolitan areas in Arizona rank forty-eighth (the least expensive) using the RPP index but only twelfth using the FMR index. In the other direction, counties outside of metropolitan areas in Wyoming are ranked ninth using the RPP index but thirty-second using the FMR index. For metropolitan areas, North Dakota moves from thirty-first using the RPP index to fiftieth using the FMR and ACS indexes. Metropolitan areas in Louisiana are ranked forty-third using the RPP index but twenty-ninth using the FMR index.

Not surprisingly, there is a high degree of correlation among the three indexes under consideration. Since HUD has begun using data from the ACS to update its FMR estimates, all three of these indexes rely to some extent on ACS estimates of housing costs. See Table 2 for estimates of the Spearman correlation coefficients.

3. APPLICATION OF INDEXES TO CPS POVERTY ESTIMATES BY STATE

In order to compare the impact of these regional cost adjustment indexes on state poverty rates, poverty thresholds derived from the NAS panel recommendations were adjusted by each index and used to derive state poverty rates for 2007 using data from the 2008 CPS ASEC. For the purposes of this analysis, the poverty rates are estimated using the set of thresholds following the NAS panel recommendations, updated using the Consumer Expenditure Survey with out-of-pocket medical expenditures subtracted from income. The thresholds are compared to the NAS income measure that subtracts taxes, adds noncash benefits and subtracts work expenses for each family. All three indexes were normalized to set the national average threshold equal to the national average threshold derived directly from the Consumer Expenditure Survey.

Table 3 summarizes the poverty rates for each of the fifty states and the District of Columbia using the three different geographic cost adjustment methodologies and indicates which of these differences are statistically significant.[6] There were small but statistically significant differences in the national poverty rates generated by the three different methods. The FMR-based poverty rate was 15.3 percent while the ACS-based adjustment resulted in a national poverty rate of 15.2 percent and the RPP-based adjustment resulted in slightly higher national rate of 15.4 percent.

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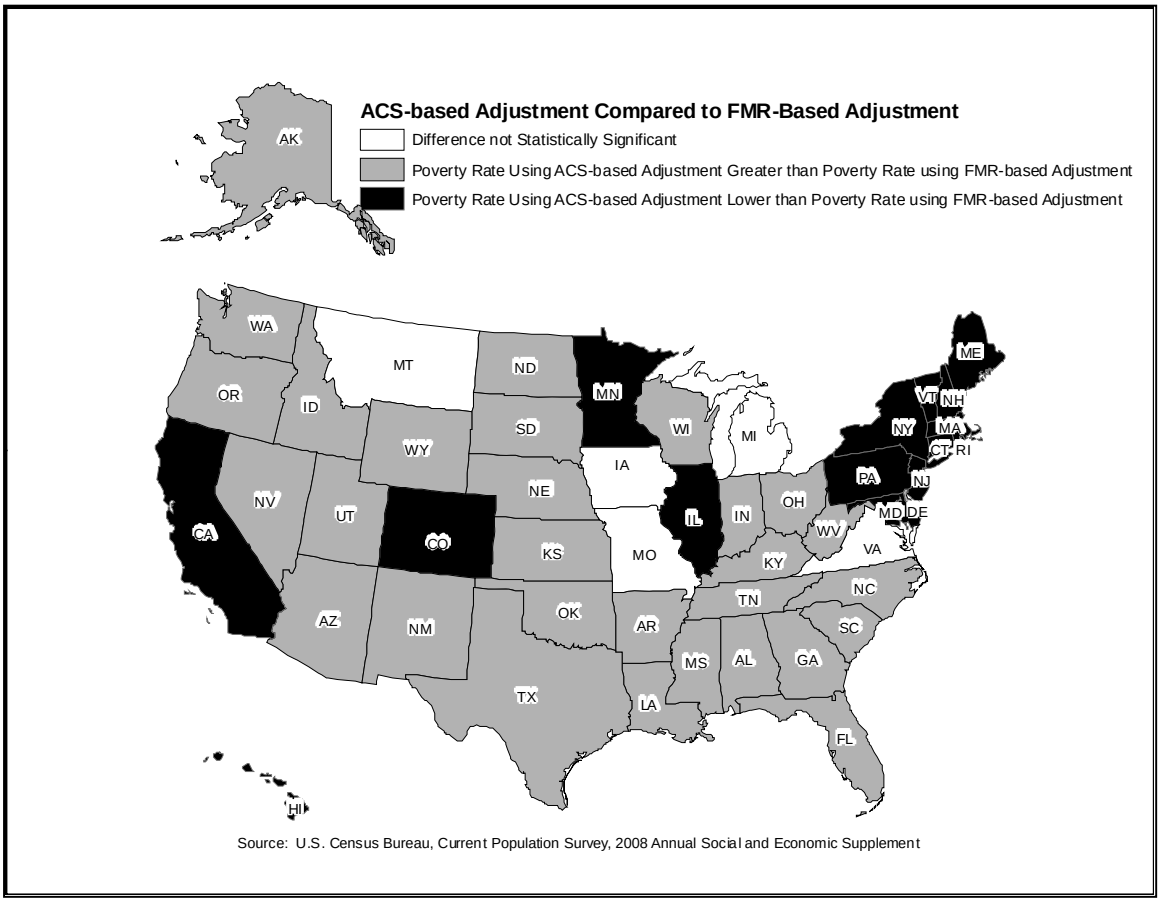
[6] The data in this report are from the Annual Social and Economic Supplement to the Current Population Survey, and the estimates in it are based on responses from a sample of the population and may differ from actual values because of sampling variability of other facts. Further information about the source and accuracy of the estimates is available at http://www.census.gov/apsd/techdoc/cps/cpsmar08.pdf.

The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report used the standard errors and correlations found in Tables 3A, 4A and 5a along with the equation for the Standard Errors of Estimated Differences provided in the source and accuracy statement.

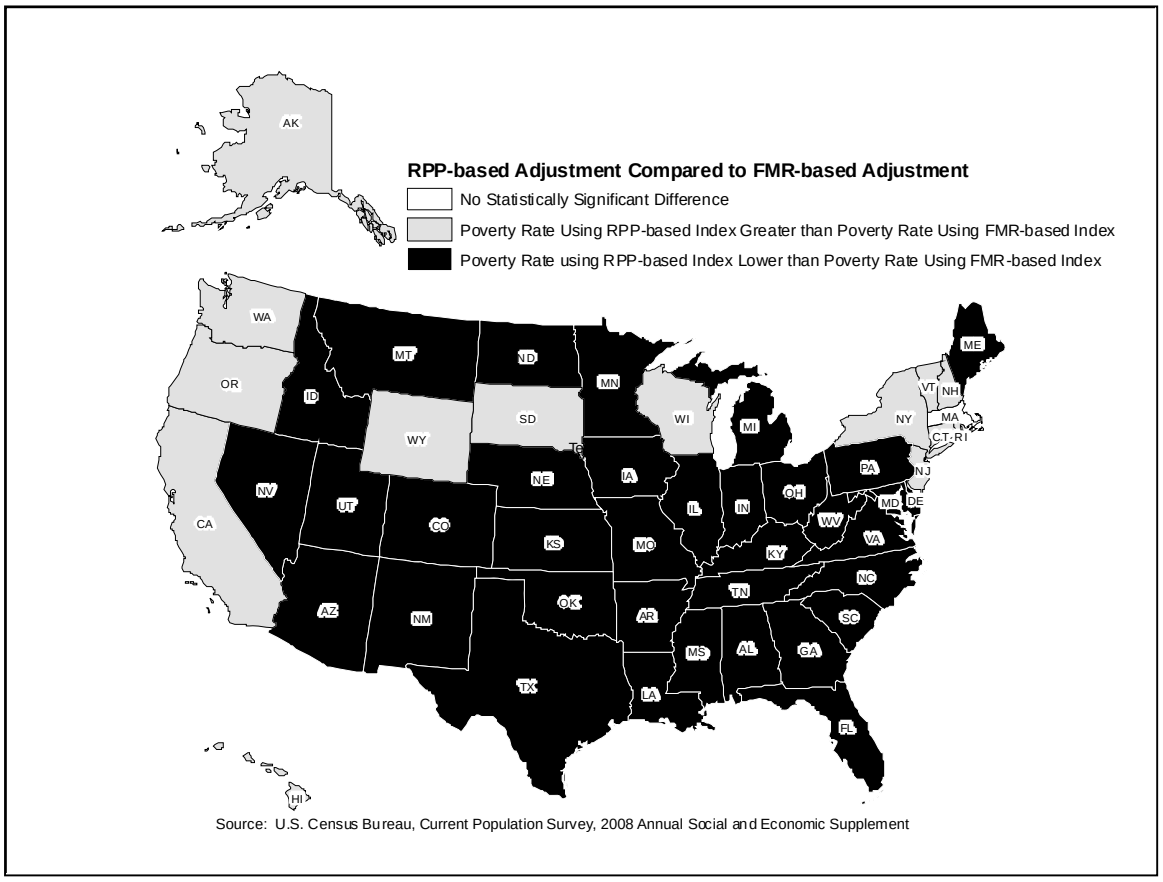
The paper departs from usual Census Bureau practice and estimates a single year poverty estimate for each state rather than a three-year average. Using three-year average poverty rates is necessary when making comparisons over time and/or among states but since the purpose of this exercise is to compare the indexes, a single year of data provides the most clear cut comparison of the three indexes

Using the ACS-based index instead of the FMR-based index generates statistically significant differences in the poverty rates in 45 states and the District of Columbia. As compared to the poverty rates generated using the FMR-based index, the poverty rates estimated using the ACS-based index were higher in 30 states and lower in 15 states and DC.



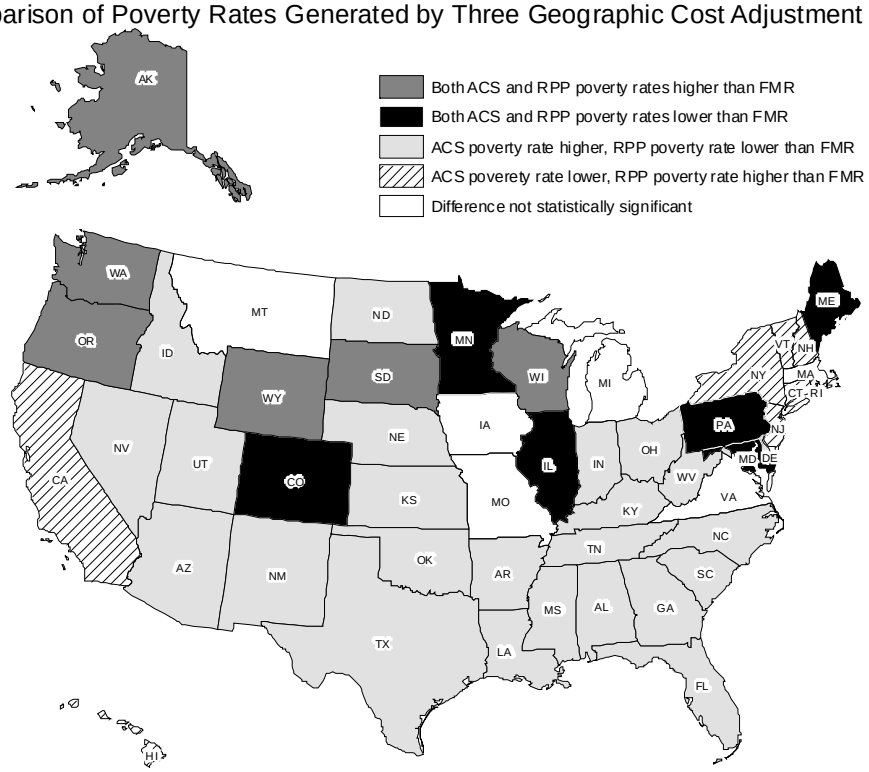
Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement

Using the RPP-based index instead of the FMR-based index generates statistically significant differences in the poverty rates for every state except Massachusetts. Using the RPP-based index resulted in higher poverty rates 14 states and lower poverty rates in 35 states and the District of Columbia.



Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement

Comparison of Poverty Rates Generated by Three Geographic Cost Adjustment Indexes

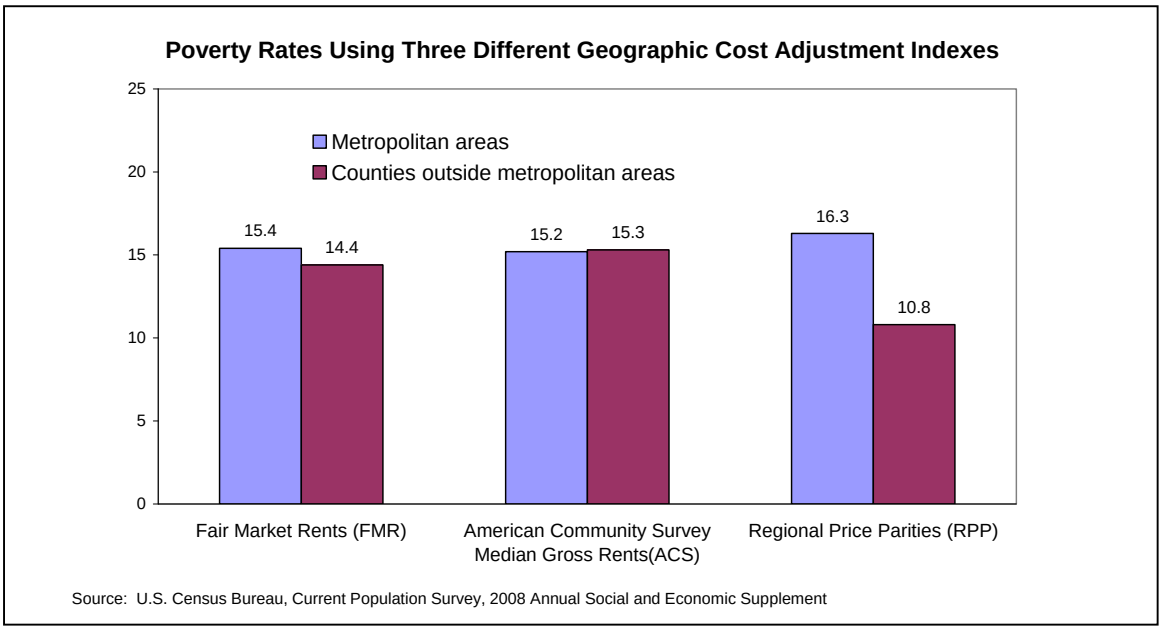


Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement

There were 45 jurisdictions for which there were statistically significant differences in the poverty rates relative to the FMR-based index with both indexes. For six states (Alaska, Oregon, South Dakota, Washington, Wisconsin and Wyoming) the poverty rates using both the RPP and ACS indexes were higher than the poverty rates using the FMR index. For six states (Colorado, Illinois, Maine, Maryland, Minnesota and Pennsylvania) and the District of Columbia the poverty rates using both the RPP and the ACS indexes were lower than the poverty rates using the FMR index. In eight states (California, Connecticut, Hawaii, New Hampshire, New Jersey, New York, Rhode Island and Vermont) the ACS index resulted in poverty rates lower than the rates using the FMR index while the RPP index resulted in higher poverty rates than the FMR index. In the remaining 24 states, the ACS index resulted in poverty rates higher than the rates using the FMR index while the RPP index produced lower poverty rates than the FMR index.

There were statistically significant differences between the poverty rates generated using the ACS index and the poverty rates generated using the RPP index in all 50 states and the District of Columbia. The ACS-based rates were higher than the RPP-based rates in 38 states. While these differences were statistically significant, some were quite small in magnitude. For 19 states, the differences were less than one percentage point.

In order to understand a little better the reasons for the differences in the poverty rates, Tables 4 and 5 compare the poverty rates in metropolitan areas and counties outside metropolitan areas in each state using each of the three indexes. The ACS-based index generated overall poverty rates for metropolitan areas which were lower than the poverty rates from the FMR-based index and poverty rates for counties outside metropolitan areas which were higher. The RPP-based index generated higher poverty rates for metropolitan areas and lower poverty rates for counties outside metropolitan areas relative to the FMR-based index and the ACS-based index.



Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement

There were statistically significant differences between the poverty rates generated using the FMR index as compared to the poverty rates generated using the ACS index for metropolitan areas in 40 states plus the District of Columbia and for counties outside metropolitan areas in 23 states. The poverty rates generated by the ACS index were higher for individuals living in metropolitan areas in 25 states for individuals living outside metropolitan areas in 21 states. The poverty rates generated with the ACS index were lower than the FMR-based poverty rates for metropolitan areas in 15 states and the District of Columbia. ACS-based poverty rates were lower than FMR-based poverty rates in the counties outside metropolitan areas of only two states, Alaska and Colorado.

When the poverty rates generated using the RPP index are compared to the poverty rates generated using the FMR index, there are statistically significant differences in 78 jurisdictions, metropolitan areas in 36 states and DC and outside metropolitan areas in 41 states. The poverty rates using the RPP index were higher than the FMR poverty rates in the metropolitan areas in 18 states and lower than the FMR poverty rates in the metropolitan areas in 19 states. The RPP index generated lower poverty rates than the FMR index for outside metropolitan areas in 40 states. The counties outside metropolitan areas of Wyoming had higher poverty rates using the RPP index than the FMR index.

There were 31 states (and DC) for which the differences in the poverty rates were statistically significant for both the ACS-based index and the FMR-based index. For metropolitan areas in seven states both alternative indexes generated higher poverty rates. For five states the poverty rates in metropolitan areas were lower using the alternative indexes than the poverty rates using the FMR-based index. For metropolitan areas in eleven states the poverty rates using the ACS were greater than the FMR-based poverty rates while the RPP-based poverty rates were lower than the FMR-based poverty rates. For nine states, the ACS- based poverty rates were lower than the FMR-based poverty rates while the RPP-based poverty rates were higher.

Outside metropolitan areas there were 19 states with statistically significant differences for both indexes relative the FMR-based index. In 16 states the ACS-based rates were greater than the FMR-based rates while the RPP-based rates were lower. In Wyoming both the ACS and the RPP rates were higher than the FMR rates. In Alaska and Colorado both the ACS-based rates and the RPP-based rates were lower than the FMR-based rates.

4. FUTURE RESEARCH

The three indexes compared in this paper have all been constructed using the state-level metropolitan and outside metropolitan areas groupings used in recent Census Bureau estimates of NAS-based experimental measures. An interesting research question is whether the relationships among the poverty rates generated by these three indexes would change if the indexes were constructed using more specific geographies. The ACS data permits the estimation of single year median gross rental costs for any jurisdiction with a population of 65,000 or more and estimates using three years of data for jurisdictions with populations as small as 20,000. The RPPs have been estimated for all 363 metropolitan statistical areas. Census Bureau respondent confidentiality protections do not allow identification of all 363 metropolitan areas on the public use microdata files. There are 21 metropolitan areas with populations less than 100,000 which cannot be identified but the other 342 areas can be identified and many of the 21 smaller areas can be combined with adjacent areas to meet disclosure requirements. This would allow for finer geographic distinctions in the construction of the index, regardless of the data source utilized.

A second area for further research revolves around the issue of housing quality. The FMR-based index includes some quality control because the data used for the FMR includes only units of "standard quality." HUD standard-quality rental housing units have the following attributes: occupied rental units paying cash rent; specified renter on 10 acres or less; with full plumbing; with full kitchen; unit more than 2 years old, and meals not included in rent.[7] Data from the ACS can be limited in a similar fashion. Yet, many would argue that there are large quality differences across geographies for units that pass that HUD standard quality test, e.g. units with complete kitchen, indoor plumbing and electricity.

[7] http://www.huduser.org/datasets/fmr/fmrover_071707R2.doc

Hedonic regressions address the issue of differences in housing quality by including housing characteristics in the regression equation. Earlier work on interarea price indexes (Moulton, 1995 and Aten, 2005) combined CPI descriptive data on the housing stock with decennial census data on neighborhood demographics to produce narrower indexes of housing costs. Aten (2006) subsequently concluded that these demographic characteristics were highly correlated with income and therefore should be excluded from the analysis. The RPP index examined in this paper includes data from the ACS on characteristics of the housing stock (number of rooms, bathrooms, age and type of housing unit) but does not include consideration of the neighborhood demographics.

A third area requiring further research is the question of whether an index based on housing costs should incorporate differences in owner occupied housing costs as well as rental costs. The regional price parities consider both costs using a weighted average that takes into consideration the tenure status of all county residents. Are these same weights appropriate in developing a poverty threshold index given the fact that low income families are more likely to be renters than families in general?

In a December 2008 paper published by the Center for Economic and Policy Research, Shawn Fremstad examined the relationship between state poverty rates using the NAS approach adjusting for differences in housing costs and two other measures of well-being and economic hardship. He found that state poverty rates calculated using the official poverty thresholds (which are not adjusted for geographic cost differences) and income measure were better correlated with USDA food insecurity rates and a health and education index (two of the three components of the American Human Development Index) than the NAS poverty rates.[8]

Fremstad suggests that differential public benefits (beyond those measured in the NAS income measure) and locational amenities as two possible sources of the discrepancy. If areas with higher housing costs also have better locational amenities (such as better schools and post-secondary institutions, recreational opportunities, greater access to quality medical care, and more public transit options) and/or better public benefits for low-income residents and these better amenities and public benefits improve the quality of life for lower income people, then a geographic adjustment of the thresholds based on housing costs will overstate the poverty rate of individuals living in high cost housing areas and understate the poverty rate of individuals in lower cost areas where there are few amenities.

The poverty rates estimated in this paper using the two alternative indexes are not more closely correlated with these hardship indexes than the poverty rates using the FMR- based index. Further research should explore the reasons for the mismatch between the geographically adjusted poverty rates and these economic hardship measures and

[8] Kathy Short (2005) reached a similar conclusion comparing the official poverty measure and NAS-based poverty measures to overall measures of material and financial hardship.

explore the question of whether or not such correlations should serve as the criteria for assessing adjustment strategies.

5. CONCLUSION

New data sources provide the opportunity for improving adjustments for regional cost differences in the poverty measurement process. Data on rental costs from the ACS can replace FMRs to develop an index based on differences in housing costs. For the first time, regional price parities are available for all areas of the United States permitting the development of an index based on differences in the cost of the entire consumer basket implicit in the NAS experimental thresholds. Either of these measures would represent a step forward in the development of a stronger poverty measure.

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Table 1: Geographic Cost of Living Indexes Constructed Using Data from the American Community Survey, Regional Price Parities and Fair Market Rents

	Metropolitan Areas			Nonmetropolitan Areas		
	Fair Market Rents	American Community Survey Median Gross Rents	Regional Price Parities	Fair Market Rents	American Community Survey Median Gross Rents	Regional Price Parities
Alabama	0.8492	0.9056	0.8530	0.8090	0.8300	0.6609
Alaska	1.0494	1.0891	1.1143	1.0607	0.9918	0.9666
Arizona	0.9764	1.0190	0.9671	0.8931	0.8940	0.6139
Arkansas	0.8570	0.9034	0.8431	0.7988	0.8312	0.6617
California	1.2157	1.1585	1.2943	0.9489	1.0112	0.9074
Colorado	1.0224	0.9990	0.9866	1.0333	0.9507	0.8278
Connecticut	1.1584	1.0796	1.2180	1.0197	0.9974	1.1022
Delaware	1.0333	1.0718	1.0049	0.9060	1.0085	0.7932
District of Columbia	1.2803	1.0752	1.0634			
Florida	1.0173	1.0763	1.0090	0.8800	0.9295	0.7240
Georgia	0.9398	1.0079	0.9129	0.8054	0.8584	0.6639
Hawaii	1.2761	1.2263	1.4208	1.1349	1.2036	1.0839
Idaho	0.9015	0.9312	0.8754	0.8503	0.8845	0.7211
Illinois	1.0194	1.0101	1.0211	0.8315	0.8439	0.7043
Indiana	0.9033	0.9206	0.8581	0.8399	0.8667	0.7257
Iowa	0.8977	0.9001	0.9175	0.8305	0.8256	0.6961
Kansas	0.9032	0.9362	0.9011	0.8227	0.8506	0.6988
Kentucky	0.8723	0.8984	0.8822	0.7994	0.8200	0.6595
Louisiana	0.9377	0.9445	0.8820	0.7724	0.8462	0.6611
Maine	0.9851	0.9501	0.9991	0.8713	0.8778	0.7912
Maryland	1.1396	1.1163	1.0716	0.8924	1.0085	0.8680
Massachusetts	1.2082	1.0818	1.2050	1.2156	1.0818	1.2895
Michigan	0.9495	0.9473	0.9466	0.8471	0.8717	0.7737
Minnesota	0.9968	0.9807	0.9696	0.8461	0.8517	0.7437
Mississippi	0.8820	0.9657	0.8878	0.8016	0.8451	0.7222
Missouri	0.8959	0.9212	0.8465	0.8093	0.8306	0.6626
Montana	0.8760	0.8834	0.8765	0.8633	0.8734	0.7984
Nebraska	0.9025	0.9323	0.9602	0.8241	0.8467	0.7208
Nevada	1.0436	1.1068	1.0189	0.9552	0.9940	0.8290
New Hampshire	1.1325	1.0841	1.2127	0.9812	1.0079	0.9902
New Jersey	1.1694	1.1263	1.2523			
New Mexico	0.9391	0.9318	0.9243	0.8269	0.8601	0.6693
New York	1.1548	1.0729	1.3555	0.8763	0.8895	0.7898
North Carolina	0.9251	0.9523	0.9169	0.8464	0.8723	0.7073
North Dakota	0.8476	0.8706	0.9228	0.8133	0.8023	0.6657
Ohio	0.9050	0.9229	0.8937	0.8323	0.8651	0.7412
Oklahoma	0.8604	0.9034	0.8872	0.7976	0.8506	0.6635
Oregon	0.9396	0.9818	0.9919	0.8910	0.9073	0.7745
Pennsylvania	0.9825	0.9518	0.9701	0.8472	0.8562	0.7334
Rhode Island	1.1132	1.0174	1.1337			
South Carolina	0.8985	0.9284	0.8616	0.8181	0.8701	0.7113
South Dakota	0.8939	0.9073	0.9378	0.8173	0.8034	0.7109
Tennessee	0.8858	0.9273	0.8939	0.8038	0.8423	0.6647
Texas	0.9462	0.9729	0.9427	0.8295	0.8673	0.6536

Table 1: Geographic Cost of Living Indexes Constructed Using Data from the American Community Survey, Regional Price Parities and Fair Market Rents

	Metropolitan Areas			Nonmetropolitan Areas		
	Fair Market Rents	American Community Survey Median Gross Rents	Regional Price Parities	Fair Market Rents	American Community Survey Median Gross Rents	Regional Price Parities
Utah	0.9207	0.9701	0.8920	0.8325	0.8784	0.6392
Vermont	1.0988	1.0507	1.1235	0.9285	0.9518	0.9143
Virginia	1.0815	1.0802	1.0603	0.8411	0.8812	0.6669
Washington	0.9757	1.0229	1.0515	0.9423	0.9001	0.7724
West Virginia	0.8399	0.8701	0.7403	0.8033	0.8134	0.6425
Wisconsin	0.9156	0.9440	0.9446	0.8637	0.8801	0.8015
Wyoming	0.8557	0.8934	0.8854	0.8274	0.9168	0.8660
Maximum Metro/Nonmetro	1.2803	1.2263	1.4208	1.2156	1.2036	1.2895
Minimum Metro/Nonmetro	0.8399	0.8701	0.7403	0.7724	0.8023	0.6139
Range Metro/Nonmetro	0.4403	0.3563	0.6805	0.4432	0.4013	0.6756
Overall Maximum	1.2803	1.2263	1.4208			
Overall Minimum	0.8399	0.8023	0.6139			
Range	0.4403	0.4241	0.8069			

Sources:

American Community Survey(ACS) median rents estimated by Bishaw (2009) from the 2007 American Community Survey

Regional Price Parities (RPPs) estimated by Aten (2008)

Fair Market Rents (FMRs) from U.S. Department of Housing and Urban Development. Index developed by averaging FMRs by state using March 2008 Current Population Survey weights

Table 2: Spearman Rank Correlation Coefficients for Alternative Geographic Cost Indexes

	FMR vs ACS	FMR vs RPP	ACS vs R PP
	Fair Market Rent & Median Gross Rental Costs from the American Community Survey	Fair Market Rents and Regional Price Parities	Median Gross Rental Costs from the American Community Survey and Regional Price Parities
All Areas	0.94732	0.90998	0.89909
Metropolitan Areas	0.93427	0.91068	0.87251
Nonmetropolitan Areas	0.88672	0.7919	0.76052

Source: U.S. Census Bureau

Table 3: 2007 State Poverty Rates Generated by Three Different Cost of Living Indexes

	2007 Poverty Rates and Standard Errors			Statistically Significant Differences		
	Fair Market Rents (FMR)	American Community Survey Median	Regional Price Parities (RPP)			
NAME	Estimate	Estimate	Estimate	ACS vs. FMR	RPP vs. FMR	ACS vs. RPP
Alabama	13.39	14.79	11.50	*	*	*
Alaska	9.17	9.83	10.15	*	*	*
Arizona	16.25	17.14	15.19	*	*	*
Arkansas	11.02	12.48	9.27	*	*	*
California	23.49	21.61	26.29	*	*	*
Colorado	12.34	11.84	11.13	*	*	*
Connecticut	12.05	10.80	13.64	*	*	*
Delaware	12.22	13.31	11.20	*	*	*
DC	24.77	18.50	18.07	*	*	*
Florida	16.10	18.12	15.62	*	*	*
Georgia	14.41	16.08	12.96	*	*	*
Hawaii	14.17	14.12	16.76	*	*	*
Idaho	9.56	10.07	8.59	*	*	*
Illinois	12.23	11.95	12.09	*	*	*
Indiana	11.84	12.19	10.15	*	*	*
Iowa	8.62	8.62	8.01		*	*
Kansas	10.28	10.86	9.02	*	*	*
Kentucky	15.37	15.61	12.95	*	*	*
Louisiana	15.08	15.59	13.97	*	*	*
Maine	10.67	10.37	10.13	*	*	*
Maryland	12.14	11.68	10.93	*	*	*
Massachusetts	16.06	12.69	16.06	*		*
Michigan	11.80	11.81	11.66		*	*
Minnesota	9.24	9.04	8.45	*	*	*
Mississippi	19.60	21.49	17.98	*	*	*
Missouri	11.15	11.24	9.47		*	*
Montana	12.73	12.88	10.64		*	*
Nebraska	10.01	10.77	9.93	*	*	*
Nevada	12.31	14.20	11.49	*	*	*
New Hampshire	9.39	9.28	10.01	*	*	*
New Jersey	15.54	13.79	17.69	*	*	*
New Mexico	14.25	14.46	12.22	*	*	*
New York	21.37	18.52	27.45	*	*	*
North Carolina	14.98	15.77	12.88	*	*	*
North Dakota	8.20	8.34	7.29	*	*	*
Ohio	12.69	13.71	11.92	*	*	*
Oklahoma	13.27	14.86	12.75	*	*	*
Oregon	14.19	15.05	14.66	*	*	*
Pennsylvania	12.21	11.82	11.30	*	*	*
Rhode Island	12.57	10.68	13.23	*	*	*
South Carolina	15.53	16.60	13.41	*	*	*
South Dakota	7.81	7.87	7.91	*	*	*
Tennessee	14.92	15.78	13.58	*	*	*
Texas	16.91	17.95	16.16	*	*	*
Utah	10.59	11.95	9.09	*	*	*
Vermont	12.52	12.44	12.53	*	*	*
Virginia	12.17	12.24	10.73		*	*
Washington	11.27	12.10	12.54	*	*	*
West Virginia	11.49	11.88	8.94	*	*	*
Wisconsin	10.41	11.22	10.65	*	*	*
Wyoming	9.83	11.22	10.49	*	*	*

Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Econom

For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF]. The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in tables 3a, 4a, and 5a along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement.

Table 4: 2007 State Poverty Rates Generated by Three Different Cost of Living Indexes - Metropolitan Areas

	2007 Poverty Rates and Standard Errors			Statistically Significant Differences		
	Fair Market Rents (FMR)	American Community Survey Median	Regional Price Parities (RPP)			
	Estimate	Estimate	Estimate	ACS vs. FMR	RPP vs. FMR	ACS vs. RPP
Alabama	10.37	12.17	10.37	*		*
Alaska	8.88	10.03	10.53	*	*	*
Arizona	15.99	16.99	15.72	*		*
Arkansas	7.98	9.04	7.54	*		*
California	23.70	21.75	26.59	*	*	*
Colorado	12.43	11.96	11.34	*	*	*
Connecticut	12.39	11.05	13.89	*	*	*
Delaware	12.31	12.75	11.50	*	*	*
DC	24.77	18.50	18.07	*	*	*
Florida	16.03	18.08	15.81	*	*	*
Georgia	13.91	15.48	13.14	*	*	*
Hawaii	14.03	12.42	17.95	*	*	*
Idaho	9.54	9.92	9.20	*		*
Illinois	12.51	12.04	12.51	*		*
Indiana	12.43	12.91	10.85	*	*	*
Iowa	8.37	8.37	8.72		*	*
Kansas	9.56	10.22	9.48	*		*
Kentucky	14.21	14.42	14.21			
Louisiana	14.48	14.67	13.62		*	*
Maine	9.78	9.12	10.81	*	*	*
Maryland	12.39	11.79	11.12	*	*	*
Massachusetts	16.10	12.72	16.10	*		*
Michigan	12.36	12.36	12.36			
Minnesota	9.10	8.83	8.74	*	*	
Mississippi	16.91	19.40	17.48	*		*
Missouri	10.50	10.61	9.89		*	*
Montana	13.10	13.10	13.10			
Nebraska	9.80	10.65	11.08	*	*	*
Nevada	12.72	14.63	11.98	*	*	*
New Hampshire	10.00	9.34	10.88	*	*	*
New Jersey	15.54	13.79	17.69	*	*	*
New Mexico	13.40	13.34	13.34			
New York	21.90	18.74	29.04	*	*	*
North Carolina	13.33	14.23	13.05	*	*	*
North Dakota	6.94	7.37	8.87	*	*	*
Ohio	13.24	13.97	12.92	*	*	*
Oklahoma	11.83	13.67	12.92	*	*	
Oregon	15.04	16.11	16.39	*	*	
Pennsylvania	12.01	11.46	11.80	*	*	*
Rhode Island	12.57	10.68	13.23	*	*	*
South Carolina	13.19	13.53	11.66	*	*	*
South Dakota	4.84	5.12	7.19		*	*
Tennessee	13.69	14.38	13.78	*		*
Texas	16.53	17.53	16.37	*	*	*
Utah	10.01	11.50	8.98	*	*	*
Vermont	12.08	10.08	12.99	*	*	*
Virginia	11.52	11.52	10.80		*	*
Washington	11.35	12.33	13.10	*	*	*
West Virginia	10.45	11.14	8.27	*	*	*
Wisconsin	10.10	10.91	10.91	*	*	
Wyoming	9.82	10.57	10.57			

Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement

For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF]. The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in tables 3a, 4a, and 5a along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement.

Table 5: 2007 State Poverty Rates Generated by Three Different Cost of Living Indexes - Nonmetropolitan Areas

	2007 Poverty Rates and Standard Errors			Statistically Significant Differences		
	Fair Market Rents (FMR)	American Community Survey Median Gross Rents(ACS)	Regional Price Parities (RPP)			
	Estimate	Estimate	Estimate	ACS vs. FMR	RPP vs. FMR	ACS vs. RPP
Alabama	21.51	21.83	14.54		*	*
Alaska	9.85	9.36	9.27	*	*	
Arizona	18.43	18.43	10.74		*	*
Arkansas	16.42	18.60	12.34	*	*	*
California	11.13	13.61	8.07	*		*
Colorado	11.35	10.42	8.60	*	*	
Connecticut	8.79	8.37	11.15			*
Delaware	11.88	15.56	9.99	*	*	*
Florida	17.56	18.98	11.83		*	*
Georgia	17.49	19.78	11.85	*	*	*
Hawaii	14.56	18.75	13.52	*	*	*
Idaho	9.60	10.34	7.54		*	*
Illinois	9.96	11.21	8.70	*	*	*
Indiana	10.34	10.34	8.37		*	*
Iowa	8.96	8.96	7.02		*	*
Kansas	11.54	11.99	8.20		*	*
Kentucky	16.52	16.80	11.70	*	*	*
Louisiana	20.35	23.70	17.09	*	*	*
Maine	12.00	12.25	9.10		*	*
Maryland	6.36	9.05	6.36	*		*
Massachusetts	0.00	0.00	0.00			
Michigan	8.50	8.61	7.52		*	*
Minnesota	9.61	9.61	7.69		*	*
Mississippi	21.64	23.07	18.36	*	*	*
Missouri	13.50	13.50	7.97		*	*
Montana	12.53	12.77	9.28		*	*
Nebraska	10.35	10.97	8.03	*	*	*
Nevada	7.08	8.76	5.23		*	*
New Hampshire	8.25	9.18	8.36	*		*
New Mexico	15.92	16.62	10.03	*	*	*
New York	16.03	16.21	11.19		*	*
North Carolina	18.12	18.70	12.58	*	*	*
North Dakota	9.33	9.20	5.88		*	*
Ohio	10.88	12.85	8.60	*	*	*
Oklahoma	16.34	17.40	12.40	*	*	*
Oregon	11.47	11.65	9.13		*	*
Pennsylvania	13.10	13.43	9.09		*	*
South Carolina	20.12	22.62	16.85	*	*	*
South Dakota	10.80	10.63	8.63		*	*
Tennessee	18.56	19.92	13.00	*	*	*
Texas	20.03	21.48	14.48	*	*	*
Utah	14.81	15.27	9.89		*	*
Vermont	12.74	13.56	12.31	*		*
Virginia	15.52	16.01	10.34		*	*
Washington	10.39	9.68	6.61		*	*
West Virginia	12.87	12.87	9.84		*	*
Wisconsin	11.44	12.26	9.75			*
Wyoming	9.83	11.51	10.46	*	*	*
Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement						

For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF]. The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in tables 3a, 4a, and 5a along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement.

Table 3A: 2007 State Poverty Rates - Rhos and Standard Errors

NAME	Rhos and Standard Errors - Using Replicate Weights					
	Fair Market Rents (FMR)		American Community Survey Median Gross Rents(ACS)		Regional Price Parities (RPP)	
	Rho	SE	Rho	SE	Rho	SE
United States	0.887	0.2	0.865	0.2	0.833	0.2
Alabama	0.874	1.6	0.866	1.6	0.814	1.2
Alaska	0.905	1.1	0.883	1.1	0.936	1.1
Arizona	0.891	1.6	0.888	1.6	0.860	1.4
Arkansas	0.879	1.3	0.869	1.5	0.810	1
California	0.839	0.7	0.796	0.6	0.751	0.7
Colorado	0.925	1	0.893	0.9	0.911	0.9
Connecticut	0.891	0.9	0.875	0.9	0.820	0.9
Delaware	0.893	1.2	0.906	1.2	0.860	1.1
DC	0.763	1.4	0.752	1.3	0.902	1.2
Florida	0.848	0.8	0.915	0.8	0.847	0.7
Georgia	0.865	1.1	0.879	1.1	0.826	1
Hawaii	0.846	1.2	0.812	1.1	0.732	1.1
Idaho	0.922	1.1	0.907	1.1	0.875	1.2
Illinois	0.918	0.8	0.936	0.8	0.912	0.9
Indiana	0.926	1	0.870	1	0.855	0.9
Iowa	0.962	0.8	0.905	0.8	0.905	0.8
Kansas	0.921	1.2	0.893	1.2	0.865	1.1
Kentucky	0.920	1.2	0.848	1.2	0.841	1.1
Louisiana	0.912	1.1	0.891	1.2	0.877	1.1
Maine	0.932	1	0.866	1	0.840	0.9
Maryland	0.919	1	0.893	0.9	0.915	0.9
Massachusetts	0.818	1.2	0.927	1	0.803	1.2
Michigan	0.945	0.9	0.941	0.9	0.940	0.9
Minnesota	0.948	0.9	0.914	0.9	0.924	0.9
Mississippi	0.839	3	0.850	3	0.815	2.8
Missouri	0.947	1	0.873	1	0.870	1
Montana	0.940	1.9	0.841	2	0.835	1.4
Nebraska	0.917	1.4	0.860	1.4	0.880	1.2
Nevada	0.861	1.2	0.907	1.2	0.837	1.1
New Hampshire	0.915	0.8	0.921	0.8	0.882	0.9
New Jersey	0.867	1.1	0.844	1.1	0.781	1.3
New Mexico	0.920	1.3	0.852	1.3	0.844	1.2
New York	0.839	0.9	0.712	0.8	0.650	1
North Carolina	0.892	1	0.856	0.9	0.827	0.9
North Dakota	0.947	1.2	0.803	1.2	0.821	1
Ohio	0.899	0.9	0.911	1	0.875	0.9
Oklahoma	0.875	1.4	0.860	1.5	0.864	1.3
Oregon	0.904	1.3	0.876	1.3	0.903	1.3
Pennsylvania	0.921	0.8	0.908	0.8	0.896	0.7
Rhode Island	0.872	1.1	0.910	1	0.835	1.1
South Carolina	0.883	1.2	0.861	1.1	0.824	1
South Dakota	0.951	1.3	0.814	1.3	0.825	1.2
Tennessee	0.897	1.3	0.885	1.3	0.860	1.4
Texas	0.879	0.8	0.893	0.8	0.861	0.8
Utah	0.881	1.1	0.878	1.2	0.819	1
Vermont	0.884	1.2	0.923	1.2	0.859	1.2
Virginia	0.940	0.9	0.890	0.9	0.888	0.8
Washington	0.905	1	0.857	1.1	0.895	1.4
West Virginia	0.929	1.2	0.833	1.2	0.819	1.2
Wisconsin	0.912	1	0.901	1.1	0.922	1.1
Wyoming	0.893	0.9	0.926	0.9	0.926	1

Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic

The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in this table along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement which can be found at : www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF].

Table 4A: 2007 Poverty Rates for Metropolitan Areas: Rhos and Standard Errors

	Rhos and Standard Errors - Using Replicate Weights					
	Fair Market Rents (FMR)		American Community Survey Median Gross Rents(ACS)		Regional Price Parities (RPP)	
	Rho	SE	Rho	SE	Rho	SE
Alabama	0.856	1.9	0.952	2.1	0.865	1.9
Alaska	0.892	1	0.865	1.1	0.928	1.2
Arizona	0.887	1.7	0.917	1.7	0.883	1.7
Arkansas	0.891	1.6	0.928	1.8	0.864	1.5
California	0.839	0.7	0.794	0.6	0.750	0.7
Colorado	0.925	1.1	0.897	1	0.914	1
Connecticut	0.887	1	0.877	0.9	0.819	1
Delaware	0.925	1.4	0.913	1.4	0.896	1.4
DC	0.763	1.4	0.752	1.3	0.902	1.2
Florida	0.846	0.8	0.920	0.9	0.851	0.8
Georgia	0.871	1.5	0.910	1.6	0.857	1.4
Hawaii	0.878	1.6	0.785	1.5	0.734	1.6
Idaho	0.926	1.4	0.932	1.3	0.905	1.4
Illinois	0.922	1	0.939	1	0.920	1
Indiana	0.918	1.6	0.868	1.6	0.849	1.5
Iowa	0.963	2	0.940	2	0.940	2
Kansas	0.919	1.6	0.952	1.6	0.919	1.6
Kentucky	0.928	2	0.933	2	0.928	2
Louisiana	0.928	1.2	0.902	1.3	0.897	1.1
Maine	0.922	1.2	0.895	1.2	0.860	1.3
Maryland	0.921	1	0.890	1	0.916	1
Massachusetts	0.818	1.2	0.926	1	0.803	1.2
Michigan	0.943	1	0.943	1	0.943	1
Minnesota	0.944	0.9	0.938	0.9	0.952	0.9
Mississippi	0.828	4.3	0.893	4.8	0.861	4.4
Missouri	0.948	1.7	0.927	1.6	0.923	1.6
Montana	0.952	2.4	0.952	2.4	0.952	2.4
Nebraska	0.911	1.3	0.882	1.3	0.927	1.3
Nevada	0.859	1.3	0.909	1.4	0.840	1.3
New Hampshire	0.922	1.1	0.904	1.1	0.867	1.2
New Jersey	0.867	1.1	0.844	1.1	0.781	1.3
New Mexico	0.936	1.8	0.936	1.8	0.939	1.8
New York	0.831	1	0.707	1	0.644	1.1
North Carolina	0.886	1.4	0.925	1.4	0.883	1.3
North Dakota	0.940	1	0.846	1	0.870	1.3
Ohio	0.902	1	0.926	1	0.894	0.9
Oklahoma	0.864	1.6	0.895	1.7	0.909	1.6
Oregon	0.893	1.6	0.884	1.7	0.918	1.7
Pennsylvania	0.920	1	0.936	1	0.926	1
Rhode Island	0.872	1.1	0.910	1	0.835	1.1
South Carolina	0.919	1.5	0.884	1.5	0.866	1.3
South Dakota	0.953	0.8	0.776	0.8	0.792	1.1
Tennessee	0.902	1.5	0.936	1.6	0.912	1.5
Texas	0.882	1.1	0.914	1.1	0.882	1.1
Utah	0.874	1.4	0.900	1.6	0.831	1.4
Vermont	0.837	2	0.905	1.6	0.793	2.1
Virginia	0.944	1	0.913	1	0.913	0.9
Washington	0.903	1.7	0.865	1.8	0.901	1.9
West Virginia	0.918	1.5	0.830	1.6	0.803	1.4
Wisconsin	0.914	1.3	0.914	1.4	0.954	1.4
Wyoming	0.929	1.9	0.929	2	0.955	2

Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic

The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in this table along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement which can be found at : www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF].

Table 5A: 2007 Poverty Rates for Nonmetropolitan Areas: Rhos and Standard Errors

	Rhos and Standard Errors - Using Replicate Weights					
	Fair Market Rents (FMR)		American Community Survey Median Gross Rents(ACS)		Regional Price Parities (RPP)	
	Rho	SE	Rho	SE	Rho	SE
Alabama	0.886	6.9	0.742	6.8	0.732	4.7
Alaska	0.937	3.1	0.931	2.8	0.957	2.8
Arizona	0.918	9.7	0.684	9.7	0.684	5.7
Arkansas	0.856	4.8	0.806	5.6	0.751	3.6
California	0.838	7	0.849	8.6	0.752	4.9
Colorado	0.920	4.4	0.823	4.3	0.861	2.6
Connecticut	0.949	2.8	0.843	2.7	0.829	3.1
Delaware	0.795	1.9	0.879	2.5	0.748	1.8
Florida	0.895	9.6	0.783	10.1	0.753	6
Georgia	0.828	6.4	0.735	7.1	0.683	4
Hawaii	0.792	2.5	0.895	2.7	0.774	2.4
Idaho	0.917	2.4	0.858	2.5	0.819	2.3
Illinois	0.880	2	0.898	2	0.832	1.8
Indiana	0.950	3.2	0.874	3.2	0.874	2.5
Iowa	0.960	2.6	0.857	2.6	0.857	1.9
Kansas	0.925	2.8	0.785	2.8	0.765	2.6
Kentucky	0.914	1.5	0.766	1.4	0.758	0.8
Louisiana	0.820	2.5	0.828	2.6	0.764	2.6
Maine	0.945	1.8	0.831	2	0.826	1.5
Maryland	0.844	1.5	0.979	1.4	0.850	1.5
Massachusetts		0		0		0
Michigan	0.954	2.4	0.922	2.4	0.914	1.9
Minnesota	0.958	2.3	0.848	2.3	0.848	2.2
Mississippi	0.845	5	0.825	5	0.786	4.8
Missouri	0.941	4.6	0.700	4.6	0.700	2.8
Montana	0.935	2.8	0.786	2.9	0.778	1.9
Nebraska	0.924	3	0.840	2.8	0.818	2.3
Nevada	0.869	4.2	0.832	5.5	0.751	3.3
New Hampshire	0.905	1.2	0.958	1.3	0.917	1.2
New Mexico	0.898	2.2	0.732	2.2	0.713	1.2
New York	0.928	4	0.773	3.9	0.770	2.8
North Carolina	0.902	2.5	0.746	2.5	0.734	2.2
North Dakota	0.951	2.2	0.787	2.2	0.794	1.6
Ohio	0.887	3.4	0.843	3.6	0.792	3.2
Oklahoma	0.896	2.7	0.803	3	0.778	2
Oregon	0.940	4.1	0.842	4.2	0.836	3.5
Pennsylvania	0.927	2.1	0.786	2.2	0.774	1.5
South Carolina	0.826	1.9	0.825	1.6	0.764	1.3
South Dakota	0.947	2.6	0.855	2.6	0.861	2.4
Tennessee	0.881	5.3	0.769	5.7	0.740	5.3
Texas	0.860	5.3	0.748	5.5	0.717	4.5
Utah	0.906	10.3	0.776	10.6	0.759	7.1
Vermont	0.908	1.5	0.932	1.6	0.897	1.4
Virginia	0.918	4.1	0.786	3.8	0.777	2.7
Washington	0.925	7.4	0.755	7.1	0.785	4.7
West Virginia	0.942	2.1	0.836	2.1	0.836	2.2
Wisconsin	0.908	1.9	0.870	2.4	0.832	2.3
Wyoming	0.876	1.1	0.925	1.1	0.912	1.1

Source: U.S. Census Bureau, Current Population Survey, 2008 Annual Social and Economic

The standard errors used in this report were calculated using Replicate Weights and may differ from the standard errors used in other reports that use Generalized Variance Parameters. The statistical testing within this report uses the standard errors and correlations found in this table along with the equation for the Standard Errors of Estimated Differences, provided in the source and accuracy statement which can be found at : www.census.gov/apsd/techdoc/cps/cpsmar08.pdf[PDF].