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ECONOMIC WELLBEING AND WHERE WE LIVE: ACCOUNTING FOR GEOGRAPHIC COST-OF-LIVING DIFFERENCES

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Economic Wellbeing and Where We Live:
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ABSTRACT

Regional cost-of-living differences affect the quality of life that individuals and families experience in different metropolitan areas. Yet, lack of metropolitan cost-of-living indexes has left analysts without the ability to make accurate cost-of-living adjustments to measures of economic wellbeing. We evaluate seven alternative inter-regional cost-of-living measures based on four criteria: (1) their data collection methodologies, (2) the variables included in cost-of-living measurement, (3) their accuracy in measuring the cost-of-living experiences of high-, low- and moderate-income populations, and (4) the measures' availability and affordability. We then applied one of the indices for illustrative purposes to various metropolitan area data sets, including median household income, the number of people living in poverty, and family eligibility for the Free and Reduced Price School Lunch and Head Start programs to illustrate some of the policy impacts of adjusting economic indicators of wellbeing for geographic cost-of-living differentials.

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INTRODUCTION

The regional cost-of-living affects the quality of life that individuals and families experience in different places. An income of $62,732, the 2002 median household income in the United States for a family of four (HHS, 2004), purchases a much higher standard of living in Wichita, KS, than in New York City, NY. Yet, lack of available data directly measuring these differences, as well as disagreement on how to do so, has left analysts with manifestly inaccurate measures of economic wellbeing.

Both researchers and policy makers often use income-based measures – particularly median household income, per capita income, and the proportion of the population with incomes below the poverty level – as tools to gauge the relative economic wellbeing of an area's residents. However, since the cost-of-living varies significantly among U.S metropolitan areas, unadjusted income-based measures inevitably yield misleading results. For instance, researchers at the U.S. Census Bureau found that in 2003 a larger proportion of people were living with incomes below the poverty line in Cleveland, Ohio than in any other major city in the nation, making Cleveland the poorest city in America (Proctor et al, 2003). However, in measuring relative poverty rates among U.S. cities, Census Bureau researchers did not account for differentials in the purchasing power of income. Rather, poverty was measured at a static rate across the nation (in 2003 it was $18,400 for a family of four). Given that Cleveland's living costs are relatively low when compared to other major cities,[1] it is doubtful that the magnitude of poverty in Cleveland is in fact higher than in many other large but high-cost metropolitan areas.

[1] See Table 4

This has had a perceptible impact on investment confidence in the region and in risk perceptions about the region's economic future. Thus, without downplaying the reality of poverty there is question as to whether or not this statistical "fact" is indeed correct, and it is quite possible that the "poorest big city" designation is having a negative impact on the economy of the city.

Further, while it is interesting to understand how regional price differences affect quality-of-life measures, it is arguably more important to understand how cost-of-living differences impact eligibility for social support and income transfer programs. Economic and community development programs such as the HOPE VI program and the Community Development Block Grant program provide financial assistance to communities based upon their level of need. However, regional living costs are not taken into account when computing community need levels. There are currently over 80 federal means-tested programs providing cash and noncash benefits to poor individuals and families. Eligibility criteria for these programs are based upon: (1) the federal poverty guidelines or the Census Bureau's poverty thresholds[2] (or a combination of both), (2) state or area median income, (3) the lower living standard income determined by the Bureau of Labor Statistics, (4) an absolute monetary standard, or (5) an income level considered to indicate "need," (CRS, 2003). With the exception of the qualification standards that are based upon state or area median income, and in some cases those that are based on multiples of the poverty standards,[3] most programs do not take living costs into consideration when determining program eligibility.

[2] The official poverty line, or threshold, was developed by economist Molly Orshansky of the Social Security Administration in 1963 based on the U S Department of Agriculture's economy food plan of 1961. Orshansky used the average national ratio of food expenditures to total family after tax income as measured by the 1955 Household Food Consumption Survey to estimate the minimum family income required to purchase the food basket (Orshansky 1976). To this day the market basket of food is repriced and used to estimate the poverty threshold. The size of the basket, and the resulting, poverty threshold is adjusted for family size (Ruggles 1990). The US Census Bureau maintains a web site on poverty research http://www.census.gov/hhes/www/povmeas.html. The US Census Bureau discusses the poverty threshold at: http://www.census.gov/hhes/poverty/povdef.html. The Office of Management and Budget's directive on the calculation and use of the poverty threshold can be found at: http://www.census.gov/hhes/poverty/povmeas/ombdir14.html.

[3] Interstate differences in the COL are not the only determinant of the portion of the low-income population that is eligible for income support programs. States set their own eligibility requirements, with some being at 150 or 200 percent of the federal poverty level.

Thus, there is a clear distortion in having a single, national, poverty line.[4] Because land costs and associated housing and rental prices and insurance costs are typically lower in rural areas than in urban areas it is safe to assume that the national average poverty line overstates rural poverty and understates urban poverty. At the same time, the national average poverty line will understate the poverty rate in "expensive" metropolitan areas and central cities and overstate it in "cheaper" metropolitan areas and central cities. Since differences in per capita income, average household income and the portion of the population with incomes below the poverty line are frequently used to compare the quality of life in different places, not accounting for differences in the regional cost-of-living distorts measures of economic wellbeing. Furthermore, failing to account for living cost differentials in program eligibility means that there are large quality of life differences among those who qualify for federal means-tested programs.

However some argue that it is undesirable to account for geographic cost-of-living differences in measures of economic wellbeing and program eligibility.[5] Proponents of this position argue that differences in living costs reflect the different packages of amenities/disamenities that are available in different areas because amenity packages are capitalized into land and housing costs. Thus, residents in high cost-of-living areas are, in effect, paying for the higher value of the amenities in they receive. If they feel that they are paying too high a cost in terms of the amenities they value and are receiving, they will move elsewhere (thus "voting with their feet" in a manner similar to that postulated by Tiebout (1956) for intra-metropolitan moves in search of tax/service packages that best meet a households preferences),

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[4] Three panels of the National Research Council (1995, 2000, and 2002) have looked at measurement issues related to poverty and cost-of-living adjustments. Citro and Michael (NRC 1995) report on the findings of a panel that looked at general poverty measurement issues. Citro and Kalton (NRC 2000) report on the findings of a panel that examined small area income and poverty measurement. This topic was also the subject of a report by the United States General Accounting Office in 1997. Schultze and Mackie (NRC 2002) led a panel that examined cost-of-living adjustments and their effect on measuring inflation and constructing price indices at the national level.

[5] See Cebula, 1979(a) and Cebula, 1979(b) for a survey of the literature regarding the relationship between welfare benefit levels, inter-state migration and adjusting policies for geographic cost-of-living differences.

and if they are satisfied with the package of amenities they are receiving, they will remain in their current location.

The argument follows that regional variations in land costs and ground rents play an important allocative function in the economy because they are a device for rationing scarce resources such as environmental amenities, cultural amenities and access to region-specific labor markets. Low ground rents are a pull factor in interregional migration decisions, while high ground rents are a push factor. Subsequently, regional variation in living costs is critical to establishing long run equilibrium in the nation's regional labor markets.

However, despite the compelling nature of these arguments, there are several reasons why geographic cost-of-living differentials should be accounted for in measures of economic wellbeing and public policy, especially when addressing the needs of poor and low-income populations. First, while it is correct that regional variations in housing prices are likely to capture amenity or disamenity differences among areas (Kaplow, 1995), housing, as we shall argue later, is only one component of regional cost-of-living differences. Differences in the cost of food, clothing, health care, utilities, etc. are likely to reflect real differences in supply costs and these differences are real components in differences in the quality of life. These differences are likely to be largely, if not completely, independent of the amenity characteristics of the area.

Second, even with respect to regional housing cost and land cost variations, which, we agree partially reflects regional amenity and labor market differences, the implicit rationale for the argument against adjusting for geographic cost-of-living differentials assumes that individuals have perfect information and mobility, as is assumed by Tiebout in his *intra-metropolitan* sorting hypothesis. But we are concerned here with *regional*, i.e., *inter-metropolitan* differences. Within a metropolitan area, Tiebout's assumption was that households could locate anywhere within that area and still have access to the same job. Clearly this is not true on an *inter-metropolitan* level.

The application of Tiebout's hypothesis to the argument against making COL adjustments is weakened further by the fact that all segments of the population are not equally mobile. Highly-educated and amenity-seeking households have a greater degree of inter-metropolitan mobility and choice because they do not face the same financial, informational and educational constraints that poor households experience. Poor and low-income households have less money for moving costs, less information about inter-metropolitan occupational and residential opportunities and less human capital to employ to take advantage of those opportunities than higher-income households. Subsequently, poor and low-income households have a relatively lower degree of inter-metropolitan residential mobility and choice than the rest of the population (Gimpel, 1999). As a result, poor people often bear the costs of amenities through higher housing prices, regardless of whether or how much they actually value them.

Fourth, the argument that regional variations in living costs serve to propel the national labor market into a long-run equilibrium is problematic for two primary reasons. First, individuals who relocate for specific jobs seek compensation for living cost differentials in high-cost areas. Thus, differences in compensation packages somewhat mitigate differences in living costs for higher-income, mobile people. Furthermore, regional differences in living costs redistribute income from those who are place bound and do not place a high value on the amenity package (often poor and low-income people) to those who place a high value on the package of amenities in a given area.

Therefore, while low-income people may be enjoying some of the amenities associated with high-cost metropolitan areas (assuming their amenity preferences match those present in the area) when compared to the rest of the population they have a limited opportunity to make choices between residential locations. In this light, economic theory suggests that when households are immobile, adjusting for COL differences is economically efficient because it does not result in interregional distortions in the allocation of labor and production (Kaplow,

1995). Therefore, although there is no existing technique available for accounting for amenity differences in cost-of-living indices and it is therefore likely that cost-of-living indices overstate inter-metropolitan variations in quality of life, we argue that adjusting for cost-of-living differences when measuring poverty is preferable to disregarding disparities in living costs altogether.

COST-OF-LIVING MEASURES

There are several cost-of-living (COL) measures available, and geographic COL estimates vary a great deal depending upon the measure that is used. For example, using four different COL measures, whose methodology we describe and critique in the following section of the article, results in very different measures of median household income. Median household income in 2000, as reported in the U.S. Bureau of the Census and not adjusted for regional cost-of-living differences, is reported in the second column of Table 1 for a set of 15 metropolitan areas.[6] We then used four existing measures of COL variation to adjust median household income levels for geographic living cost differences: the Department of Housing and Urban Development's (HUD) Fair Market Rents (FMR) measure, the Economic Policy Institute's (EPI) Family Budgets Measure, the Brookings Institute's Metropolitan Price Indices, and ACCRA's Cost-of-Living Indices (all of these indices are described in detail later in the paper). As is evident in the table, the estimated purchasing power of a household's income varies a great deal depending on the COL adjustment used. In the Chicago metropolitan area, for example, the Census Bureau's unadjusted median household income in 2000 was $51,680. Using the Fair Market Rent approach for measuring COL differences, the median household income Chicago is

[6] The Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) included in Table 1 (and subsequent tables) were chosen for illustrative, not statistical, purposes. All MSAs/PMSAs included have central cities that had populations over 125,000 and were in MSAs or PMSAs with populations over 250,000 in 2000. The 15 MSAs/PMSAs included in our tables were selected to be illustrative of America's metropolitan areas by region and size. They do not constitute a statistically valid random sample.

adjusted down to $30,047, using the EPI' Family Budget adjustment it is estimated at $45,333, using the Brookings Institute Index it is estimated at $41,757, and using the ACCRA index, it is $42,188. This represents a range in COL estimates of $21,633, depending on the measure used. Although adjusted median household income measures do not vary as much for all MSAs/PMSAs as they do for Chicago, all of the metropolitan areas in our sample vary by at least $5,637 in adjusted median income levels.

Table 1 about here

The measures of central tendency for median household income unadjusted for COL differences (reported at the bottom of the second column of Table 1) differ from the measures of central tendency for the distributions of median household income that were adjusted for inter-metropolitan area COL differences. HUD's Fair Market Rent measure produces the lowest average median household income estimates ($31,256), with the second-highest coefficient of variation (CV). The estimates of median household income produced with EPI's Family Budget, Brookings' Metropolitan Indices, and ACCRA's COL measure are much closer to one another as measured by their average values than is HUD's Fair Market Rent measure. The average median household income estimates using the EPI's Family Budget COL adjustment is $40749, Brookings Metropolitan Price Index is $37,832 and ACCRA's COL Series is $39,903. ACCRA's indices result in the highest variation among metropolitan areas.

The summary statistics from Table 1 demonstrate that failing to adjust for COL differences is likely to distort relative measures of wellbeing and that different methods for adjusting the original data yield widely varying results. Thus, it is important to evaluate the different COL measures that are available to gauge the impact that their methodologies and data collection strategies have on measuring geographic differences in the COL on the economic wellbeing of residents. In the following sections we identify and evaluate seven alternative COL measures based on their data collection methodologies, the components included in the

measures, their applicability to low-, moderate- and high-income households and their availability and affordability for researchers.

Housing-based Measures

There are two primary approaches to measuring geographic COL differences: housing-based measures and market basket measures. Housing-based measures rely on housing costs as the sole source of regional COL differences and do not take the costs of other goods and services into account. Market basket models are more inclusive in their approach, as they compare the costs of a constant combination of goods and services across geographic areas (the composition of the market basket remains the same across metropolitan areas).

Housing-based COL measures rely on the assumption that housing costs are the only source of COL differences among areas, or that the other sources of price differences in a region's COL are highly correlated with its housing costs. Thus, housing-based COL measures estimate geographic COL differences based on housing costs alone, while other possible contributors, such as groceries, heating and cooling costs, automobile insurance, and clothing are omitted from the regional COL estimates. While housing-based COL measures are useful in estimating the relative costs of housing between geographic areas, they have weaknesses as a broader measure of the regional differences in the quality of life.

Housing-based methods depend on housing price data from one of two sources: the U.S. Census Bureau's American Housing Survey (AHS) or the U.S. Department of Housing and Urban Development's (HUD) Fair Market Rents. Data from The Census Bureau's American Housing Survey (AHS) report on housing and resident characteristics such as income levels, housing and neighborhood quality, housing costs, equipment and fuel consumption, the size of housing units, and recent moves. These data are collected at the metropolitan statistical area (MSA) level every other year for a sample of housing units (AHS, 2004). Fair Market Rents

(FMRs) are rental cost measures derived from the AHS data, Census data, and random digit dialing telephone surveys. FMRs are used by the Department of Housing and Urban Development (HUD) to determine program eligibility for Section 8 housing assistance voucher programs, and are estimated annually for 354 metropolitan areas and 2,350 non-metropolitan rural areas. FMRs are set the 40th percentile rental level in a metropolitan area, meaning that the lowest 40 percent of all rent and utility payments in a metropolitan area are at or below the FMR dollar amount (HUD, 1995 pp. 2-3). FMRs are updated annually with AHS and Census data.

There are several examples of inter-regional COL measures that rely on AHS and FMR data. Three of these measures include the Basic Needs Budget, the National Academy of Sciences' alternative to the official poverty measure and the Brookings Institution's Metropolitan Price Indices.[7] The Basic Needs Budget was created by Trudi Renwick in her 1995 dissertation (Renwick 1995). The purpose of the Basic Needs Budget was not to measure inter-area COL differences; rather the Basic Needs Budget was proposed as a measure of the income levels required for single parent families to maintain modest living standards. Thus, the Basic Needs Budget approximates how much income a family requires to purchase the contents of a standard market basket of goods including food, housing, health care, transportation, clothing, personal care, and childcare. Assuming that all prices, with the exception of housing, are uniform nationally, geographic COL estimates are built into the Basic Needs Budget through the housing price input.

Housing prices included in the Basic Needs Budget are based upon AHS median rental housing cost data for three types of geographic areas: urban, suburban, and rural. Thus, three geographically distinct Basic Needs Budgets were developed: one for all urban residents nationally, a second measure for all suburban residents and a third for all rural residents. Beyond

[7] Both the Basic Needs Budget and the NAS alternative measure are proposed alternative poverty measures to the current US Bureau of the Census poverty threshold. They are not currently used in any social programs. The Brookings Institute's Metropolitan Price Indices were employed for research purposes.

these three distinctions, however, the model does not account for differences between metropolitan housing markets or other locational attributes that affect geographic COL differences, such as food, clothing and insurance costs (Renwick, 1995).

A second housing-based COL measure was created in 1995 by the National Academy of Sciences Panel on Poverty and Family Assistance (NRC 1995, 2002). Similar to the Basic Needs Budget, the NRC measure is a proposed alternative to the current poverty threshold and is based upon the purchase price of a constant market basket of goods and services. However, like the Basic Needs Budget, geographic COL variation in the NRC model is derived from rental cost differences. The NRC constructed 54 regional housing price indices from 1990 Fair Market Rent values. Each of the indices created by the NRC corresponds to a set of metropolitan areas, differentiated by population size, within a Census region. The nine Census regions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain and Pacific) were broken down into six population size categories:

- Nonmetropolitan areas
- Metropolitan areas under 250,000
- Metropolitan areas 250,000 – 500,000
- Metropolitan areas 500,000 – 1,000,000
- Metropolitan areas 1,000,000 – 2,500,000
- Metropolitan areas 2,500,000 or more

Thus, each of the nine Census regions had six possible FMR values, for a total of 54 different COL differentials that were incorporated into the NRC poverty measure (NRC, 2002).

Similar to the NRC poverty measure, Berube and Thacher (2004) developed metropolitan price indices based upon FMR values in their study of household income distributions in U.S. cities. They divided metropolitan FMR values by the national average FMRS to get the relative COL index in specific metropolitan areas. They then multiplied the index value by 0.33 because, the 2000 Census and the Bureau of Labor Statistics Consumer Expenditure Survey indicated that

individuals typically spend one-third of their income on housing and related expenses (Berube and Thacher, 2004; BLS, 2004). They then add .67 to the product in order to get a regional COL index, thereby making the cost of all goods other than housing constant across metropolitan areas.[8]

The three housing-based COL measures discussed, as well as housing-based COL measures in general, overstate inter-area COL differentials because housing costs vary geographically more than the costs of other goods. Table 2 illustrates the inter-area variation of the costs of housing, healthcare, utilities, groceries, transportation, and miscellaneous goods and services for the second quarter of 2004 for the nation's 26 largest MSAs (ACCRA, 2004). (The national average value for each sub-index and the overall index is 100.) The standard deviation for these 26 metropolitan areas are displayed for each sub-index, as is their correlation with housing costs. As the table illustrates, the standard deviation of the housing cost indices is more than four times greater than the next highest sub-index, the cost of health care. The standard deviation of housing is more than seven times that of miscellaneous goods and services, the category with the lowest standard deviation across all of the 26 largest metropolitan areas. Thus, it is clear that measures relying only on housing costs to adjust for COL differences will overstate COL differences. This point is also illustrated in Table 1 because the median household incomes that are adjusted with Fair Market Rent measures are significantly lower than the COL adjustments based on the other measures.

Table 2 about here

[8] For instance, for an MSA with an Fair Market Rent (FMR) value of $250 and a national average FMR of $400, the COL index value would be the following:

MSA FMR/National FMR:	$250/ 400 = 0.625
Regional FMR ratio * Portion of budget spent on housing where 0.33 is proportion of housing and related costs in the average household budget:	0.625 * 0.33 = 0.206
Housing index + Portion of income spent on all other goods where 0.67 is the average household budget not related to housing:	0.67 + 0.206 = 0.876

Thus, the cost-of-living in the MSA would be .876 of the national average COL, which is 1.00.

Housing-based COL measures do not recognize regional variation in the 67% of the average after-tax household budget that is not related to household expenditures. This would not be a problem if inter-area variations in the costs of other goods were highly correlated with the inter-area variation in housing costs; however Table 2 shows that variations in the non-housing sub-index values do not necessarily correspond with variations in housing prices. This is particularly the case with health care (with a correlation of 0.36), utilities (correlation of 0.42), and miscellaneous goods and services costs (correlation of 0.68). Thus, COL measures that only take housing costs into consideration will be inaccurate.

Furthermore, FMR values have additional problems as a generalized way of measuring inter-regional cost-of-living differences. First, FMRs were developed specifically for the Section 8 program, and were not intended as overall housing cost measures. Consequently, FMRs only measure rents, not total housing costs or costs associated with homeownership (Short, 2001). Second, FMRs only observe the expenses of recent movers, who are defined as people that have moved in the past year. This is problematic because recent movers only represent a small portion of the population, and it is likely that collecting data for recent movers results in an upward bias in the FMR because long-term renters often experience discounted rents (NRC, 1995). Third, the National Research Council (1995) stated that the FMR measure does not control for housing quality, and, as a consequence, substandard housing in low-income areas will exert a downward bias on the FMR.[9] Fourth, because FMRs are calculated for the 40th percentile of the rent distribution it is skewed toward lower-income households, making it a poor representation of the cost-of-living experienced for the middle and upper levels of the income distribution. Thus, it is clear that relying on housing-based measures in general, and FMRs in particular, as measures of geographic variations in living costs is problematic. A broader

[9] Malpezzi, Chun and Green's (1998) Place-to-Place Housing Price Indices addressed this issue by examining the impact of housing and neighborhood quality (among other variables), on variations in the price of housing using data from the Population Census' Public Use Microdata Samples (PUMS).

measure of geographic COL differences is necessary in order to accurately gauge inter-area living cost differentials and to make regional income measures better indicators of the economic well-being of residents.

Market Basket Measures

An alternative approach to housing-based measures for assessing geographic COL differences is to make use of market basket measures. Such measures estimate the relative costs of a constant combination of goods and services, or a market basket, across geographic areas. This approach offers a more accurate assessment of COL differences than housing-based measures because it includes the relative prices of goods and services such as health care, transportation, food, clothing, and insurance—all of which are omitted in the housing-based measures.

Fundamental to market basket approaches to COL adjustments are consumer profiles. To determine the goods that are included in the market basket and the appropriate proportion of income spent on those goods, researchers construct profiles of consumers based upon consumption data from the U.S. Bureau of Labor Statistics' (BLS) Consumer Expenditure Survey data. Consumer profiles are usually derived from the national average consumption patterns of a study population (for instance, the national average expenditure patterns of a family of four, earning $55,000 per year), and the market basket of goods and services is then specified based upon average consumption patterns of the specified study population. The relative cost of obtaining the market basket across local areas is then compared and indices are constructed to measure how far prices in each locality deviate from the reference area or the national average.

Koo et. al. (2000) identify two major potential biases in market basket approaches.. First, because the baseline indices count all cities equally rather than population-weighting them, the overall baseline (i.e., the standard of 100 against which other scores are based) is arguably too

low. As a consequence, the cost-of-living for large cities is overestimated. None of the COL measures examined in this article are weighted for differences in population. Second, because market basket indices are based on a national market basket of goods, regional differences in consumption patterns are not reflected in the measures. This is a weakness of all COL indices using a market basket approach

Market Basket Measures Using Secondary Data Sources

Different types of market basket COL measures can be distinguished by examining their data collection methods. Market basket COL measures either use existing price data to construct COL indices or they rely on information collected for the specific purpose of COL measurement. Measures that use existing price data, such as local retail surveys, state-level data, and national surveys that were conducted for other purposes, are referred to as secondary data measures. Measures that rely on original, first-hand, data that were collected for the specific purpose of COL measurement are primary data measures. Primary data measures collect information through either on-site reporting or the use of surveys designed specifically for the collection of COL information.

The Economic Research Institute (ERI), which is a private organization that conducts salary, compensation and benefits research for public and private sector clients, developed a software package that uses secondary data sources to estimate geographic COL differences. ERI's Relocation Assessor Software provides estimates of COL differentials for professional and managerial persons living in over 10,000 cities worldwide. Estimates of COL differentials are based upon the consumption patterns of professional and managerial persons, which are obtained from the Consumer Expenditure Survey or equivalent international data sources. Then, using existing data sources, such as housing rental price data from local realtors' offices and local surveys of retail prices, ERI constructs estimates of geographic COL divergences based upon

expenses for housing, transportation, health care, utilities, taxes and miscellaneous goods and services. Data for U.S. and Canadian residences are reported at the city level (defined by municipal boundaries) and the ZIP code level. COL information for all other international cities is only available at the city level (ERI, 2004).

ERI's Relocation Assessor software compares intra-metropolitan COL differentials for various profiles of professional-level households. In addition, variables such as family size, income level, vehicle type and housing size can be altered in the program so that users can project COL estimates that do not fit into ERI's pre-defined consumer profiles. However, despite the software's flexibility in estimating the COL experiences for professional-level households, the Relocation Assessor software is lacking in its applicability to low- and moderate-income households. The data presented in the first column of Table 3 illustrate this point. Table 3 compares the proportion of income allotted to expenditures on major categories of goods used by three different COL measures with the actual expenditure data of low- and moderate income consumers obtained from the Consumer Expenditure Survey. The data in the first column of the table shows the Relocation Assessor software's apportionment of income into five categories of expenditures for a family of four earning the poverty wage. As the table illustrates, the Relocation Assessor software estimates that the family spends a negative portion of their income on miscellaneous goods and services. Thus, it is evident that the software package is not designed to estimate the expenditure realities of low income consumers. In addition, ERI only collects housing price data on "professional-standard housing." This further limits the program's applicability to low- and moderate-income households because the housing costs reflected in the Relocation Assessor software are likely to be much higher than those faced by consumers of more limited means.

Table 3 about here

An alternative COL measure, the Family Budgets Methodology, is more sensitive to the life experiences of low- and moderate-income people. Family Budgets are a proposed poverty measure created by the Economic Policy Institute (EPI), which is a nonprofit research institute that studies issues pertaining to low- and middle-income workers. EPI's Family Budgets base geographic COL differentials on the consumption patterns of low-income consumers as reported by the Consumer Expenditure Survey. (However, they do not reflect the consumption patterns of middle- or high-income households.) Expenditures in six categories of goods, including housing, food, childcare, transportation, health care, other necessities, and taxes are analyzed and minimum-standard income levels, or Family Budgets, are estimated based upon consumption of these goods (EPI, 1999). These data are displayed in the second column of Table 3.

Similar to ERI's Relocation Assessor software, all of the Family Budgets price estimates are based on secondary data sources. For instance, projected food expenditures in the Family Budgets measure are based on the U.S. Department of Agriculture's Economy Food Plan, while health insurance costs are based on quotes from the Web-based health insurance provider eHealthInsurance Services, Inc. (EPI, 1999).

Geographic COL sensitivity is built into the Family Budgets poverty measure through the price estimates for housing, childcare, transportation, taxes and other necessities. Housing prices are based upon Fair Market Rent values, which are collected at the Metropolitan Statistical Area (MSA) level. Childcare expenditures are based on price data obtained from the Children's Defense Fund, which reports average childcare costs for most states and a few U.S. cities. Transportation costs are estimated using data from the Nationwide Personal Transportation Survey, and the IRS cost-per-mile rate. The National Transportation Survey indicates that the average annual miles driven varies by MSA size. For instance, in 1999, people residing in MSAs with less than 250,000 people drove 8,437 miles on average per year, while people in MSAs with 1 – 3 million people drove 9,121 miles per year, and those in non-metropolitan areas

drove 10,541 miles per year (EPI, 1999). Subsequently, transportation costs are estimated by multiplying the average annual miles driven for the appropriate MSA size by the IRS standard mileage rate, which is $0.375 in 2004 (IRS, 2004). Finally, the "other necessities" element of the Family Budgets depends on data from the Consumer Expenditure Survey, which reports that low-income families spend 31% of the cost of housing and food combined on other necessities. Thus, the projected cost of "other necessities" is equal to (Expenditures on Fair Market Rent housing + Economy Food Plan expenditures) * .31. Finally, tax expenditures are based on federal and state-level taxation levels (EPI, 1999).

In sum, the Family Budgets COL measure uses metropolitan-level price data for the costs of housing and transportation. However, because of the lack of available data, state-level price data are used for childcare services and taxes, national average price data are used for food and health insurance, and the cost of other necessities is predicted based on national average expenditures. Thus, although EPI's Family Budgets aim to measure local-level COL differentials faced by low- and moderate-income families, with the exception of housing and transportation costs, the Family Budgets do not fully reflect the prices generated within local economies. As a result, cities in the same state, such as Buffalo and New York City, Champagne-Urbana and Chicago or Compton and Los Angeles, are regarded as having the same prices for childcare services, taxes, food, health insurance and other necessities in the Family Budgets measure. Furthermore, the Family Budgets measure uses HUD's Fair Market Rent values to measure housing costs, which results in the measurement errors discussed in the previous section.

Several other private sources also measure geographic COL differentials based upon secondary price information. For instance, Sperling's *Best Places* develops an inter-area COL index based upon federal level data including the Bureau of Labor Statistics' Consumer Price Index (CPI), the Consumer Expenditure Survey, and the National Association of Home Builders

survey (NAHB) (BestPlaces.net, 2005). However, Sperling's indices appear to be conceptually incorrect because of their use of CPI price data. The CPI is a measure of inflation, not a measure of inter-area living cost differences. Thus, the CPI measures changes in prices over time within a geographic area, but cannot be used to accurately measure price differences among geographic areas (BLS, 2003).[10] As a consequence, we have not included Sperling's measure or the CPI itself in our analysis. In addition, other sources such as Salary.com and Homefair.com each produce measures of inter-metropolitan COL variation based on national average consumption patterns. However, most of these COL measures are driven by estimated housing and transportation expenditures, and do not incorporate local-area price data on other items such as food and health care. As a result, they, too, were excluded from our analysis.

Most critics of the COL measures we have discussed argue that their weakness lies in the fact that the baseline data used in the measures are inaccurate (GAO, 1997). Biases and inaccuracies will skew COL estimates when the COL measure is based on price data that has not been carefully designed to measure differences in interarea living costs. For instance, in the case of ERI's Relocation Assessor software program, data for COL estimates are obtained from existing, independent, local-level data sources. Most of these local sources employ different definitions and methodologies for collecting their data, yet because ERI collects price data on several different items in 10,000 different cities, it would be virtually impossible for them to identify and control for all of the data inconsistencies. Thus, it is likely that ERI's COL measure is imprecise in measuring inter-regional cost-of-living differences.

In order to overcome the problem of local-level data unavailability and inconsistency, the market basket COL measures discussed often use large-level geographic data to measure COL differences. For instance, many of the measures use state-level data to estimate portions of their

[10] Koo, Phillips and Sigalla (2000), Kokoski, Cardiff and Moulton (1994), Moulton (1995), Kokoski, Moulton and Zieschang (1996) have estimated interarea COL indices based upon models constructed from Consumer Price Index

local indices. However this, too, is problematic because living costs are likely to vary as much within states as between them. For example, the cost-of-living in metropolitan Chicago may have more in common with New York City than with Springfield, IL, and the cost-of-living in Seattle, WA may have more in common with Portland, OR than with Spokane, WA. The National Research Council (1995) found that after reviewing 1990 Census data on housing costs, the population of a geographic area was a more important factor in predicting housing (and other) costs than was the state of residence, and that "most states include urban and rural areas that vary widely in population density and housing costs" (p. 62). Thus, COL indices that use state-level data to approximate living costs are less desirable than are measures that control for population size.

In conclusion, COL measures that are based on secondary data sources tend to lack precision. Secondary price data are often only available at large geographic levels, and these data are often inconsistent with regional price variations. In the event that local-level price data are available, they are often incompatible with one another due to the fact that data collection techniques are inconsistent, resulting in misconstrued COL measures. It is desirable, therefore, that COL measures are based on local-level data sources that collect data under a consistent protocol.

Market Basket Measures Using Primary Data Sources

As an alternative to basing COL projections on existing data sources, two groups have developed COL estimates using primary price information. Runzheimer International's Cost-of-Living Differentials estimate COL differences for 350 domestic and international cities on a monthly basis using price data collected by on-site researchers (Runzheimer, 1994). In addition, ACCRA, formerly the American Chamber of Commerce Research Association, develops COL

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data; however these indices have been based upon complex calculations for a small number of areas and the

indices for roughly 200 Urbanized Areas every quarter.[11] ACCRA collects its data through self-administered surveys in which retailers respond to questions regarding the prices they charge for goods and services (ACCRA, 2003).

Like the measures discussed in previous sections, Runzheimer International's Cost-of-Living Differentials are market basket COL indices based on consumer profiles obtained from Consumer Expenditure Survey. Runzheimer's COL Differentials are available for several profiles of consumers, although they are typically based on the consumption patterns of professional-level consumers. Runzheimer's COL measure is noteworthy in the rigor of its data collection procedures.

Runzheimer's COL Differentials are based upon costs of four categories of goods and services: transportation, housing, miscellaneous goods and services, and taxes. Runzheimer uses on-site researchers to collect price data for the transportation, housing and miscellaneous goods and services costs components of their COL index, and a predictive model is used to measure expected taxation expenditures.

In order to estimate transportation costs, Runzheimer assumes that consumers own and operate their own vehicles and that vehicles increase in value as consumer income increases. Transportation costs are predicted for each consumer profile based on automobile prices obtained from car dealerships within study areas (Runzheimer, 1994).

In terms of housing costs, Runzheimer collects local area housing price data on owner-occupied homes and rental properties. In order to estimate the housing costs borne by homeowners, Runzheimer determines the market value of the standard home (adjusted for the financial status of each consumer profile) at each geographic location. These data are obtained from local realtors and rental agencies. For rental properties, Runzheimer uses the average net

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formulations used are not easily replicable for other metropolitan areas or other points in time.

[11] Urbanized Areas are defined by the Census Bureau as areas within a federally designated Metropolitan Area (MA) that have a residential population density of at least 1,000 persons per square mile. For a discussion of the

rental cost in the MSA, which are based upon quotations obtained from rental agencies and other firms that manage rental properties in each specific geographic location. Homeowners' or renters' insurance and utility costs are included in both cost estimates (Runzheimer, 1994).

Prices are also collected for 10 major categories of goods: food consumed at home, food consumed away from home, tobacco, alcohol, furnishings and household operations, domestic service, clothing, personal care, medical care, and recreation. Runzheimer collects prices directly for over 150 items at three different places in each location on a semi-annual basis (GAO, 1997). In addition, Runzheimer developed a model to approximate annual federal, state, local, Social Security and sales taxes for each consumer profile at each location rather than collect tax data directly.

ACCRA takes an alternative approach to collecting primary data for measuring geographic COL differences. The ACCRA COL index measures geographic price differences based on information for 59 items classified into six categories: grocery items, housing, utilities, transportation, health care, and miscellaneous goods and services. Retailers recruited by local ACCRA members in each Urbanized Area respond to detailed surveys regarding prices they charge. The surveys are designed by ACCRA, yet are self-administered by respondents. Once local price data are obtained, they are compared to the national average of all prices, which is set at 100. Local-area COL indices are then expressed as a percentage of that number (ACCRA, 2003).[12]

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geographic units used in ACCRA's analysis, see the "ACCRA Cost-of-Living Index Manual" available at http://www.accra.org.

[12] Koo et. al. (2000) identify several potential biases in market basket measures such as ACCRA. First, because baseline indices count all cities equally rather than population weighting them, the overall baseline (i.e. the standard against which other scores are based) is arguably too low. As a consequence, the cost-of-living for large cities is overestimated. None of the COL measures examined in this article are weighted for population. Second, indices based on a national market basket of goods do not reflect regional differences in consumption patterns. The bias introduced by using a market basket measure has a marked effect on the housing price input of the ACCRA index. The price of housing that goes into the ACCRA index is for a 2,400 square foot home with three to four bedrooms, two full baths, an attached two-car garage, and several other amenities (ACCRA, 2003). However, mid-level managers that live in high-cost areas such as New York City or San Francisco often do not live this type of housing because of the cost of real estate in the area. Therefore, using this standard of housing as a proxy for housing prices

Evaluating COL Measures

Both Runzheimer International and ACCRA have developed powerful COL information through the collection of primary price data. EPI's Family Budgets measure and ERI's Relocation Assessor software provide insights into geographic COL differences using secondary data sources. Which of these measures provides the most useful and accurate understanding of geographic COL differentials? In order to answer this question, we evaluate the measures against one another based upon four criteria: (1) their data collection methodologies and accuracy, (2) the components of the overall COL index, (3) their applicability to poor and low-income people, and (4) their availability and affordability for researchers.

Data collection methods and accuracy: We concluded in the previous section that market basket approaches are superior to housing-based approaches and that, among the market basket approaches evaluated, those that employed primary data collection methods (Runzheimer International and ACCRA) were more accurate in measuring interarea COL variability than those that rely on secondary data collection methods. Collecting firsthand data allows both Runzheimer and ACCRA a greater degree of precision in terms of actual price information as well as the level of geographic sensitivity incorporated into the measures.

In comparing Runzheimer with ACCRA, we found that Runzheimer employs superior information gathering techniques. Runzheimer's measures are based on price data for 150 different goods and services gathered through the use of on-site researchers who are trained to collect data in a consistent manner. The price information included in the Runzheimer index is updated monthly. ACCRA, on the other hand, collects price data on only 59 goods and services through the use of self-administered surveys filled out by volunteer retailers. ACCRA data are

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in all metropolitan areas results in an overestimate of living costs in high-cost areas. Together, these biases suggest that the cost-of-living for large cities with high housing costs may be overestimated using a market basket approach.

updated on a quarterly basis. Subsequently, it is clear that the data collection techniques, the number of goods sampled, and the frequency of data updates of Runzheimer data are superior to ACCRA. In addition, while the minimum acceptable sample size for inclusion in the Runzheimer index is unknown, ACCRA requires price information on a minimum of only five goods for most items included in the index. This is a very small sample size and it is likely to lead to distortions in the ACCRA index (Koo, 2000).

Cost of purchasing the data: Data collection does not come without costs. In terms of the availability and affordability of the four measures discussed, one sees great differences between the cost of obtaining the COL data from the sponsoring organization —ACCRA, EPI, ERI, and Runzheimer. EPI's Family Budgets COL measure is the most affordable option, as it is available on their website free of charge. ACCRA's COL index reports are the next most affordable option, with a one-year subscription to the report costing between $140 and $295. The report comes with four quarterly updates, and generally contains COL indices for approximately 300 cities in major metropolitan areas. A single quarterly ACCRA COL report costs $70. ERI's Relocation Assessor software is the third most expensive COL measurement tool, with a one-year subscription with quarterly updates for 10,000 cities in 2004 costing $829. Finally, Runzheimer International has the most expensive option, with a basic charge of $345 for one COL index for one consumer profile at one location at one point in time. Discounts for larger purchases are available; indices for 100 locations can be purchased for $26,000 (GAO, 1997).

Applicability to the poor and low- income people: The EPI Family Budgets measure is the only COL measure that incorporates data on the consumption patterns of low-income households. ERI's Relocation Assessor software focuses on professional- and managerial-level consumers, as do the Runzheimer and ACCRA measures. The Relocation Assessor software uses Consumer Expenditure Survey data on the consumption patterns of "professional-level"

consumers. Runzheimer's COL measures use consumer profiles that begin at income levels of $25,000 for individual wage earners and range up to $300,000. The cost data that Runzheimer collects typically comes from affluent municipalities within each MSA, while cost data from low- and middle-income municipalities are not reported. Similarly, ACCRA's consumer profile is for "moderately affluent professional and managerial households" (ACCRA, 2003). Operationally, these households are defined as those in which at least one spouse holds a professional or managerial occupation, or those that are in the top 20 percent of the income distribution in the Urbanized Area. Both spouses are assumed to hold college degrees, and couples that are homeowners are assumed to have one child. In addition, most of ACCRA's cost data are collected from high-end retail establishments, such as specialty grocery stores, luxury beauty salons, and moderate- to high-priced clothing stores. Large discount stores, such as Wal-Mart or Target, are deliberately excluded from their data collection.

Despite the fact that ERI's Relocation Assessor, and the Runzheimer and ACCRA indices reflect the living expenses of higher-income households, it is useful to ascertain whether or not they offer insights into the COL experiences of low- and moderate-income populations. This comparison is done in Table 3, where the consumption patterns of low- and moderate-income groups as reported in the Consumer Expenditure Survey are compared with those included in ERI's Relocation Assessor software, EPI's Family Budgets measure, and ACCRA's COL indices. Runzheimer's consumer profiles are not included in our comparison because the exact consumption patterns used to construct or weight their indices are not publicly available, and we were unable to obtain them from Runzheimer despite repeated requests.

Table 3 displays the distribution of spending across the five components of consumer spending—housing, health care, utilities, groceries, and miscellaneous goods and services. The right-hand column lists the distribution of spending for low-and-moderate income consumer

units,[13] defined as those in the lowest two quintiles of the income distribution—with incomes less then or equal to $21,162 in 2002—in the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey. The upper portion of the table lists the distribution without considering expenditures on income or payroll taxes. These tax payments were not considered because they are not part of the ACCRA methodology. The lower portion of the table shows percentage differences in the distribution of spending between the BLS' Consumer Expenditure Survey and the EPI, ERI, and ACCRA cost-of-living methodologies.

The distribution of spending that is reflected in ACCRA's methodology is the closest to the consumption patterns of low- and moderate-income consumer units in terms of expenditures on three categories of goods: housing/utilities, health care, and transportation The EPI's Family Budgets measure comes the closest to measuring the proportion of income spent on food, however it should be noted that the food expenditures category in the ERI's Relocation Assessor software includes other "consumable goods." It is impossible to separate out food expenditures from other consumable goods, and it is therefore cannot be ascertained if the Relocation Assessor's food expenditures are comparable to those of the Consumer Expenditure Survey or to the other cost-of-living measures. Part of what the ERI has included in consumable goods is most likely classified as a miscellaneous goods and services in the BLS statistical series.

According to the BLS' Consumer Expenditure Survey information in Table 3, low-income consumers spend the greatest proportion of their income on housing and utilities (34.2%), miscellaneous goods (24.3%) and transportation (17.9%). In addition, according to ACCRA's 2004 goods-based indices, housing costs represent the largest degree of variability among metropolitan areas (see Table 2). Thus, we concluded that it is of primary importance that COL measures closely represent the expenditure patterns of low- and moderate-income

[13] A consumer unit, as defined by BLS, consists of any of the following, "(1) All members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a

consumers on housing, and it is desirable that COL measures reflect the expenditures of low- and moderate-income consumers on miscellaneous goods and transportation. Based on these criteria, we concluded that the ACCRA COL index does the best job of the currently available methodologies of representing the cost-of-living realities faced by low- and moderate-income consumers while preserving the variation in the cost-of-living that exists between metropolitan areas.

Components of the Indices: Finally, we assessed the COL measures' usefulness based upon the components included in consumers' expenses. The most obvious weakness of all of the aforementioned measures is that they do not account for regional differences in consumption patterns. All of the indices are based upon a national average market basket of goods, and interarea variations in expenditures, which are largely the result of differences in climate, are not reflected in the indices. This is likely to lead to significant distortions in the indices' accuracy in estimating interarea COL differences.

Another striking difference in the COL indices is that the EPI's Family Budgets measure, the ERI's Relocation Assessor software, and Runzheimer International all include taxation expenditures in their COL measures, while the other measures do not. However, although taxation levels do in fact vary across geographic areas, accounting for tax expenses in COL measurements is conceptually problematic because different relative tax rates exist largely because different communities purchase different bundles of goods and services. Differences in taxation expenditures partially represent varying relative costs of service delivery. However, without standardizing for the package of goods and services considered in taxation expenditures, it is conceptually inappropriate and misleading to include taxes in a cost-of-living methodology. High tax jurisdictions that provide high levels of quality public services are different from high

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household with others…who is financially independent; or (3) two or more persons living together who use their incomes to make joint expenditure decisions." Source: http://www.bls.gov/cex/csxfaqs.htm

tax jurisdictions that offer inefficient and low quality public services. State and local tax expenditures are therefore incomparable across geographic areas, and ACCRA is the only source that does not include taxes in their calculation, which we believe is appropriate.

Our evaluation of the usefulness of the COL methodologies suggest important trade-offs among them. First, in terms of accuracy, Runzheimer and ACCRA employ research methodologies that are far superior to the other two measures because they collect local-level, consistent data. Between the two measures, however, Runzheimer International is preferred to ACCRA because Runzheimer uses trained, on-site researchers to gather information, price data is collected for more items, and information is updated more frequently. Second, in terms of the expenditure components covered, all of the measures are likely to understate interregional variations in COL because they do not reflect region-specific consumption patterns. In addition, we concluded that it is inappropriate to include tax expenditures in COL measures unless service levels are controlled for. ACCRA is the only measure that excludes taxation costs. Third, in terms of applicability to low- and moderate-income populations, we found that ACCRA is superior to the EPI's Family Budgets and the ERI's Relocation Assessor software. We do not have access to Runzheimer's consumer profiles, and therefore are unable to ascertain the applicability of their COL measures to low-income populations. Finally, in terms of cost, we concluded that ACCRA is the best choice. Although the EPI's Family Budgets COL calculator is available on-line free of charge, much of the data used is based on state-level prices. ACCRA's cost-of-living report costs between $140 and $295 per year, but the degree of precision in ACCRA's measures far surpasses that of the Family Budgets.

Application of COL Adjustments: What Difference Does It Make?

Based upon our analysis of the COL measures, we concluded that the Runzheimer, International and the ACCRA measures were superior to the other COL indices. However, because Runzheimer indices were unavailable to us, we opted to employ the ACCRA COL

measure to illustrate the impact of accounting for COL differences in measures of economic wellbeing and determinants program eligibility. One weakness we encountered when using ACCRA's information for measuring geographic COL differences, however, is that although the data are reported for geographic areas that represent 70% of the U.S. population (ACCRA, 2003), the set of Urbanized Areas for which cost-of-living indices are available varies every quarter because participation in the ACCRA survey is voluntary.[14] As a consequence, the ACCRA data would appear to pose serious problems for research use because it is inconsistent and often unavailable for specific metropolitan areas and cities.[15] However, we have remedied this problem through the specification of a regression equation that estimates geographic COL indices for the several areas that are not included in ACCRA reports. Because of lack of data availability for specific Urbanized Areas, we predicted indices at the MSA/PMSA level.

As the first step in our analysis we estimated a regression equation for 2000 ACCRA indices in which a sample of sixty-seven ACCRA index values were regressed against three independent variables. The independent variables include the median owner-occupied housing value in the central city of the MSA/PMSA, the natural log of population in the central city of the MSA/PMSA, and the region in which the MSA/PMSA is located. Median home value and population figures were obtained from the U.S. Census Bureau's American Housing Survey and the U.S. decennial Census of Population. The twelve regions used in the model were derived from the Bureau of Economic Analysis' eight regions, but were modified to better group regions by similarity in economic trends.[16]

[14] On average, ACCRA reports COL data on 200 Urbanized Areas each quarter. We do not have information about why regions do or do not particiapte to the ACCRA survey or why they drop in or out. There is a chance that there is some sort selection bias in the ACCRA data. We inspected the data and could not find any obvious omissions or pattern that should be considered.

[15] A further weakness of ACCRA data, identified by Koo (2000), is that because participation in the survey varies each quarter, the base (100) value in each period is just the average of the cities included, not a fixed concept. Therefore, ACCRA data cannot be used for time series measures of COL changes even if a city participates in every survey.

[16] The twelve regions included in the model for this article are defined as follows:

1. Coastal Southeast: Florida, Georgia, North Carolina, South Carolina, Virginia
2. Continental Far West: California, Nevada, Oregon

When the ACCRA indices were regressed against the independent variables, the model produced an R-squared value of 0.789 for the year 2000. The high R-squared value suggests that the independent variables (median home value, population and regional location) explain 79% of the variation in ACCRA Cost-of-living Index in 2000. Furthermore, when the model is used to predict the COL index for a metropolitan area, the actual and predicted indices had a correlation coefficient of .882. Thus, we concluded that our model can be used to predict the ACCRA COL indices for those metropolitan areas where there are missing observations (the time series of indices for a particular metropolitan area is interrupted because the survey was not undertaken for a specific number of time periods). This can be thought of as a "fill in the blank" use where data are missing episodically.[17]

As discussed in the beginning of this article, the primary public policy applications of COL adjustments involve measuring economic wellbeing. Typical indicators used to gauge economic wellbeing are the portion of the population or the percentage of households with incomes that are at, or below, the official poverty thresholds, the median household income and per capita income. In order to assess the difference that would result if COL adjustments were applied to these measures, we applied, for illustrative purposes, the ACCRA Cost-of-living Index to the official 2000 poverty guidelines and the 1999 median household incomes of a selection of 98 MSAs. The MSAs included in our selection are MSAs of at least 250,000 people that

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3. Great Lakes: Illinois, Indiana, Michigan, Ohio, Wisconsin, all New York State MSAs west of Albany, and all Pennsylvania MSAs west of Philadelphia
4. Inland Southeast: Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Tennessee, West Virginia
5. Non-continental Far West: Alaska, Hawaii
6. Northern Mideast: New Jersey (except those in the NYC CMSA), New York (excluding those in Great Lakes region or NYC CMSA), Pennsylvania (excluding those in Great Lakes region)
7. Northern New England: Maine, New Hampshire, Vermont
8. Plains: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
9. Southern Mideast: Delaware, District of Columbia, Maryland
10. Southern New England: Connecticut, Massachusetts, Rhode Island
11. Southwest: Arizona, Colorado, Idaho, Montana, New Mexico, Oklahoma, Texas, Utah, Wyoming
12. New York City CMSA

[17] Khandker and Mitchell (1998) estimated a regression equation for predicting missing 1990 ACCRA values based upon county-level data. The independent variables in their analysis were the average age of county residents, percentage of females in the county, percentage of white residents, percentage of college graduates, the average size

contained central cities with populations of at least 125,000 in 1980. Table 4 reports these results, and it is evident that the purchasing power of the median household income varies a great deal across metropolitan areas. In the Chicago metro area, the Census-reported 2000 median household income of $38,625 is only equal to $31,527 after adjusting for living costs (a decline of 18.4%), while the purchasing power of Memphis's median household income of $32,285 increases to $35,517 (an increase of 10.0%). Overall, average median household income levels in our group of 98 MSAs and PMSAs decreased by $2,489 when adjusted for cost-of-living differences.

Table 4 about here

As stated previously, the poverty guidelines, which are used by states in setting qualifying standards for a number of social welfare programs for households and individuals, are currently set at uniform levels across the country (although states sometimes use different multiples of the poverty level to establish their qualifying standards.) When adjusting for geographic COL differentials however, the poverty guidelines show significant variation across the nation's metropolitan areas. The coefficient of variation for the maximum federal poverty level rises from zero to .21.[18] For the group of 98 MSAs/PMSAs examined, the mean household income poverty level for a family of four increases from the unadjusted level of $17,050 to an adjusted level of $18,272 in 2000. The impact of adjusting for cost-of-living differences is particularly significant in cities with especially high living costs, such as in the Honolulu, HI MSA, where the poverty line would increase from $17,050 for a family of four to $22,818 if cost-of-living differentials were recognized.

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of households, the log of home value, median monthly rent, population per square mile, local unemployment and region of the country. They then applied these estimates to adjust poverty rates for the elderly in 25 major cities.

[18] The coefficient of variation of poverty line has to be zero by definition because it is the same across the nation.

The percentage and number of families that are considered to be poor would change dramatically in a number of metropolitan areas if the official income guidelines recognized metropolitan area differences in the cost-of-living. Table 5 illustrates the number of families that were considered to be below the poverty threshold in 1999 in the group of 15 metropolitan areas used earlier in this article, versus the number that would have been considered poor in the same year, had the poverty guidelines been adjusted for living cost differences.[19] In the Chicago PMSA, the number of families considered to be poor in 2000 rises from 8.0% of all families in the PMSA to 10.3%. This represents a real increase of 46,216 families. Several jurisdictions see gains in the number of families considered poor, while others experience losses in their poor populations.

Table 5 about here

Accounting for regional differences in the cost-of-living would have an impact on the number of people and families eligible for public policies. Table 6 shows the change in the number of families that would be eligible for the Free and Reduced Price School Lunch and Head Start programs in the group of 15 metropolitan areas that have been followed in this article.[20] The Free and Reduced Price School Lunch program provides free lunches for school-aged children from families with incomes at or below 130% of the poverty level. The Head Start program provides early childhood and preschool education for children under 5 from families with incomes below 100% of the poverty guideline. As Table 6 depicts, adjusting for metropolitan cost-of-living differences when determining poverty levels greatly increases the number of people eligible for social services in high-cost MSAs and PMSAs, while it decreases the number in low-cost MSAs and PMSAs. In Chicago, for example, 26,841 more families

[19] Using data from the U.S. Census Bureau on family income by family size in 1999, we interpolated both the number of families considered poor under current standards as well as the number of poor families that would be considered poor under income-adjusted standards. A detailed explanation of our methodology is contained within the table.

qualify for free lunches and 6,690 more families qualify for Head Start. In low-cost MSAs and PMSAs, such as Kansas City, MO, program eligibility for free lunches and Head Start decreases by 402 families and 144 families respectively.

Table 6 about here

[20] Using income data from the Census Bureau, we interpolated the number of children currently available for the selected programs, and compared that with the interpolated number that would be available for the same programs under COL-adjusted qualification standards. A detailed explanation of our calculations is available in the table.

Conclusion

Economic indicators of wellbeing such as the official poverty measure and median household income are currently insensitive to geographic cost-of-living differentials. This is problematic because real income indicators do not account for the geographic differences in the purchasing power of income and the subsequent differences in living standards faced by individuals and families across geographic areas. While several cost-of-living measures exist, they vary greatly in their accuracy, cost-effectiveness, applicability to populations of various income levels and appropriateness of their components. Based upon these criteria, we conclude that market basket measures using primary data sources is the approach that currently best meets these conditions. We have utilized one such measure, developed by ACCRA, to illustrate that adjusting for cost-of-living differences would have substantial impacts on public policy and on eligibility for means tested programs. While we acknowledge that all existing cost-of-living indices contain biases and defects (which we have discussed), we believe the test should be whether applying a well-constructed, though imperfect, cost-of-living index yields a better understanding of the world than would ignoring these differences and not adjusting for regional variations in the cost-of-living at all. We believe that it does and point to the simple calculations we have performed as evidence of the potential impact of taking cost-of-living variations into account.

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Table 1

Reported Census Median Household Income and Estimated Median Household Income after Adjusting for Cost of Living Differences

Metropolitan Area	Reported Median Household Income, 1999[1]	Estimated Median Household Income After Cost of Living Adjustment				Range of Household Median Income
		HUD Fair Market Rent (FMR)[2]	Economic Policy Institute Family Budget[3]	Brookings Institute Metropolitan Price Indices[4]	ACCRA Cost of Living Series[5]	
Albuquerque, NM MSA	**$39,088**	$29,600	$38,701	$35,349	$38,739	$9,488
Atlanta, GA MSA	**$51,948**	$32,326	$48,100	$43,276	$50,484	$19,622
Baton Rouge, LA MSA	$38,438	$41,110	**$43,189**	$37,735	$38,095	$2,079
Boston, MA-NH PMSA	**$55,183**	$25,956	$38,590	$40,229	$41,151	$29,227
Chicago, IL PMSA	**$51,680**	$30,047	$45,333	$41,757	$42,188	$21,633
Evansville-Henderson, IN-KY MSA	$39,307	$35,096	**$42,725**	$37,814	$41,289	$7,629
El Paso, TX MSA	$31,051	$26,093	$34,122	$29,219	**$35,732**	$9,639
Jacksonville, FL MSA	$42,439	$34,872	**$46,129**	$38,718	$44,115	$11,257
Jersey City, NJ PMSA	**$40,293**	$22,286	$36,300	$31,810	$24,704	$18,007
Kansas City, MO-KS MSA	$46,193	$35,642	$46,193	$42,086	**$47,136**	$11,494
Philadelphia, PA-NJ PMSA	**$47,536**	$28,533	$42,067	$38,972	$40,047	$19,003
Shreveport--Bossier City, LA MSA	$32,558	$35,187	**$36,582**	$33,566	$36,378	$4,024
Spokane, WA MSA	**$37,308**	$31,671	**$37,308**	$35,234	$34,290	$5,637
Springfield, MA MSA	**$40,740**	$27,602	$32,079	$35,206	$33,781	$13,138
Washington, DC-MD-VA-WV PMSA	**$62,216**	$32,814	$43,814	$48,016	$50,418	$29,402
Mean	$43,732	$31,256	$40,749	$37,932	$39,903	$14,085
Std. Deviation	8,629	4,807	4,867	4,803	6,739	
Coefficient of Variation	0.20	0.15	0.12	0.13	0.17	

Notes:

Highest median household income after adjusted for metropolitan cost-of-living (COL) is listed in **bold**.

All indices are indexed to 100, which represents the national average. Adjusted median household income levels were derived by dividing the median household income in a metropolitan area reported by the U.S. Bureau of the Census by the appropriate index and multiplying by 100. For instance, in Albuquerque, the original median household income ($39,088) was divided by the FMR index of 132.1, arriving at a quotient of 295.9. That number was then multiplied by 100, arriving at an adjusted income of $29,600. This method was used for all adjusted income levels in all subsequent tables.

The Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) included in Table 1 (and subsequent tables) were chosen from a study by Hill, Furdell and Wolman (2003), in which the authors studied urban distress in 98 central cities. The central cities included in their study were cities with populations over 125,000 that were in MSAs/PMSAs with populations of over 250,000 in 2000. The 15 MSAs/PMSAs included in our tables are a subset of the MSAs/PMSAs that were represented in the study by Hill, et al. The 15 MSAs/PMSAs that we selected to include in our tables were based on the criteria of national regional representation and variations in size. The set of 15 MSAs/PMSAs was chosen for illustrative purposes and is not a statistically representative sample.

[1] Source: U.S. Census Bureau, 2000. http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=111680527320

[2] FMR value based on two bedroom apartment in 2000. MSA/PMSA FMRs are indexed to national average FMR, which was $443 for a 2 bedroom apartment in 2000.
Source: U.S. Department of Housing and Urban Development. http://www.huduser.org/datasets/fmr.html

[3] Family Budgets values are based on two-parent, one-child family, 1999. MSA/PMSA values are indexed to national average Family Budget values.
Source: http://www.epinet.org

[4] Brookings Institute Metropolitan Price Indices are based on the study by Berube & Thacher, 2004. The original indices used in the study were based on 1999 FMR values, and were calculated using the following formula: metropolitan FMR/national FMR * 0.33 + 0.67. We applied Berube & Thacher's formula to 2000 FMR values to increase comparability between the indices included in Table 1.

[5] ACCRA indices are for the fourth quarter, 2000

Table 2

ACCRA Cost of Living Index Values for the 26 Largest Metropolitan Areas
Second Quarter 2004

Component of the Cost of Living Index	Index Values			Correlation With Housing Index
	Highest	Lowest	Std. Deviation	
Housing	259.8	79.3	58.8	
Health Care	138.3	82.9	13.7	0.36
Utilities	134.1	90.4	12.2	0.42
Groceries	133.3	85.9	10.8	0.79
Transportation	131.9	95.7	10.4	0.79
Miscellaneous goods and services	124.3	95.3	8.3	0.68

National average = 100.0

Source: Accra at http://www.accra.org/media/

Table 3

Distribution of Expenditures by Major Categories of Goods Compared to the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey Data for the Lowest 40% of the Income Distribution

Distribution of expenditures without payroll or income taxes

Component of the Cost of Living Indices	Economic Research Institute Relocation Assessor[1]	Economic Policy Institute Family Budget[2]	ACCRA Cost of Living Index[3]	US Bureau of Labor Statistics Consumer Expenditure Survey Low and Moderate-Income Consumers[4]
Housing/Utilities	42.8%	19.7%	13.0%	16.0%
Health Care	45.9%	21.8%	39.0%	34.2%
Transportation	8.9%	8.8%	10.0%	17.9%
Groceries	7.1%	10.5%	4.0%	7.7%
Miscellaneous goods and services	-4.7%	39.2%	34.0%	24.3%

Differences between the distribution of consumer expenditures: COL methodology and the Consumer Expenditure Survey[5]

Component of the Cost of Living Indices	Economic Research Institute Relocation Assessor	Economic Policy Institute Family Budget	ACCRA Cost of Living Index	US Bureau of Labor Statistics Consumer Expenditure Survey Low and Moderate-Income Consumers[6]
Housing/Utilities	26.8%	3.7%	-3.0%	16.0%
Health Care	11.7%	-12.4%	4.8%	34.2%
Transportation	-9.0%	-9.0%	-7.9%	17.9%
Groceries	-0.6%	2.8%	-3.7%	7.7%
Miscellaneous goods and services	-28.9%	14.9%	9.8%	24.3%

Notes:

EPI's Family Budgets and ERI's Relocation Assessor include adjustments for local taxation expenditures, however these results are reported without the tax component to maintain comparability with the other indices.

1 ERI estimates are for a family of 4 earning $18,850 in 2004. Homeowners/renters insurance is included as a housing cost. The Relocation Assessor software produces a negative value for Miscellaneous Goods and Services because the algorithm used in the computer program is not designed to compute expenditures for low-income families.
Source: ERI's Platform Library, CD ROM, April 2004

2 EPI Family Budget for a 2 parent, 2 child household in 1999. Miscellaneous expenditures include childcare (24.4%) and miscellaneous goods (11.5%)
Source: http://www.epinet.org/datazone/fambud/xls/2p2c.xls

3 Expenditure weights were updated in 2003 based on U.S. Bureau of Labor Statistics Consumer Expenditure data. ACCRA indices typically construct two separate sub-indices for housing and utilities, however the two categories were combined in order to increase comparability between indices.
Source: ACCRA Cost of Living Index Manual, 2003

4 Average expenditures for consumer units in 2002 with incomes in the lowest quintile ($8,316 per year) and in the second quintile ($21,162 per year).
Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, 2004, http://www.bls.gov/cex/2002/Standard/quintile.pdf

5 Calculated as the percentage distribution from the COL methodology Less the percentage distribution in the BLS CEX

6 The material in this column is carried over from the upper portion of the table.

Table 4
ACCRA-Adjusted Poverty Guidelines and Median Household Income for 98 Central Cities, 1999 & 2000

Selected Central Cities	Federal Poverty Guideline, Family of Four, 2000				Median Household Income, 1999			
	Reported Federal Maximum Income Level	ACCRA Cost-of-living Adjusted Maximum Income Level	Difference (ACCRA - Federal)		U.S. Bureau of the Census	ACCRA Cost-of-living Adjusted Median Income	Difference (ACCRA - Federal)	
			Dollar	Percent[2]			Dollar	Percent[2]
Akron, OH	$17,050	$17,287	$237	1.4%	$31,835	$31,398	-$437	-1.4%
Albuquerque, NM	$17,050	$17,203	$153	0.9%	$38,272	$37,931	-$341	-0.9%
Anaheim, CA	$17,050	$23,535	$6,485	38.0%	$47,122	$34,138	-$12,984	-27.6%
Atlanta, GA	$17,050	$17,544	$494	2.9%	$34,770	$33,790	-$980	-2.8%
Austin, TX	$17,050	$16,351	-$699	-4.1%	$42,689	$44,514	$1,825	4.3%
Baltimore, MD	$17,050	$16,539	-$512	-3.0%	$30,078	$31,008	$930	3.1%
Baton Rouge, LA	$17,050	$17,203	$153	0.9%	$30,368	$30,097	-$271	-0.9%
Birmingham-Hoover, AL	$17,050	$16,504	-$546	-3.2%	$26,735	$27,619	$884	3.3%
Boston, MA	$17,050	$22,864	$5,814	34.1%	$39,629	$29,552	-$10,077	-25.4%
Bridgeport, CT	$17,050	$28,895	$11,845	69.5%	$34,658	$20,451	-$14,207	-41.0%
Buffalo, NY	$17,050	$16,862	-$188	-1.1%	$24,536	$24,809	$273	1.1%
Charlotte, NC	$17,050	$17,135	$85	0.5%	$46,975	$46,741	-$234	-0.5%
Chattanooga, TN	$17,050	$16,845	-$205	-1.2%	$32,006	$32,395	$389	1.2%
Chicago, IL	$17,050	$20,888	$3,838	22.5%	$38,625	$31,527	-$7,098	-18.4%
Cincinnati, OH	$17,050	$16,965	-$85	-0.5%	$29,493	$29,641	$148	0.5%
Cleveland, OH	$17,050	$19,113	$2,063	12.1%	$25,928	$23,129	-$2,799	-10.8%
Colorado Springs, CO	$17,050	$16,897	-$153	-0.9%	$45,081	$45,490	$409	0.9%
Columbus, OH	$17,050	$17,152	$102	0.6%	$37,897	$37,671	-$226	-0.6%
Corpus Christi, TX	$17,050	$14,358	-$2,692	-15.8%	$36,414	$43,240	$6,826	18.7%
Dallas, TX	$17,050	$17,152	$102	0.6%	$37,628	$37,404	-$224	-0.6%
Dayton, OH	$17,050	$17,186	$136	0.8%	$27,423	$27,205	-$218	-0.8%
Denver, CO	$17,050	$18,397	$1,347	7.9%	$39,500	$36,608	-$2,892	-7.3%
Des Moines, IA	$17,050	$15,818	-$1,232	-7.2%	$38,408	$41,399	$2,991	7.8%
Detroit, MI	$17,050	$19,351	$2,301	13.5%	$29,526	$26,015	-$3,511	-11.9%
El Paso, TX	$17,050	$14,808	-$2,242	-13.2%	$32,124	$36,988	$4,864	15.1%
Evansville, IN	$17,050	$16,232	-$818	-4.8%	$31,963	$33,575	$1,612	5.0%
Flint, MI	$17,050	$16,373	-$677	-4.0%	$28,015	$29,174	$1,159	4.1%
Fort Lauderdale, FL	$17,050	$17,426	$376	2.2%	$37,887	$37,069	-$818	-2.2%
Fort Wayne, IN	$17,050	$15,976	-$1,074	-6.3%	$36,518	$38,973	$2,455	6.7%
Fort Worth, TX	$17,050	$17,272	$222	1.3%	$37,074	$36,598	-$476	-1.3%
Fresno, CA	$17,050	$18,312	$1,262	7.4%	$32,236	$30,015	-$2,221	-6.9%
Gary, IN	$17,050	$16,970	-$80	-0.5%	$27,195	$27,323	$128	0.5%
Grand Rapids, MI	$17,050	$17,527	$477	2.8%	$37,224	$36,210	-$1,014	-2.7%
Greensboro, NC	$17,050	$16,470	-$580	-3.4%	$39,661	$41,057	$1,396	3.5%
Hartford, CT	$17,050	$20,594	$3,544	20.8%	$24,820	$20,549	-$4,271	-17.2%
Honolulu, HI	$17,050	$22,818	$5,768	33.8%	$45,112	$33,709	-$11,403	-25.3%
Houston, TX	$17,050	$16,198	-$853	-5.0%	$36,616	$38,543	$1,927	5.3%
Indianapolis, IN	$17,050	$16,573	-$477	-2.8%	$40,051	$41,205	$1,154	2.9%
Jackson, MS	$17,050	$15,669	-$1,381	-8.1%	$30,414	$33,095	$2,681	8.8%
Jacksonville, FL	$17,050	$16,402	-$648	-3.8%	$40,316	$41,909	$1,593	4.0%
Jersey City, NJ	$17,050	$27,804	$10,754	63.1%	$37,862	$23,218	-$14,644	-38.7%
Kansas City, MO	$17,050	$16,709	-$341	-2.0%	$37,198	$37,957	$759	2.0%
Knoxville, TN	$17,050	$16,300	-$750	-4.4%	$27,492	$28,757	$1,265	4.6%
Lansing, MI	$17,050	$18,005	$955	5.6%	$34,833	$32,986	-$1,847	-5.3%
Las Vegas, NV	$17,050	$18,175	$1,125	6.6%	$44,069	$41,341	-$2,728	-6.2%
Lexington, KY	$17,050	$16,607	-$443	-2.6%	$39,813	$40,876	$1,063	2.7%
Little Rock, AR	$17,050	$16,215	-$835	-4.9%	$37,572	$39,508	$1,936	5.2%
Los Angeles, CA	$17,050	$21,398	$4,348	25.5%	$36,687	$29,233	-$7,454	-20.3%
Louisville, KY	$17,050	$16,266	-$784	-4.6%	$28,843	$30,234	$1,391	4.8%
Madison, WI	$17,050	$17,995	$945	5.5%	$41,941	$39,740	-$2,201	-5.2%
Memphis, TN	$17,050	$15,498	-$1,552	-9.1%	$32,285	$35,517	$3,232	10.0%
Miami, FL	$17,050	$18,141	$1,091	6.4%	$23,483	$22,070	-$1,413	-6.0%
Milwaukee, WI	$17,050	$18,582	$1,532	9.0%	$32,216	$29,561	-$2,655	-8.2%
Minneapolis, MN	$17,050	$17,937	$887	5.2%	$37,974	$36,097	-$1,877	-4.9%
Mobile, AL	$17,050	$15,754	-$1,296	-7.6%	$31,445	$34,031	$2,586	8.2%
Montgomery, AL	$17,050	$16,521	-$529	-3.1%	$35,627	$36,767	$1,140	3.2%
Nashville, TN	$17,050	$16,283	-$767	-4.5%	$39,232	$41,081	$1,849	4.7%
New Haven, CT	$17,050	$20,989	$3,939	23.1%	$29,604	$24,049	-$5,555	-18.8%
New Orleans, LA	$17,050	$16,920	-$130	-0.8%	$27,133	$27,342	$209	0.8%
New York, NY	$17,050	$39,556	$22,506	132.0%	$38,293	$16,506	-$21,787	-56.9%
Newark, NJ	$17,050	$30,483	$13,433	78.8%	$26,913	$15,053	-$11,860	-44.1%
Norfolk, NE	$17,050	$16,521	-$529	-3.1%	$31,815	$32,833	$1,018	3.2%
Oakland, CA	$17,050	$24,004	$6,954	40.8%	$40,055	$28,451	-$11,604	-29.0%
Oklahoma City, OK	$17,050	$15,345	-$1,705	-10.0%	$34,947	$38,830	$3,883	11.1%
Omaha, NE	$17,050	$16,283	-$767	-4.5%	$40,006	$41,891	$1,885	4.7%
Orlando, FL	$17,050	$16,675	-$375	-2.2%	$35,732	$36,536	$804	2.2%
Patterson, NJ	$17,050	$22,768	$5,718	33.5%	$32,778	$24,546	-$8,232	-25.1%
Philadelphia, PA	$17,050	$20,238	$3,188	18.7%	$30,746	$25,902	-$4,844	-15.8%
Phoenix, AZ	$17,050	$17,613	$563	3.3%	$41,207	$39,891	-$1,316	-3.2%
Pittsburgh, PA	$17,050	$17,392	$342	2.0%	$28,588	$28,026	-$562	-2.0%
Portlandr, OR	$17,050	$19,181	$2,131	12.5%	$40,146	$35,685	-$4,461	-11.1%
Providence, RI	$17,050	$20,202	$3,152	18.5%	$26,867	$22,675	-$4,192	-15.6%
Raleigh, NC	$17,050	$17,272	$222	1.3%	$46,612	$46,014	-$598	-1.3%
Richmond, VA	$17,050	$17,715	$665	3.9%	$31,121	$29,953	-$1,168	-3.8%

Riverside, CA	$17,050	$19,028	$1,978	11.6%	$41,646	$37,317	-$4,329	-10.4%
Rochester, NY	$17,050	$17,075	$25	0.1%	$27,123	$27,084	-$39	-0.1%
Rockford, IL	$17,050	$16,266	-$784	-4.6%	$37,667	$39,483	$1,816	4.8%
Sacramento, CA	$17,050	$19,284	$2,234	13.1%	$37,049	$32,758	-$4,291	-11.6%
Salt Lake City, UT	$17,050	$17,911	$861	5.0%	$36,944	$35,169	-$1,775	-4.8%
San Antonio, TX	$17,050	$15,243	-$1,807	-10.6%	$36,214	$40,508	$4,294	11.9%
San Diego, CA	$17,050	$21,585	$4,535	26.6%	$45,733	$36,124	-$9,609	-21.0%
San Francisco, CA	$17,050	$29,039	$11,989	70.3%	$55,221	$32,423	-$22,798	-41.3%
San Jose, CA	$17,050	$28,701	$11,651	68.3%	$70,243	$41,728	-$28,515	-40.6%
Seattle, WA	$17,050	$21,927	$4,877	28.6%	$45,736	$35,563	-$10,173	-22.2%
Shreveport, LA	$17,050	$15,267	-$1,783	-10.5%	$30,526	$34,090	$3,564	11.7%
Spokane, WA	$17,050	$18,550	$1,500	8.8%	$32,273	$29,663	-$2,610	-8.1%
Springfield, MA	$17,050	$20,562	$3,512	20.6%	$30,417	$25,221	-$5,196	-17.1%
St. Louis, MO	$17,050	$16,487	-$563	-3.3%	$27,156	$28,083	$927	3.4%
Stockton, CA	$17,050	$18,257	$1,207	7.1%	$35,453	$33,108	-$2,345	-6.6%
Syracuse, NY	$17,050	$17,221	$171	1.0%	$25,000	$24,752	-$248	-1.0%
Tacoma, WA	$17,050	$17,749	$699	4.1%	$37,879	$36,387	-$1,492	-3.9%
Tampa, FL	$17,050	$16,627	-$423	-2.5%	$34,415	$35,289	$874	2.5%
Toledo, OH	$17,050	$17,442	$392	2.3%	$32,546	$31,814	-$732	-2.2%
Tucson, AZ	$17,050	$17,374	$324	1.9%	$30,981	$30,403	-$578	-1.9%
Tulsa, OK	$17,050	$15,942	-$1,108	-6.5%	$35,316	$37,771	$2,455	7.0%
Washington, DC	$17,050	$21,040	$3,990	23.4%	$40,127	$32,518	-$7,609	-19.0%
Wichita, KS	$17,050	$16,402	-$648	-3.8%	$39,939	$41,517	$1,578	4.0%
Worcester, MA	$17,050	$19,894	$2,844	16.7%	$35,623	$30,531	-$5,092	-14.3%
Summary Statistics								
Mean	$17,050	$18,655	$1,605	9.4%	$35,372	$32,883	($2,489)	-6.4%
Standard deviation		3,832	3,832	22.5%	6,994	6,605	5,845	13.9%
Coefficient of variation		0.21	2.39	2.39	0.20	0.20	-2.35	-2.16

The central cities in Table 4 were chosen from a study by Furdell, Hill and Wolman (2004), in which the authors studied urban distress in 98 central cities. The central cities included in their study were cities with populations over 125,000 that were in MSAs/PM

Bolded MSAs/PMSAs are the regions for which the ACCRA COL index was predicted using our regression model.

1 ACCRA-adjusted poverty levels were derived by dividing the appropriate index by 100, and multiplying by the current poverty guideline.

Example: The calculation for Albuquerque's poverty level was (100.9/100) * 17,050 = 17,203

ACCRA-adjusted median household incomes were derived by dividing the appropriate index by 100 and dividing into the current median household income.

Example: The calculation for Albuquerque's median household income was 38,272/(100.9/100) = 37,931

2 The percentage difference was calculated as [(ACCRA-Federal)/Federal]

Sources:
2000 Poverty Guidelines: Federal Register, Vol. 65, No. 31, February 15, 2000, pp. 7555-7557

Table 5

Effect of Using ACCRA's Cost-of-living Adjustments to Estimates of the Poverty level and the number of Families with Incomes at, or Below, the Poverty Level in 2000

	Current Federal Maximum Poverty Income Level		ACCRA Cost-of-living Adjusted Poverty Estimates		
	Number of Poor Families	Poor Families as % of Total Families	Number of Poor Families	Poverty Families % of Total Families	Change in Number of Poor Families
Albuquerque, NM MSA	19,323	10.6%	19,592	10.7%	269
Atlanta, GA MSA	73,716	7.0%	76,594	7.3%	2,878
Baton Rouge, LA MSA	19,112	12.3%	19,342	12.4%	230
Boston, MA--NH PMSA	49,766	6.0%	73,106	8.8%	23,340
Chicago, IL PMSA	161,787	8.0%	208,004	10.3%	46,216
El Paso, TX MSA	33,380	20.0%	27,213	16.3%	-6,168
Evansville--Henderson, IN--KY MSA	5,993	7.5%	5,556	6.9%	-437
Jacksonville, FL MSA	23,907	8.1%	22,596	7.7%	-1,311
Jersey City, NJ PMSA	19,795	13.7%	36,411	25.1%	16,617
Kansas City, MO--KS MSA	29,470	6.3%	28,674	6.1%	-796
Philadelphia, PA--NJ PMSA	107,924	8.3%	132,174	10.2%	24,250
Shreveport--Bossier City, LA MSA	15,058	14.5%	12,900	12.4%	-2,158
Spokane, WA MSA	9,064	8.4%	10,352	9.6%	1,288
Springfield, MA MSA	15,241	10.5%	19,076	13.1%	3,835
Washington, DC--MD--VA--WV PMSA	64,610	5.2%	85,232	6.9%	20,623

The Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) included in Table 6 were chosen from a study by Hill, Furdell and Wolman (2004), in which the authors studied urban distress in 98 central cities. The central cities included in their study were cities with populations over 125,000 that were in MSAs/PMSAs with populatio
The 15 MSAs/PMSAs included in our tables are a subset of the MSAs/PMSAs that were represented in the study by Hill, et al. The 15 MSAs/PMSAs that we selected to include in our table
national regional representation and variations in size. The set of 15 MSAs/PMSAs was chosen for illustrative purposes and is not a statistically representative sample.
See Appendix C for current and adjusted families in poverty for all 98 MSAs/PMSAs and the unadjusted federal poverty guidelines for all family sizes.

Federal poverty guidelines from U.S. Department of Health and Human Services were used as opposed to the U.S. Census Bureau's Federal Poverty Standards.
because HHS' poverty guidelines are used more frequently to determine program eligibility than the Census' poverty standards.
For a detailed discussion of poverty guidelines and poverty standards, see (The Institute for Research on Poverty, 2003).

Using data from the U.S. Census Bureau on family income by family size (1999), we interpolated both the number of families considered poor under current standards as well as the number of poor families considered poor under income-adjusted standards.
The calculation used for the number of two person poor families under current standards in Albuquerque, NM is as follows:

Federal poverty guideline for a family of two: $11,250	
Number of two person families earning less than $10,000 in Albuquerque, NM	5,173
Number of two person families earning $10,000 - $14,999 in Albuquerque, NM	4,858
Poverty guideline - Lower bound of range ($11,250 - $10,000)	1,250
Upper bound of range - Lower bound of range ($14,999 - $10,000)	4,999
Percent of category that are poor: (1,250/4,999)	25%
0.25(5,173) = 1,294 families in category that are poor	1,215
Two person poor families under current standards (5,173 + 1,294)	6,388

The same calculation was used for all MSAs/PMSAs for all family sizes (up to 7 or more people). The total number of poor families is the aggregate number of poor families at each family s
The same calculation was used for current and income-adjusted standards.

ACCRA-adjusted poverty guideline and median household income levels were derived by dividing the reported federal level by the appropriate index, multiplied by 0.01.

The total number of poor families (under current and income-adjusted standards) is the aggregate number of poor families at each family size in each MSA/PMSA

Poor families as a percent of total families = (total number of poor families)/(total families)

Table 6

Change in the Number of Families Eligible in 2000 if Cost of Living Adjustments Were Permissible

MSA/PMSA	Change in Eligibility for Free School Lunch through the Free and Reduced-Price Lunch Program1 Poor families with children aged 6 - 17		Change in Eligibility of Families for Head Start Program2 Poor families with children under 5	
	Number	Percent Difference	Number	Percent Difference
Albuquerque, NM MSA	144	1.3%	49	1.4%
Atlanta, GA MSA	1,680	4.1%	458	3.9%
Baton Rouge, LA MSA	410	3.7%	38	1.2%
Boston, MA-NH PMSA	13,951	49.0%	3,614	46.9%
Chicago, IL PMSA	26,841	30.7%	6,690	28.6%
El Paso, TX MSA	-11,851	-57.9%	-750	-18.5%
Evansville	-318	-9.5%	-101	-7.3%
Jacksonville, FL MSA	-1,236	-8.4%	-214	-5.5%
Jersey City, NJ PMSA	9,380	80.5%	2,091	83.9%
Kansas City, MO-KS MSA	-402	-2.4%	-144	-2.7%
Philadelphia, PA-NJ PMSA	15,125	24.7%	3,072	22.5%
Shreveport-Boisser, LA MSA	-4,830	-51.9%	-367	-14.3%
Spokane, WA MSA	803	14.9%	286	14.2%
Springfield, MA MSA	2,238	25.3%	668	25.2%
Washington, DC-MD-VA-WV PMSA	12,331	33.9%	2,913	31.9%

1 Children eligible for free school lunches under the Free and Reduced-Price School Lunch Program are school-aged children whose annual family income is at or below 130% of the federal poverty guidelines. Children with family incomes greater than 130% but less than 185% of the federal poverty guidelines are eligible for reduced-price lunches, however we did not include reduced-price lunches in our analysis.

The following calculation was used to calculate the COL-adjusted and unadjusted number of families elibible for free lunches: (Albuquerque, NM MSA)

Unadjusted Federal Poverty Guideline for 2 person families	11,250	Unadjusted Poverty Guideline for 2 person families	11,250
Adjusted for COL by ACCRA Index/100): 100.9/100 = 1.09	11,351		
Adjusted for Program Eligibility: 10,946 * 1.3	14,757	Adjusted for Program Eligibility: 11,250 * 1.3	14,625
Number of 2 person families earning less than 10,000	5,173	Number of 2 person families earning less than 10,000	5,173
Number of 2 person families earning 10,000 - 14,999	4,858	Number of 2 person families earning 10,000 - 14,999	4,858
14,999 - 10,000	4,999	14,999 - 10,000	4,999
14,757 - 10,000	4,757	14,625 - 10,000	4,625
4,757/4,999	0.952	4,625/4,999	0.925
.952 * 4,858	4,622	.925 * 4,858	4,495
Families with adjusted incomes ≤ 130% FPG (5,173 + 4,622)	9,795	Families with incomes ≤ 130% of FPG (5,173 + 4,495)	9,668

This calculation was repeated for all family sizes, up to families with 7 or more persons. Totals for Albuquerque are as follows:

Families with COL-adjusted incomes at or below 130% of poverty		Families with incomes at or below 130% of poverty	
2 person families	9795	2 person families	9,668
3 person families	6939	3 person families	6,855
4 person families	5849	4 person families	5,772
5 person families	3389	5 person families	3,341
6 person families	1603	6 person families	1,583
7 person families	1283	7 person families	1,270
Total families	28,858	Total families	28,490
Percent of poor families in Albuquerque with children aged 5 - 17	0.390	Percent of poor families in Albuquerque with children aged 5 - 17	0.390
Total families eligible for free lunches	11,262	Total families eligible for free lunches	11,118
Change (19,787 - 19,534)	144		
Percent Difference (19,787 - 19,534)/19,534	1.3%		

2 The Head Start program is available to pre-school aged children from families with incomes at or below 100% of the federal poverty guideline. The same basic calculation as above was used to determine the number of families eligible for Head Start. The only differences were: (1) there was no need to adjust incomes by a multiplier for program eligibility. and (2) the total number of families eligible for the Head Start program was multiplied by the percentage of poor families in each MSA with children under 5 (as opposed to children aged 5 - 17).

Sources:

U.S. Census Bureau, Census 2000 SF4 Summary Tables, Table PCT117: "Family Size by Family Income in 1999"

U.S. Census Bureau, Census 2000 SF3 Summary Tables, Table P90: "Poverty Status in 1999 of Families by Family Type by Presence of Related Children Under 18 Years by Age of Related Children"

Program eligibility data obtained from CRS Report for Congress, "Cash and Noncash Benefits for Persons with Limited Income: Eligibility Rues, Recipient and Expenditure Data, FY 2000 - FY 2002," November, 2003, Report Order Code RL32233.