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# Understanding the Rise in Rural Child Poverty, 2003-2014

Thomas Hertz and Tracey Farrigan





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## Abstract

According to official estimates, between 2003 and 2012, the share of rural children living in poor families rose from 20.1 percent to 26.7 percent, its highest level since at least 1968. According to ERS research, 35 percent of this increase in rural child poverty was due to declining average family income, 24 percent stemmed from demographically driven changes in the distribution of income, and the remaining 41 percent of the increase may be attributed to other changes in the distribution of income—namely, faster-than-average income declines for families near the poverty line—that cannot be explained by demographic shifts, and that occurred despite rising educational attainment. Between 2012 and 2014, average real incomes for urban and rural families with children grew by about 6 percent, approximately returning to their 2003 levels. This income growth has reduced poverty, but the rise in income inequality since 2003 has not been reversed, and this growing inequality has limited the extent of poverty reduction in both urban and rural counties. As a result, urban and rural child poverty rates remain 3 to 4 percentage points above their 2003 levels.

**Keywords:** poverty, rural child poverty, nonmetropolitan poverty, Current Population Survey, American Community Survey, income inequality, average income, recession, recovery, demographic change

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# Understanding the Rise in Rural Child Poverty, 2003-2014

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## What Is the Issue?

Rural child poverty fell during the 1990s, but trended upward from 2003 to 2012, rising during the economic expansion of 2003-07, the recession of 2007-2009, and in the first few years of economic recovery. The share of rural children living in poverty peaked in 2012 at 26.7 percent, the highest rate since at least 1968. The rural child poverty rate has since declined, but it remains significantly higher than in 2003. ERS researchers analyze the causes of this decade-long net increase in rural child poverty. How does rural child poverty grow during periods of national economic expansion? Why do poverty rates remain elevated 5 years after the end of the recession? And last, how do trends in child poverty differ between rural and urban areas?

## What Did the Study Find?

Rural child poverty increased by 6.6 percentage points between 2003 and 2012, peaking at 26.7 percent. By 2014, the rural child poverty rate had declined by 3.0 percentage points from the peak. Looking first at the 2003-12 period, we find the following:

- The rise in rural child poverty is partly due to the fact that average incomes for rural families with children did not rise during the economic expansion of 2003-07, and *fell* during the recession and the early years of the recovery. Between 2003 and 2012, average real family incomes fell by 6.5 percent for rural families with children, compared with 3.8 percent for urban families. The effects of declining average income explain an estimated 35 percent of the rise in rural child poverty and 25 percent of the rise in urban child poverty between 2003 and 2012.
- Roughly two-thirds of the rise in rural child poverty and three-quarters of the rise in urban child poverty between 2003 and 2012 resulted not from declining *average* incomes but rather from changes in the distribution of income around that average. Child poverty rose more than might be expected, given average income changes, because income declines were especially large for families with children that were close to the poverty line.
- Some change in the rural distribution of income that resulted in higher child poverty rates reflects changes in the characteristics of rural families with children, including education levels of the parents, family size and composition, and age, sex, race/ethnicity, country of birth, and marital status of the head of household. For urban children during the same 2003-2012 period, changes in these household characteristics had no net effect on poverty.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.



- The share of children living in married-couple families fell from 71.6 percent to 66.4 percent in rural areas between 2003 and 2012 and from 71.1 percent to 68.4 percent in urban areas. Together with other changes in the number of adults per family, this raised child poverty rates by an estimated 1.4 percentage points in rural areas and 0.2 percentage points in urban areas.
- Although rural education levels still lagged urban areas, the share of rural heads of households (with children) who held bachelor of arts degrees or higher increased by 2.9 percentage points between 2003 and 2012. Rising rural educational attainment held down child poverty by 0.8 percentage points.

From 2012 to 2014, average incomes for families with children grew, nearly regaining their 2003 levels in rural areas and exceeding that year’s value in urban counties. This income growth reduced child poverty considerably. However, the adverse changes in the distribution of income since 2003 have not been reversed; as a result, urban and rural child poverty rates in 2014 remained 3 to 4 percentage points above 2003 levels.

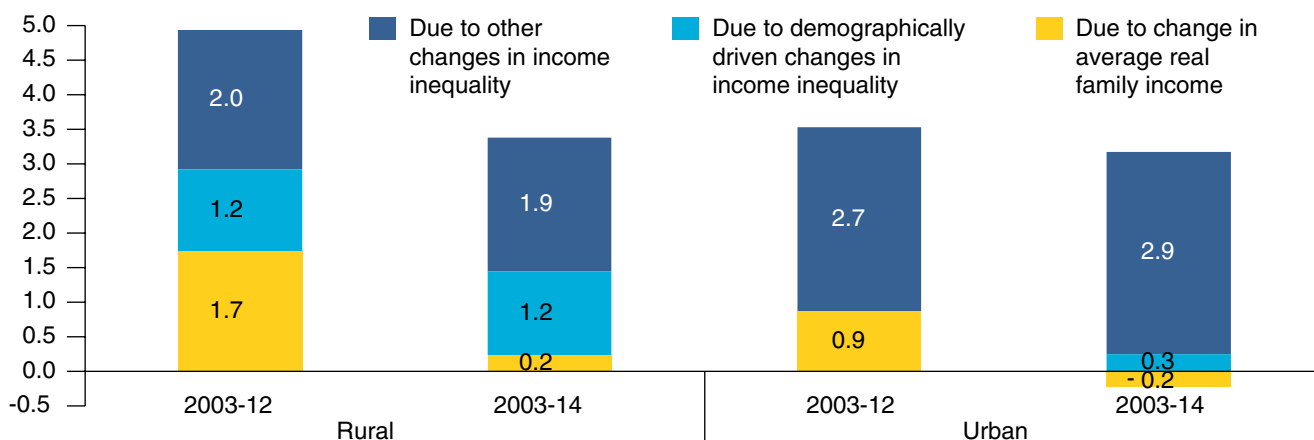
For the full study period, 2003 to 2014, the net increase in rural child poverty was 3.4 percentage points. Just 0.2 percentage point (7 percent) was due to lower *average* income for rural families with children. Had income inequality remained constant, 0.2 percentage points would have been the extent of the increase in rural child poverty. However, lower income families fared worse than average, raising rural child poverty by an additional 3.2 percentage points.

These 3.2 percentage points can be further broken down: changes in factors such as family composition, marital status, and education increased rural child poverty by 1.2 percentage points. But the remaining 1.9 percentage points of the rise resulted from sources of rising income inequality other than changes in these basic demographic factors. These findings emphasize that rising income inequality, often cited in the stagnation of middle-class incomes, also is crucial in explaining the rise in child poverty through 2010 (urban) or 2012 (rural), and its slow rate of decline since then.

Summary figure

### Changes in average real family income explain little of the rise in child poverty between 2003 and 2014

Percentage point change in child poverty rate



Note: The components of change in the rural child poverty rate do not sum to the 3.4 percent total due to rounding.

Source: USDA, Economic Research Service calculations from U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement (CPS-ASEC), public-use microdata, various years.

### How Was the Study Conducted?

This study analyzed individual and family-level data from the U.S. Census Bureau's Current Population Survey's Annual Social and Economic Supplements for 2003, 2007, 2010, 2012, and 2014. The effects of income growth, changing income inequality, and changing demographics were calculated using the method of Danziger and Gottschalk (1995), supplemented by regression analysis.

# Understanding the Rise in Rural Child Poverty, 2003-2014

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## Introduction and Overview

In 2012, the share of rural (nonmetropolitan<sup>1</sup>) children living in poverty reached the highest level recorded since at least 1968, when current methods were first applied to the study of poverty (Council of Economic Advisers et al., 2015). According to U.S. Census Bureau estimates, in 2012, some 2.9 million rural children—26.7 percent of the rural child population—lived in families whose pre-tax money incomes fell below the poverty level, which was \$23,283 for a family of two parents and two children.<sup>2</sup> Of those children living in poverty, 1.3 million were in deep poverty, meaning their families' incomes were less than half the poverty threshold. Another 1.4 million rural children lived in families whose incomes were between 100 and 150 percent of the poverty level. These numbers are not just a measure of short-term material deprivation: child poverty has negative long-term consequences as well, both for children's physical health and for their cognitive development (Brooks-Gunn and Duncan, 1997). One estimate places the total annual economic costs of child poverty—taking account of its effects on economic productivity, crime, and health care expenditures—at nearly 4 percent of gross domestic product (GDP) (Holzer et al., 2008).

Not surprisingly, some of the recent increase in rural child poverty occurred during the profound recession of 2007-09. Yet, the growth in rural child poverty predated the recession, and it continued to rise until 2012, 3 years after the recession was officially over, before eventually starting to decline (fig. 1). Urban child poverty, by contrast, peaked in 2010, and has fallen gradually since then. We aim to explain the most basic causes of this decade-long net increase in rural child poverty: How is it possible that rural child poverty grew during periods of national economic expansion? Why did rural child poverty remain elevated 5 years after the end of the recession? How do trends in child poverty differ between rural and urban areas? To answer these questions, we employ a widely used decomposition approach, augmented by regression-based methods. Our contribution to the debate is not methodological; rather, this report presents the first systematic analysis of child poverty dynamics that covers the “boom” of 2003-07, the recession of 2007-09, and the economic recovery to date (2010-14)—and that permits a comparison of rural and urban dynamics.

The study of the decline in rural child poverty since 2012 is complicated by the fact that different data sources yield different estimates of the magnitude of this decline. This discrepancy is shown in figure 1, which compares the official estimates (based on the Census Bureau's Current Population Survey, Annual Social and Economic Supplement, or CPS-ASEC) to alternative estimates based on

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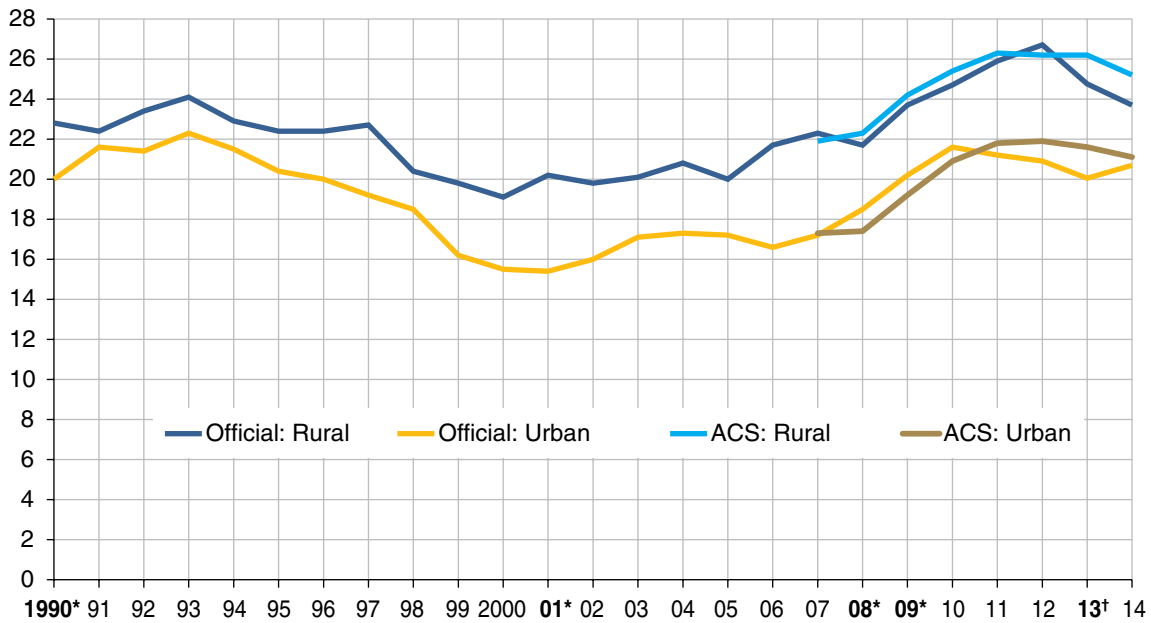
<sup>1</sup> Throughout this report, we refer to metropolitan counties, as defined by the Office of Management and Budget, as “urban” and nonmetropolitan counties as “rural.” See the discussion of these terms on the Economic Research Service's Web site: <http://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural.aspx>.

<sup>2</sup> The Census Bureau does not report poverty rates for rural children in its annual report, *Income, Poverty, and Health Insurance Coverage in the United States*, but provides additional cross-tabulations of poverty by age and rural residence here: [www.census.gov/hhes/www/cpstables/032013/pov/pov40\\_000.htm](http://www.census.gov/hhes/www/cpstables/032013/pov/pov40_000.htm).

Figure 1

**Official and alternative estimates of child poverty rates by urban/rural status, 1990-2014**

Percent of children in poverty



Notes: “Official” poverty status is based on family money income in the prior calendar year, as measured by the Current Population Survey’s Annual Social and Economic Supplement (CPS-ASEC), while American Community Survey (ACS) poverty status is based on family money income in the past 12 months, in monthly surveys conducted in the stated year. Urban/rural status in some counties changed in 2004 and 2014; the effects of this change are discussed in Appendix 1.

\* Six or more months of calendar year designated as recessionary period.

† Note: The 2014 CPS-ASEC (for income year 2013) used a split-sample design in order to evaluate the effects of a change in the survey instrument. Figures reported above for 2013 are the averages of results from both subsamples. Official published results relied on the subsample that used the same questionnaire as in prior years. In this subsample, the child poverty rate in 2013 was 23.1 percent in nonmetro areas and 19.4 percent in metro areas.

Sources: USDA, Economic Research Service calculations from U.S. Census Bureau, CPS-ASEC public-use microdata, and ACS data, accessed via American Fact Finder, table S1701 (“All children for whom poverty status is determined”), various years.

the Census Bureau’s American Community Survey (ACS). Our analysis works with the official data through 2014; the differences between the two data sources are discussed in the box “CPS Versus ACS: Which Better Estimates Rural Child Poverty?” (p. 3). In general, although the ACS results differ in small ways from the CPS data, their trends are broadly similar.

The study of both rural and urban poverty has generated a long and complex literature; Tickamyer and Duncan (1990) and Lichter and Eggebeen (1992) provide two useful summaries. We focus on two of the many issues raised in past work that seem particularly salient in light of recent trends. The first is the question of the relative importance of changes in average family incomes versus changes in the distribution of income around the average. The second is the degree to which changes in the income distribution may be explained by changes in a set of demographic factors that have consistently been shown to strongly correlate with poverty rates. These factors include changes in family size and composition, marital status, and the household head’s age, race, ethnicity, gender, country of birth, and level of education.



## **CPS Versus ACS: Which Better Estimates Rural Child Poverty?**

The Census Bureau's poverty estimates are based on data from the monthly Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC). Surveying some 60,000 households each March, this supplement collects detailed data on family structure, demographics, labor market outcomes, money income from all sources for the previous calendar year, and more. Poverty estimates from this survey are available from 1968 to the present, and these serve as the Government's official published estimates of poverty. The American Community Survey (ACS) is a larger national survey, covering roughly 2 million households over the course of each calendar year. Although the ACS includes questions about money income, from which poverty status may be calculated, these questions are less detailed than those used in the CPS-ASEC. Rural child poverty estimates from this survey are available from 2007 to the present.

The ACS and CPS-ASEC results parallel one another quite closely for rural areas from 2007 to 2012 (fig. 1): both show a steady increase in rural child poverty, and both estimates peak at over 26 percent. Thereafter, the rural results for the two surveys appear to diverge: the CPS-ASEC estimate of rural child poverty fell to 23.7 percent in 2014 (a decline of 3.0 percentage points from 2012), while according to the ACS, rural child poverty fell to 25.2 percent over this period (a decline of 1.0 percentage point). This divergence between the two surveys, however, was not statistically significant, given the large margins of error associated with the CPS's relatively small sample of rural households.

The differences in the results from these two surveys reflect both sampling variability and differences in the surveys' questionnaires and timeframes. The Census Bureau recommends relying on the CPS-ASEC, with its more detailed information on income, for national estimates of poverty. However, for subnational estimates (such as for rural areas), particularly when these are calculated for subsets of the population (such as children), the Bureau recommends that the CPS-ASEC results be "supplemented" with results from the larger ACS.

In this report we work with CPS-ASEC data through 2014, because the ACS does not include sufficient information to permit us to join the household heads, their unmarried partners, and the children of these partners into a single family resource unit—an issue we show to be important for the study of rural child poverty. However, as explained in the discussion accompanying table 1, our estimate of the decline in rural child poverty since 2012 lies roughly halfway between the CPS and ACS results that appear in figure 1. Given the uncertainties in these estimates, this compromise estimate is a plausible one.

## Determinants of Child Poverty: Basic Concepts and Prior Research

Poverty status is determined by comparing a family's income to the Census Bureau's poverty thresholds, which depend on family size, the number of children, and whether the household head is 65 or older. "Income" is defined as pre-tax money income (earnings, capital incomes, and cash transfer payments, such as Social Security and other retirement incomes, Supplemental Security Income (SSI), Social Security Disability Insurance (SSDI), Transitional Aid to Needy Families (TANF), and other smaller sources). This definition ignores important sources of in-kind support available to low-income families with children, including food and nutrition assistance provided through the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the free and reduced-price National School Lunch Program. The official Census Bureau measures focus on pre-tax income also implies that it misses the important poverty-alleviating effects of the Earned Income Tax Credit (EITC) and the Child Tax Credit (CTC).

These omissions have been criticized, and since 2010, the Census Bureau has also reported alternative measures, which include these income elements and make other adjustments to the official definition of poverty as well, under the title Supplemental Poverty Measure (SPM) (Short, 2013). Nevertheless, analyzing the official poverty rate still helps us understand why—and the extent to which—the (pre-tax and transfer) market economy leaves some families below the poverty threshold. Moreover, it is difficult to estimate the SPM before 2010 because of data limitations.<sup>3</sup> Since our aim is to use a consistent poverty measure reaching back to 2003, we follow the official definition, but make one modification related to the way the family resource unit is defined, as described in the following section.

For any given level of total (or per capita) national income, the poverty rate will clearly depend on the way in which that income is distributed across families. Between 1950 and 1975, the U.S. economy grew strongly, and inflation-adjusted median household income doubled. The benefits of economic growth were broadly shared, and the poverty rate declined as a result: between 1959 and 1973, the national poverty rate was cut in half, from 22.4 percent to 11.1 percent. Gould et al. (2013) estimated that if the relationship between per capita GDP growth and poverty reduction observed during this period had held in later decades, the poverty rate would, in principle, have fallen to zero by the mid-1980s. Instead, that relationship changed: during the macroeconomic expansion of 1983-1989 income inequality rose markedly, representing a departure from the post-WWII trend, and the national poverty rate declined only slightly (Blank, 1991; Cutler and Katz, 1991).

The role of rising income inequality is succinctly demonstrated by Danziger and Gottschalk (1995) for the periods 1949-1969 and 1973-1991. During the first period, poverty fell by 25.7 percentage points, of which 21.4 can be attributed to rising average income, and the remainder (4.3 percentage points) is attributed to a *reduction* in the inequality of income around that average (meaning that incomes rose faster for lower income families than for higher income families). From 1973 to 1991,

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<sup>3</sup> See, however, Wimer et al. (2013) for a careful attempt to extend the SPM to prior years. See also Council of Economic Advisers et al. (2015) for a comparison of rural child poverty trends using the official definition versus the (approximate) SPM. These sources demonstrate that there was virtually no change in either rural or urban child poverty under the SPM between 2003 and 2013. This implies that programs such as the EITC and SNAP have had their intended poverty-alleviating effect.

however, poverty increased by 1.8 percentage points, and this rise was entirely due to rising income inequality: growth in average incomes worked to reduce poverty by 2.1 percentage points during this period, but rising income inequality more than cancelled these gains.

Danziger's and Gottschalk's decomposition has been extended to more recent years by Mishel et al. (2012), who conclude that rising income inequality explains virtually all of the increase in poverty between 2000 and 2007. Surprisingly, they find that this conclusion also applies to the period 2007–10: the large drop in average income caused by the recession explained only 0.4 of the 2.6-percentage-point increase in the national poverty rate, with the remainder (2.2 percentage points, or 85 percent of the total) being due to rising income inequality. The current weakness of the connection between average income changes and poverty changes was also highlighted by the Stanford Center on Poverty and Inequality (2015), which notes that just about one-third of the cross-State variation in poverty reduction between 2007 and 2013 can be explained by the corresponding changes in gross State product per capita, a measure of average income.

As the first step in our analysis, we apply Danziger's and Gottschalk's method to the study of changes in child poverty between 2003, 2007, 2010, 2012, and 2014, distinguishing between urban and rural areas. This approach can also be used to estimate the roles of parental educational attainment, family structure, and other demographic factors, as explained in our discussion of methods. Mishel et al. (2012) argue that the effects of these demographic elements have been fairly modest at the national level in recent years: they find that changes in racial composition, education, and family structure worked to reduce all-ages poverty by 0.1 percentage points between 2000 and 2007, and raised poverty by just 0.3 percentage points between 2007 and 2010. We use similar variables to demonstrate that the role of demographic change differs strikingly between rural and urban areas.

Lichter (1997) observes that many analyses of the determinants of child poverty conclude that changes in family structure have played a large role in the past. Changes in family structure explain roughly 60 percent of the increase in rural child poverty during the 1980s (Lichter and Eggebeen, 1992). Lerman (1996) notes that the share of children living in two-parent families declined from 85 to 73 percent between 1970 and 1989, and demonstrates that this compositional change can in principle explain almost the entire observed increase in child poverty over that interval. Swanson and Dacquel (1996) also confirm that family structure effects were large in both urban and rural areas prior to 1990. And Sawhill (2014) concludes that had marriage rates remained at 1970 levels, child poverty would be 4 percentage points lower than it is today.

The determination of the extent to which changes in income inequality are driven by changes in family structure is complicated by the fact that the latter is influenced by the former. McLanahan and Percheski (2008) argue that rising income inequality and rising male unemployment have led to a reduction in marriage rates and an increase in single motherhood. This implies that we should not treat our results pertaining to family structure as being driven solely by exogenous cultural forces: they may indeed in part reflect the effects of rising economic inequality itself. Another strain in the literature, typified by Levernier et al. (2000) uses county-level data, as opposed to household survey data, to study the relation between poverty and local economic conditions, in addition to the influence of county-level averages of demographic variables. These studies confirm the importance of the demographic variables we study.

## Measuring Trends in Child Poverty

As noted in the box (“CPS Versus ACS: Which Better Estimates Rural Child Poverty?” p. 3), the U.S. Census Bureau, Current Population Survey’s Annual Social and Economic Supplement (CPS-ASEC) surveys approximately 60,000 U.S. households in March of each year and forms the basis for the official poverty measure. It contains a detailed series of questions about employment status and money income from all sources during the prior year, as well as a host of demographic and other variables. When survey sampling weights are applied, the data are considered representative of the whole U.S. population; we use these sampling weights in all calculations.

We compare estimates of child poverty for 2003, 2007, 2010, 2012, and 2014. We start with 2003 because it marks the start of the last economic expansion.<sup>4</sup> The period between 2003 and 2007 was one of national economic growth and a falling national unemployment rate, but rising rural poverty. The effects of the recent profound recession are then captured by comparing 2007 and 2010: although the recession officially ended in June of 2009, employment losses continued into the third and fourth quarters of that year, and thereafter recovered sufficiently slowly that total employment remained slightly lower in 2010 than in 2009, in both urban and rural counties (Hertz et al., 2014). Trends during the first few years of the economic recovery are explored by comparing estimates from 2010 and 2012, when rural child poverty reached its peak. Finally, we compare 2012 to 2014, when child poverty was falling in rural areas.

Our definition of poverty relies on the Census Bureau’s income thresholds for each year, which vary according to the total number of people in the family, the number of children, and whether the household head was 65 or older. However, we follow the National Research Council’s recommendation (NRC, 1995) by including unmarried partners and their children in the same family unit as their partners, rather than dividing them into separate families as does the Census Bureau’s definition.<sup>5</sup> This adjustment reduces measured child poverty, because it locates more children in multi-adult families whose resources are more likely to exceed the poverty threshold, even taking into account the larger family size.<sup>6</sup> As seen in table 1, this definition change is particularly key for measuring child poverty in rural areas, and its effect was larger in 2010-2014 than it had been in 2003 or 2007.

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<sup>4</sup> Although the prior recession ended in 2001, the national unemployment rate continued to rise until 2003, peaking at 6 percent, and poverty would generally not be expected to fall while unemployment was rising.

<sup>5</sup> The NRC definition of the family resource unit corresponds to the family units used in construction of the SPM. It was implemented using the modified family relationship variables MOMLOC (mother’s line number), POPLOC (father’s line number), and SPLOC (spouses line number) created by the Integrated Public Use Microdata Series (IPUMS-CPS) project of the University of Minnesota (Ruggles et al., 2015). A question identifying unmarried partners for all household members was added to the CPS-ASEC in the 2007 survey. Before then, only the unmarried partners of the household heads were identified. For consistency over time, we include only the unmarried partners of the heads of household in the family unit, and their children, who are identified in all years. These represent between 91 and 94 percent of all unmarried partners in households containing children in the surveys for which both measures are available. In these years, our estimate of the rural child poverty rate is overstated by 0.16 to 0.18 percentage points compared to what it would be if all unmarried partners and their children were included in the family unit of their partner. The urban child poverty rate is similarly overstated by 0.23 to 0.28 percentage points. The fact that these differences are small and stable over time implies that this concession to data limitations should have little effect on our analysis.

<sup>6</sup> The Census Bureau also does not attempt to determine the poverty status of foster children under age 15 and other children under age 15 who are not living with family members; they are thus dropped from the population for whom poverty is measured. We re-included these children as members of the primary family within the household, under the plausible assumption that their consumption needs are being met by these unrelated adults; this inclusion has a very small effect on measured poverty. Note that we use the term “family” to refer to these reconfigured family units, whereas the Census Bureau’s definition of family includes only related individuals.

Table 1

**Child poverty rates under two definitions of family resource unit, 2003-2014, by urban/rural status**

	Percent of children in poverty					Change		
	2003	2007	2010	2012	2014	2003-12	2012-14	2003-14
<b>Rural</b>								
Official estimates, as published	20.1	22.3	24.7	26.7	23.7	6.6	-3.0	3.6
Official estimates, replicated	20.2	22.1	24.5	26.3	24.5	6.1	-1.8	4.3
Modified family units	18.7	20.2	21.7	23.7	22.1	4.9	-1.6	3.4
90% Confidence Interval	18.0 to 19.4†	18.8 to 21.5	20.4 to 22.9	22.2 to 25.2	20.7 to 23.5	3.8 to 6.1†	-3.5 to 0.4	2.3 to 4.5†
Modified - Official, replicated	-1.5	-2.0	-2.8	-2.7	-2.4			
<b>Urban</b>								
Official estimates, as published	17.1	17.2	21.6	20.9	20.7	3.8	-0.2	3.6
Official estimates, replicated	17.1	17.2	21.6	20.9	20.6	3.8	-0.3	3.5
Modified family units	16.1	16.2	20.4	19.6	19.1	3.5	-0.6	3.0
90% Confidence Interval	15.8 to 16.4†	15.6 to 16.8	19.9 to 21.0	19.0 to 20.3	18.5 to 19.6	3.0 to 4.0†	-1.4 to 0.2	2.5 to 3.4†
Modified - Official, replicated	-1.0	-1.0	-1.2	-1.3	-1.5			

Notes: The “official” estimates are based on the U.S. Census Bureau, Current Population Survey’s Annual Social and Economic Supplements (CPS-ASEC), which uses a definition of poverty that excludes a small number of unrelated children under age 15 and a definition of the family resource unit that does not recognize unmarried partners as members of the same family. The “Modified family unit” follows the National Research Council’s (NRC) recommendation that re-includes the excluded children and sums the incomes of unmarried partners, thus placing more children in two-earner families, which reduces measured child poverty. The differences between the published estimates and those that are replicated from the public-use microdata reflect the suppression of the urban/rural status variable for a small number of records, and in 2010 through 2014, the random alteration of certain income components to protect respondent confidentiality.

†Confidence intervals calculated conventionally. All other confidence intervals are calculated using replicated sampling weights which take account of survey design effects, but are not available for 2003.

Sources: Published data: <http://www.census.gov/hhes/www/poverty/data/incpovhlth/2014/index.html> (Detailed Tables/POV-40 series). Other results are USDA, Economic Research Service calculations from U.S. Census Bureau, Current Population Survey’s Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

According to the Census Bureau’s definition, as replicated using the public microdata, the rural child poverty rate rose by 6.1 percentage points between 2003 and 2012, whereas under the NRC’s more inclusive definition of the family (including unmarried partners and their children), rural child poverty rose by 4.9 percentage points. For urban areas, the choice of family definition matters much less—a fact that reflects a more rapid increase in the number of unmarried partners in rural counties, as discussed below.

Table 1 also reports the official estimates of rural and urban child poverty for 2014, and the corresponding estimates based on the public-use microdata. In this year, the results from the microdata differ significantly from the published figures for rural areas: according to the official estimates (as published), rural child poverty fell by 3.0 percentage points from 2012 to 2014, while the official estimates (replicated) put the decline at 1.8 points. This discrepancy is an artifact of the income-masking algorithm that is used to protect the confidentiality of respondents, and it complicates our efforts to understand the reasons for the decline. However, the estimate of a 1.8-percentage-point decline is a plausible one, and in fact is very close to the average of the official CPS-based estimate of the change (-3.0 points) and the ACS-based estimate (-1.0 points). We thus accept the estimate of 24.5 percent for rural areas in 2014, based on the CPS-ASEC public-use microdata, as valid; as in

other years, once we modify the definition of the family unit, child poverty falls by several percentage points, to 22.1 percent.

The CPS-ASEC records the metropolitan/nonmetropolitan status (which we refer to as urban/rural status in this report) of nearly all respondents; for a small minority of the population (ranging between 0.2 percent in 2003 and 0.7 percent in 2012), metropolitan status is not reported for confidentiality reasons, and these cases are omitted from our analysis. The CPS-ASEC metropolitan status variable follows the classifications made by the Office of Management and Budget (OMB), and these classifications have changed over time, both because of population growth and because of changes in the urbanized population and inter-county commuting criteria that OMB employs to define metropolitan status.<sup>7</sup> This evolution means that the comparison of 2003 with later years is not a strict comparison of the same geographic regions. This caveat needs to be borne in mind, but its importance should not be exaggerated: it makes sense to revise the definition of rural areas to exclude counties that have grown more urban over time.

Still, it is also true that, for any initial level of population, the counties with the fastest growing populations are more likely to be reclassified as urban. If part of this more rapid population growth reflects in-migration due to more rapid employment and household income growth, then some of the observed decline in rural family income and, hence, some of the increase in poverty, will reflect the reclassification of more prosperous counties as urban. In Appendix 1, we demonstrate that the change in the urban/rural definition had a fairly small effect on our rural poverty estimates. The rise in rural child poverty between 2003 and 2007 visible in table 1 appears to slightly overstate, by 0.2 to 0.3 percentage points, the results we would see if we held the urban/rural definition constant over time. For urban areas, reclassification effects are even smaller. Moreover, this concern does not affect the results for 2007-2012, throughout which period the urban/rural definition did not change.

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<sup>7</sup> Details of the changes in the definition of urban/rural (metro/nonmetro) status are available here: <http://webarchives.cdlib.org/sw15d8pg7m/http://ers.usda.gov/Briefing/Rurality/NewDefinitions/>.



## Trends in Income and Demographics

We first report summary statistics relating to average income and the changing shape of the income distribution, as well as trends in the demographic statuses of urban and rural families with children. These statistics set the stage for our discussion of the effects these trends have had on rural child poverty.

Income trends for urban and rural families with children are reported in table 2. Measured family income grew by 1.3 percent in urban areas between 2003 and 2007 (cumulatively, not annually) but fell slightly, by 0.2 percent, in rural areas.<sup>8</sup> These estimates are imprecise and are not statistically different from zero or from each other. This imprecision goes hand in hand with an uncertainty over the actual change in the poverty rate over this period. However, although both the income and poverty estimates are subject to statistical uncertainty, the *relationship* between income changes and poverty changes is deterministic, and we will soon quantify this relationship by directly altering incomes and recalculating poverty.

Between 2007 to 2010, incomes fell in both urban and rural regions, due to the effects of the recession: urban families with children saw a 6.0-percent decline, while incomes for rural families with children fell by 3.1 percent (statistically insignificant). During the early years of the recovery, income trends diverged: urban families with children experienced income growth of 1.0 percent (not significant) while incomes in rural areas continued to slide, by 3.3 percent, for families with children. This difference is one of the key forces driving the divergence between child poverty trends in urban and rural areas: the first years of the national economic recovery did not translate into gains in average family income for rural families. All told, from 2003 to 2012, incomes were down by 3.8 percent for urban families with children, and by 6.5 percent for their rural counterparts. We thus expect falling average incomes to explain a significant share of the increase in child poverty through 2012, especially in rural counties. Finally, between 2012 and 2014, both urban and rural average incomes grew by about 6 percent for families with children, returning to levels that were within 1 or 2 percent of 2003 levels, which we would expect to lead to a reduction in child poverty.

The third and fourth panels of the table report the levels and period-to-period percentage changes in the 25th percentile of the family income distribution, which is in the vicinity of the poverty line; we again limit ourselves to families with children. Incomes at this relatively low point in the income distribution fell more rapidly than did the average, declining by 17.3 percent between 2003 and 2012 in rural areas, and by 12.8 percent in urban counties. Between 2012 and 2014, incomes at the 25th percentile rebounded, but they still remained 10 percent below their 2003 values. This difference between growth trends at the average and at the 25th percentile represents an increase in income inequality that we demonstrate generates an increase in poverty.

The final panel of the table makes this point in another way, reporting the ratio of average income to income at the 25th percentile, which is a measure of inequality that is appropriate for this analysis. We see that this ratio increased in every year through 2012, confirming that 25th-percentile incomes fell more rapidly (or grew more slowly) than the average. Between 2012 and 2014, however, inequality decreased somewhat in rural areas, while continuing to grow in urban counties. In both regions however, inequality (by this particular metric) was considerably higher in 2014 than in 2003.

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<sup>8</sup> Note that the growth rate at the national level exceeds the growth rate in both rural and urban areas. This seeming contradiction occurs because a significant fraction of families were reclassified as urban in 2007, as noted above and explained further in Appendix 1.

Table 2

**Real family income for families with children, 2003-2014, average and 25<sup>th</sup> percentile, by urban/rural status (at 2014 prices)**

Average (\$/year)	2003	2007	2010	2012	2014	
National	86,635	88,204	83,250	83,775	88,660	
Rural	67,280	67,151	65,038	62,922	66,604	
Urban	90,823	92,001	86,471	87,351	92,238	
25th Percentile (\$/year)	2003	2007	2010	2012	2014	
National	35,378	35,391	31,481	30,930	32,001	
Rural	31,160	29,064	27,530	25,775	28,020	
Urban	36,665	36,594	32,046	31,965	33,140	
<i>Percent changes</i>						
Average (\$/year)	2003-07†	2007-10	2010-12	2012-14	2003-12†	2003-14†
National	1.8**	-5.6***	0.6	5.8***	-3.3***	2.3**
Rural	-0.2	-3.1	-3.3*	5.9***	-6.5***	-1.0
Urban	1.3	-6.0***	1.0	5.6***	-3.8***	2
<i>Percent changes</i>						
25th Percentile (\$/year)	2003-07†	2007-10†	2010-12†	2012-14†	2003-12†	2003-14†
National	0.0	-11.0***	-1.8	3.5**	-12.6***	-9.5***
Rural	-6.7**	-5.3*	-6.4**	8.7**	-17.3***	-10.1***
Urban	-0.2	-12.4***	-0.3	3.7**	-12.8***	-9.6***
Ratio of Avg. Real Family Income to 25 <sup>th</sup> Percentile	2003	2007	2010	2012	2014	
National	2.45	2.49	2.64	2.71	2.77	
Rural	2.16	2.31	2.36	2.44	2.38	
Urban	2.48	2.51	2.70	2.73	2.78	

Notes: "Family" refers to modified family units, implementing the NRC definition, as described in text. The final panel reports the ratio of average real family income to income at the 25<sup>th</sup> percentile of the family income distribution, which is a proxy for the level of income of those that are near the poverty level, and at risk of falling below it.

†Statistical significance of percentage changes in average income for 2003-07, 2003-12, and 2003-14, and of changes at the 25<sup>th</sup> percentile in all years, were estimated using conventional standard errors; all other results reflect application of replicated sampling weights that take account of survey design effects. Real values are stated at 2014 prices.

\* = statistically significant at 90% confidence level; \*\* = 95%; \*\*\* = 99%.

Source: USDA, Economic Research Service calculations from the U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

Table 3 looks at the components of income for all families with children in the bottom quartile of the distribution of income. We first divide total income<sup>9</sup> into earnings versus nonlabor income (which includes a trivial share of capital incomes, and larger contributions from unemployment insurance, Social Security and other retirement incomes, Supplemental Security Income (SSI),

<sup>9</sup> Note that the "Real income" figures reported here are the average real incomes for all families in the bottom quartile, that is to say, the average for all families whose incomes fell below the 25<sup>th</sup> percentiles that are tracked in table 2.

Table 3

**Average real incomes, earnings, nonlabor incomes, and hours of work, 2003-2014, bottom income quartile of families with children, by urban/rural status (at 2014 prices)**

						Percent change		
	2003	2007	2010	2012	2014	2003-12	2012-14	2003-14
<b>Rural</b>								
Real income (\$/year)	17,169	16,133	15,386	13,835	14,860	-19	7	-13
Real earnings (\$/year)	12,835	11,379	9,980	9,262	10,357	-28	12	-19
Hours worked per family	1,519	1,310	1,151	1,084	1,218	-29	12	-20
Real earnings / hour (\$)	9.77	11.38	9.84	9.30	11.31	-5	22	16
Nonlabor income (\$/year)	4,332	4,753	5,403	4,571	4,501	6	-2	4
<b>Urban</b>								
Real income (\$/year)	19,586	19,980	16,649	17,002	17,661	-13	4	-10
Real earnings (\$/year)	15,135	16,174	12,036	12,927	13,839	-15	7	-9
Hours worked per family	1,513	1,555	1,249	1,349	1,430	-11	6	-5
Real earnings / hour (\$)	11.37	11.77	11.71	11.27	13.14	-1	17	16
Nonlabor income (\$/year)	4,449	3,783	4,612	4,069	3,810	-9	-6	-14

Source: USDA, Economic Research Service calculations from U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

Social Security Disability Insurance (SSDI), Transitional Aid to Needy Families (TANF), and other smaller sources), and then examine changes in the two main determinants of labor earnings, namely, total hours worked by the family, and real family earnings per hour. We see that in nonmetro areas, a 28-percent loss in real earnings between 2003 and 2012 for bottom-quartile families was driven by a 29-percent decline in hours of work, and by a 5-percent decline in real wages, while nonlabor incomes rose by 6 percent. Furthermore, although real earnings per hour in nonmetro areas have rebounded to 2007 levels since 2012, hours of work have not done so. In urban areas, between 2003 and 2012, real earnings for this bottom quartile of families fell by 15 percent, hours of work fell by 11 percent, real wages were flat, and nonlabor incomes fell by 9 percent.

Table 4 summarizes the demographic variables we consider. These were selected based on voluminous prior evidence of their strong correlation with poverty. From 2003 to 2014, factors that tended to increase rural child poverty included a slight increase in the number of children per family, a slight decrease in the number of prime-working-age adults (25-54 years old), and an increase in the share of children living in families whose household heads were not married.<sup>10</sup> Rises in the share of household heads who were not white and in the share who were foreign-born are also expected to be associated with rising child poverty. On the other hand, we see an improvement in educational attainment, one of the most powerful determinants of poverty status, with the share of rural children living in families whose household heads had at least some college education rising from 46.0 percent to 52.8 percent.

In urban areas, the decline in the share of children living in married couple households was only about half as large, and, interestingly, a greater increase was seen in the share living in single-male-headed households than living in single-female-headed ones. Educational attainment trends were

<sup>10</sup> Unmarried cohabiting partners are among those counted as unmarried in this measure.

favorable, while trends related to race, ethnicity, and country of birth worked in the direction of an expected increase in poverty (as they did in rural areas).

Table 4

**Demographic characteristics of families with children, 2003-2014, by urban/rural status**

						% change							% change	
	2003	2007	2010	2012	2014	2003-12	2003-14	2003	2007	2010	2012	2014	2003-12	2003-14
Family structure	Rural							Urban						
Prime-age adult women/family	0.90	0.90	0.89	0.89	0.91	-1	1	0.93	0.93	0.95	0.94	0.94	1	1
Prime-age adult men/family	0.77	0.75	0.74	0.74	0.73	-3	-4	0.75	0.75	0.75	0.75	0.75	-1	-1
Total prime-age adults/family	1.67	1.64	1.62	1.64	1.64	-2	-2	1.68	1.68	1.70	1.68	1.68	0	0
Number of children in family	2.37	2.39	2.37	2.44	2.48	3	5	2.37	2.38	2.37	2.37	2.36	0	0
% in married couple families	71.6	68.7	67.3	66.4	66.3	-7	-7	71.1	70.5	69.1	68.4	69.0	-4	-3
% in single-male head families	7.2	7.5	8.0	8.6	8.5	20	18	5.7	6.3	6.7	7.5	6.9	30	20
% in single-female head families	21.2	23.8	24.8	25.0	25.3	18	19	23.2	23.2	24.3	24.2	24.2	4	4
Characteristics of head of family														
Age	38.3	38.7	39.2	39.0	39.4	2	3	39.2	39.7	39.7	40.0	40.3	2	3
No education (%)	0.1	0.1	0.1	0.1	0.1	8	-33	0.1	0.1	0.2	0.2	0.3	38	100
Less than 9th grade (%)	5.4	4.3	4.6	4.2	4.5	-22	-17	6.3	5.7	6.0	5.0	5.1	-21	-19
9th - 12th (%)	11.4	9.5	9.4	10.2	10.1	-10	-11	10.3	10.0	9.4	8.9	8.8	-14	-14
HS graduate (%)	37.1	36.6	34.6	33.8	32.5	-9	-12	27.0	26.4	25.3	23.8	23.7	-12	-12
Some college (%)	30.2	31.8	32.2	33.0	33.3	9	10	27.7	27.6	27.6	28.7	27.7	4	0
Bachelor's (%)	10.7	12.8	13.6	13.7	13.6	27	27	18.9	19.8	20.1	21.2	21.3	12	12
Masters or higher (%)	5.1	5.0	5.6	5.0	5.9	-2	15	9.7	10.5	11.4	12.2	13.1	26	36
White, non Hispanic (%)	76.8	76.3	73.9	72.0	73.9	-6	-4	58.2	55.9	53.6	53.8	52.6	-8	-10
Black, non Hispanic (%)	9.7	10.5	9.4	10.1	10.3	4	6	16.1	15.7	15.0	15.0	14.6	-7	-9
Hispanic (%)	9.4	8.8	10.5	11.9	9.8	26	5	19.4	22.1	23.8	23.7	24.4	22	25
Other (%)	4.1	4.5	6.2	6.1	6.0	47	44	6.3	6.3	7.6	7.6	8.4	20	34
Foreign born (%)	7.2	5.8	7.4	8.3	7.9	15	10	23.4	24.5	25.4	25.4	26.4	9	13

Notes: These statistics are calculated with the child as the unit of analysis: the interpretation is thus that the average rural child lived in a household that had 2.37 children in 2003, that 71.6 percent of rural children lived in households headed by a married couple, and so forth.

Source: USDA, Economic Research Service calculations from U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

## Decomposing the Changes in Rural and Urban Child Poverty

The decomposition popularized by Danziger and Gottschalk (1995) quantifies the relative importance of *changes in average family income* versus *changes in the distribution of income around the average*—that is to say, changes in income inequality—as factors that drive the observed change in poverty rates from one period to the next. The latter component can be further refined to isolate the contribution of those changes in income distribution that are driven by changing demographics, including education. The Danziger-Gottschalk decomposition is conceptually straightforward. The first step asks how poverty would have changed between any two survey years (Year 1 and Year 2) if all families had seen their real incomes grow (or fall) at the average rate. If poverty in fact increased by more than this amount, this must logically result from an adverse change in the distribution of income, namely, slower-than-average income growth (or more rapid decline) for families located near the poverty line. This income-distribution effect can be further explored to isolate the effects of demographic change. This is accomplished by reweighting the Year 1 data set so that it has the same demographic proportions as the Year 2 data set. Further details are provided in Appendix 2.

The results of this decomposition of the effects of income growth (or decline) versus changes in income distribution, for urban and rural areas, and for each period from 2003 to 2014, are reported in table 5. These results may be summarized as follows:

### More Than Falling Average Incomes, Rising Income Inequality Explains Rising Child Poverty

Rural child poverty rose by 1.4 percentage points between 2003 and 2007 (although an estimated 0.2 to 0.3 percentage points of this increase are an artifact of the changing definition of rural areas). A small share (3 percent) of this increase can be attributed to the decline in average incomes just reported. The remaining 97 percent of the increase in rural child poverty is per force the result of a worsening of the rural income distribution among families with children. Only a small share of this inequality-driven increase in poverty—0.1 percentage points, or 5 percent of the total—was attributable to the net effect of changes in the demographic variables that we considered. In our discussion of the longer term results from 2003 to 2012, we present a more detailed look at the effects of demographic changes. The bottom line is that between 2003 and 2007, fully 1.3 of the 1.4 percentage points by which rural child poverty increased were due not to falling *average* incomes, but rather to the more rapid declines in incomes experienced by people near the poverty line. Moreover, these more rapid income losses cannot be attributed to the net effects of changes in education, family structure, and other demographic factors. The effects of differential income growth, or rising inequality, also dominated in urban areas, where the effect of a slight *increase* in average incomes (which worked to reduce poverty by 0.2 percentage points between 2003 and 2007) was more than offset by rising inequality, leaving the child poverty rate virtually unchanged.

Turning to the period that spans the recession (2007-10), we expect falling incomes to play an important role, and indeed they do. The decline in average income served to raise child poverty by 0.8 percentage points in rural areas, accounting for 53 percent of the total observed change, and by 1.5 percentage points (35 percent of the total) in urban areas, which saw larger income declines. Yet rising inequality still explained nearly half the rise in child poverty in rural areas and nearly two-thirds of the increase in the cities. The striking difference here is that changes in demographics

Table 5

**Effects of changes in average income and income distribution on the child poverty rate, by urban/  
rural status**

	2003-7†		2007-10		2010-12		2003-12†		2012-14		2003-14†	
	Change	%	Change	%	Change	%	Change	%	Change	%	Change	%
<b>Rural counties</b>												
% point change in child poverty [90-percent confidence interval]	1.4** [0.4–2.5]	100	1.5 [-0.1–3.2]	100	2.0* [0.3–3.7]	100	4.9*** [3.8–6.1]	100	-1.6 [-3.5–0.4]	100	3.4*** [2.3–4.5]	100
Due to change in rural real average household income	0.05	3	0.8	53	0.8	38	1.7	35	-1.5	98	0.2	7
Due to changes in income distribution within rural areas	1.4	97	0.7	47	1.2	62	3.2	65	-0.02	2	3.2	93
Effects of changes in distribution driven by demographic change	0.1	5	0.4	26	0.5	27	1.2	24	0.2	-11	1.2	36
Effects of changes in distribution driven by other factors	1.3	92	0.3	21	0.7	35	2.0	41	-0.2	12	1.9	57
<b>Urban counties</b>												
% point change in child poverty [90-percent confidence interval]	0.1 [-0.4–0.6]	100	4.2*** [3.4–5.1]	100	-0.8 [-1.6–0.0]	100	3.5*** [3.0–4.0]	100	-0.6 [-1.4–0.2]	100	3.0*** [2.5–3.4]	100
Due to change in urban real average household income	-0.2	Not informative	1.5	35	-0.4	52	0.9	25	-1.2	206	-0.2	-8
Due to changes in income distribution within urban areas	0.3		2.8	65	-0.4	48	2.7	75	0.6	-106	3.2	108
Effects of changes in distribution driven by demographic change	-0.05		0.0	1	-0.1	7	0.0	0	0.1	-20	0.3	8
Effects of changes in distribution driven by other factors	0.3		2.7	65	-0.3	41	2.7	75	0.5	-86	2.9	99

Notes: †Standard errors calculated conventionally for 2003-07, 2003-12 and 2003-14; all other results reflect application of replicated sampling weights that take account of survey design effects and are available from 2005 on. "Not informative" indicates that the percentage contributions of each element are difficult to interpret when the net effect is so small (0.1 points). Other percentages may not sum to 100 due to rounding error.

\* = statistically significant at 90% confidence level; \*\* = 95%; \*\*\* = 99%.

Source: USDA, Economic Research Service calculations from the U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

significantly contributed to rising child poverty in rural areas (accounting for 26 percent of the total increase, or 0.4 percentage points), but had virtually no net effect on child poverty in urban America.

During the initial years of the recovery (2010-12), urban and rural experiences differed sharply. In rural America, the child poverty rate rose by 2.0 percentage points, being driven by falling average incomes (which added 0.8 percentage points to rural child poverty, or 38 percent of the total change), and worsening income inequality (which added 1.2 percentage points, or 62 percent of the



total). The effect of rising income inequality broke down as follows: Demographic changes made a significant contribution, raising rural child poverty by 0.5 percentage points, or 27 percent of the overall total, while other sources of rising income inequality added 0.7 percentage points to rural child poverty, or 35 percent of the total change for this period. In urban areas, by contrast, income gains and *improvements*<sup>11</sup> in income distribution each reduced child poverty by 0.4 percentage points. Education and other demographic changes collectively explained very little of the income-distribution effect.

The next column of table 5 considers the boom-bust-initial-recovery period, 2003-12, during which time child poverty rose by 4.9 percentage points in rural counties and 3.5 percentage points in urban areas. In the cities, changes in average income accounted for one-quarter of the rise, while rising inequality, none of which was attributable to the net effects of demographic changes, explained the remaining three-quarters. In rural areas, however, falling average incomes raised child poverty by 1.7 percentage points (35 percent of the total increase); changes in income distribution that were attributable to demographic factors added 1.2 points (24 percent of the total); and other sources of rising income inequality contributed to the remaining 2.0 points (41 percent of the total). In summary, between 2003 and 2012, rising inequality more than falling average incomes drove the nationwide increase in child poverty; in rural areas, but not in cities, a portion of this rise in inequality was associated with the net effect of demographic changes along the dimensions we considered. These results, which are also represented graphically in figure 2, are qualitatively similar for the period 2007-12, implying that they are not being driven by the change in urban area definition.

The next column of table 5 reports the results for 2012-14, when rural child poverty declined by three full percentage points in the official data, and by a smaller and statistically insignificant amount (1.6 points) when calculated using the public microdata, and applying the NRC definition of the family resource unit. The decomposition reveals that this apparent decline was entirely driven by rising average incomes, with no further deterioration, but also no improvement, in the distribution of incomes around the average. In urban areas, income growth was estimated to have reduced child poverty by 1.2 percentage points, but a continued worsening of the distribution of income cancelled half of these gains.

The final columns of table 5 provide the longest-run perspective, and most clearly highlight the primary role of rising inequality in generating rising child poverty. As noted in table 2, average real family incomes in 2014 were within 1-2 percent of their levels in 2003. Yet child poverty in both rural and urban areas in 2014 was three percentage points higher than it had been a decade earlier. Rising inequality explains 93 percent of the increase in rural child poverty, and more than fully explains the increase in urban child poverty over this period (see also fig. 2). Again, the salient difference between rural and urban areas is that changing demographic characteristics do explain some of the changes in the rural distribution of income that were associated with higher child poverty, but, on balance, do not explain much of the increase in urban child poverty.

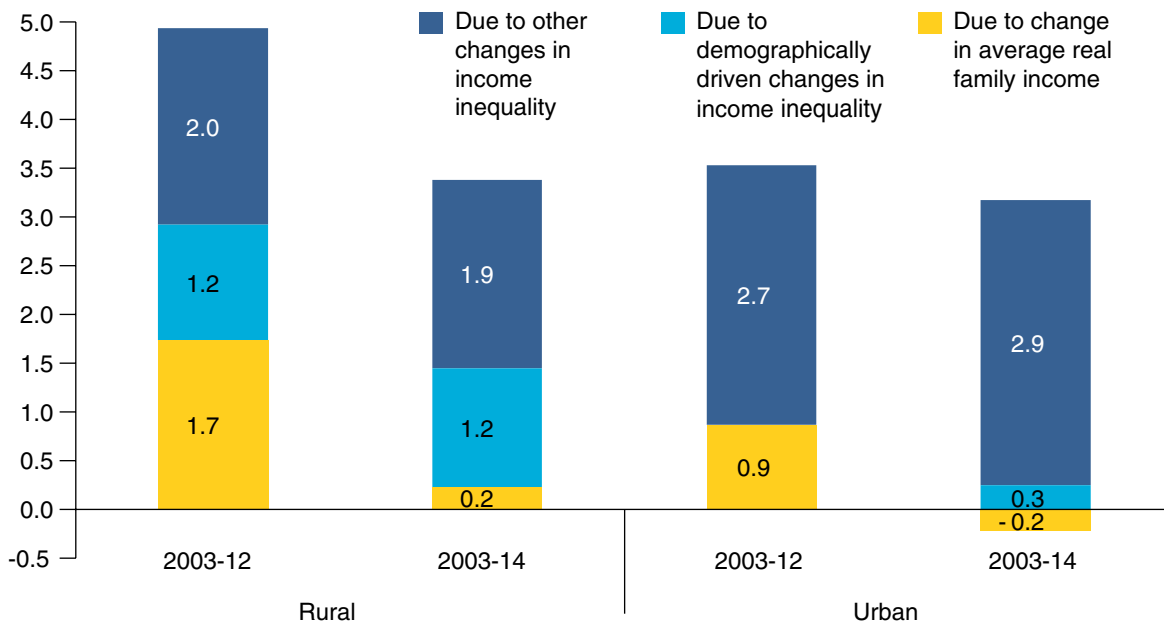
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<sup>11</sup> In table 2, our measure of inequality (the ratio of the average to the 25th percentile of income) rose marginally over this period in urban areas. Nonetheless, the decomposition approach reveals that the distribution of income changed in ways that were not captured by that statistic, but which resulted in a higher child poverty rate.

Figure 2

**Changes in average real family income explain little of the rise in child poverty between 2003 and 2014**

Percentage point change in child poverty rate



Note: The components of change in the rural child poverty rate do not sum to the 3.4 percent total due to rounding.

Source: USDA, Economic Research Service calculations from U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement (CPS-ASEC), public-use microdata, various years.

**Demographic Changes Explain Some of the Increase in Rural Child Poverty**

Table 6 presents the estimated individual effects of the observed changes in each demographic variable on child poverty, using the regression methods described in Appendix 3.<sup>12</sup> We focus on 2003-2012, the period that saw the largest increase in rural child poverty; results through 2014 were very similar, as there was little demographic change between 2012 and 2014. In rural areas, the slight increase in the number of children per family (which rose from 2.37 to 2.44) is estimated to have added 0.4 percentage points to the child poverty rate; in urban areas, there was no change in the number of children (see table 4) and hence no effect on poverty. Similarly, in rural areas, a slight decrease in the number of prime-working-age adults per family (which fell from 1.67 to 1.64) is estimated to have added 0.7 percentage points to child poverty, while in urban areas these changes were again negligible.

The reduction in the share of children living in married-couple households (which fell from 71.6 to 66.4 percent in rural areas and from 71.1 to 68.4 percent in urban areas) is estimated to have raised

<sup>12</sup> It should be noted that—unlike the Danziger-Gottschalk-based estimate of the *net* effect of demographic shifts—these regression-based estimates of the separate effect of each demographic variable will reflect a combination of their effects on the *shape* of the income distribution (which is what we seek to estimate here) and on the *level* of average income. As such, these regression-based estimates are likely to overstate the purely distributional effects of demographic changes.

Table 6

**Estimated effects of changes in demographic factors on rural and urban child poverty rates, 2003 to 2012**

Changing demographic factors	Resulting percentage point change in poverty	
	Rural	Urban
Number of children	0.4 ***	0.0
Number of adults of prime working age, by gender	0.7 ***	0.1
Marital status of household head	0.7 ***	0.1 ***
Age of household head	-0.2 ***	-0.3 ***
Race and country of birth of household head	0.2 ***	0.2 ***
Education of household head	-0.8 ***	-1.0 ***
Net explained change in poverty	0.9 ***	-0.9 ***

Notes: \* = statistically significant at 90% confidence level; \*\* = 95%; \*\*\* = 99%.

Source: USDA, Economic Research Service calculations from the U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, various years.

rural child poverty by 0.7 percentage points, and raised urban child poverty by 0.1 percentage points between 2003 and 2012. The causal mechanisms behind this estimated marriage effect are worth considering carefully. Married-couple families have more adults available to earn income: in 2012, the average number of adults in a rural family with children was 2.3 for married couples and 1.6 to 1.7 for single-male- and single-female-headed families. Yet our regression estimator controls for the number of prime-working-age adults in the family, so the primary mechanism by which marriage reduces poverty in our analysis is not simply by increasing the number of adults in the family. However, our measure of the number of adults of working age is taken at a single point in time (March of the survey year), and we do not know how many adults were present on average over the calendar year for which income is estimated, so our ability to control for this important factor is imperfect. Marriage is associated with the more stable presence of the other adult (Sawhill, 2014), suggesting that a spouse observed in March of a given year is more likely (than an unmarried partner would be) to have been a member of the family over the full course of the prior year. In addition, research suggests that marriage has an independent positive effect on male earnings, all else being equal (Lerman, 2010).

The slight rise in the average age of household heads is estimated to have reduced poverty by 0.2 to 0.3 percentage points in rural and urban areas, while the increasing share of non-White and foreign-born families added 0.2 percentage points. Improvements in the educational attainment levels of the household head, however, had a strongly negative effect on poverty, estimated at 0.8 percentage points in rural counties and 1.0 percentage points in urban areas.

To summarize, changes in the number of adults, number of children, and marital status appear to have played a significant role in raising rural child poverty: taking the sum of the marginal effects reported in the table for these three variables, we conclude that they added 1.7 percentage points to the rural child poverty rate between 2003 and 2012, compared to just 0.3 percentage points in urban areas. Improvements in education appear to have reduced child poverty considerably, while the remaining variables—age and race/ethnicity of the household head and whether the head was foreign-born—had relatively minor effects. Unfortunately, the sum of the effects from the regression analysis need not equal the net effect derived from the Danziger-Gottschalk approach. For rural

families, the two approaches yield comparable estimates: in table 5, the net effect of education and other demographic change is to add 1.2 percentage points to rural child poverty between 2003 and 2012, while in table 6 the sum of the individual effects is 0.9 percentage points. For urban areas, however, the reweighting approach of table 5 implies that education and other demographic changes had no net effect on child poverty over this time period, while the regression results in table 6 suggest a *negative* net effect on poverty. It is also important to note that, as with any econometric analysis, the possibility exists that our results are biased by the exclusion of other relevant determinants of poverty from the regression equation. However, results were virtually identical under an alternative specification that controlled for the average effect of all unobserved State-level characteristics, implying that State-level differences in economic conditions are not biasing our results.

## Conclusions and Policy Implications

Average income for American families with children has now approximately recovered to its pre-recessionary level, yet child poverty remains elevated in both urban and rural areas. This implies that the distribution of income has worsened: there is a greater gap in incomes between the bottom and the rest of the income distribution than existed prior to the Great Recession of 2007-09.<sup>13</sup> This report demonstrates that this growth in income inequality accounts for all of the net increase in urban child poverty since 2003, and virtually all of the net increase in rural child poverty.

For rural families with children, the gap between average income and the 25th income percentile grew steadily between 2003 and 2012, both during the national economic expansions of 2003-07 and 2010-12, and during the recession (see table 2). Since 2012, this gap has narrowed slightly, but not enough to make much of a dent in rural child poverty (see table 5). In urban counties, improvements in the distribution of income between 2010 and 2012 were reversed by 2014, according to the decomposition results in table 5.

In addition, rural trends in average income for families with children diverged from metro and national trends in two key respects: there was no growth in rural average income between 2003 and 2007, and the rural average actually fell during the first few years of the recovery (2010-2012).<sup>14</sup>

Rising inequality is often conceptualized as the result of growing incomes for the top 1 percent of the distribution, juxtaposed with stagnant incomes for the bottom 99 percent. Our results reveal another facet of rising inequality, namely, that incomes have fallen for the poorest households, even as average income has more or less recovered from the effects of the recession. The sources of this change lie in the labor market, since labor income is the largest component of family income, and the reasons for the longrun trend toward greater inequality in earnings have been extensively debated. There are varying degrees of evidence for the effects of the following factors, to different extents, and with different intensity at different points in time: the falling real value of the minimum wage (Autor et al., 2015), the decline in union bargaining power (Western and Rosenfeld, 2011), enhanced competition from lower wage counties (Freeman, 1995), a rising number of lower skilled immigrant workers (Card, 2009), and technological change favoring the better educated coupled with a decline in the rate of growth of the supply of college-educated workers (Autor, 2014). There is also a clear spatial relationship between changes in rural child poverty and the decline in rural manufacturing employment (McGranahan, 2015).

The results in table 3 show that real earnings per hour in rural areas have largely rebounded to 2007 levels, but that total hours of work have not. This suggests that job creation in rural areas may help alleviate rural child poverty. However, the strength of the link between job creation and poverty

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<sup>13</sup> This conclusion is based on the growing gap between average income and the 25th income percentile. The gap between *median* income and the 25th percentile has also risen, albeit by a smaller proportion.

<sup>14</sup> Here, however, we must insert the caveat that the CPS-ASEC rural sample displays income and employment trends that are not entirely consistent with other sources. An analysis of the Local Area Unemployment Statistics dataset reported in Hertz et al. (2014) finds that rural employment grew by 0.7 percent between 2010 and 2012, whereas the CPS-ASEC rural employment trend is distinctly negative for this period. The reasons for this divergence are not immediately obvious. It may simply reflect sampling error in the CPS-ASEC, or it may imply that the CPS-ASEC rural sample frame is not fully representative of rural America; yet the CPS-ASEC data are not taken out of thin air and are surely representative of at least a significant portion of rural counties, which, in 2012, had yet to see much benefit from the resumption of national economic growth.

reduction depends on whether low-income families have the skills needed to fill these new jobs. Further research is needed to determine the best way to stimulate rural employment that matches workers' current skills.

Differences in methods and the selection of covariates make it hard to compare our demographic results directly with the results of past work on this topic. However, we can broadly confirm that changes in the average number of adults per household and their marital statuses exacerbated rural child poverty, during both the recession and the recovery. Sawhill (2014) presents a thoughtful discussion of the causes of these trends and possible policy responses. Our results assign somewhat more weight to the importance of demographic change (and also more weight to the role of falling average incomes) than does the work of Mishel et al. (2012) (which relates to national poverty for all age groups, not rural children) and fall more in line with work by Lichter (1997), Swanson and Dacquel (1996), and Sawhill (2014) relating to earlier time periods.

Our results on education are more encouraging: between 2003 and 2012, the share of rural children living in families headed by an adult with a college degree rose by 2.9 percentage points, and this trend had a clear poverty-reducing effect. Ongoing initiatives to increase access to college education for low-income families in both urban and rural areas may contribute to further reductions in poverty. However, more research is needed to ascertain how effectively different educational and skills training policies might address whatever skills deficits exist.

Our last conclusion is methodological. We show that changes in the definition of the family resource unit—as recommended by the National Research Council and implemented in the Supplemental Poverty Measure—significantly affect the measured child poverty rate, particularly for rural areas, precisely because of the rise in unmarried partnerships. Using this revised definition, rural child poverty rose from 18.7 percent to 23.7 percent between 2003 and 2012, a change of 4.9 points (up to rounding error), while under the official Census Bureau definition it rose from 20.2 percent to 26.3 percent, a gain of 6.1 percentage points. This highlights the implications of adopting the NRC's recommendations for rural analyses.



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## Appendix 1: Effects of Changes in the Definition of Rural Areas on Child Poverty Rates, 2003-2007

For the 2003 income year, metropolitan/nonmetropolitan status (which we refer to as urban/rural status in this report) reflects the 1993 Office of Management and Budget (OMB) classification, according to which 18 percent of the CPS-ASEC population (or 52 million people) resided in 2,305 rural counties (out of a total of 3,141 counties). For the 2007, 2010, and 2012 income years, urban/rural status reflects the 2003 OMB classification, by which measure 15-16 percent of the population (46-47 million people) resided in 2,052 rural counties. Some 298 counties, with a 2000 census population of 10 million, switched from rural, under the 1993 classification, to urban, under the 2003 classification, and 45 counties, containing 3 million people, switched from urban to rural. Our concern is that if more prosperous rural counties were more likely to have been reclassified as urban, this change could affect our estimates of rural poverty trends.

We can estimate the effects of this change in urban/rural definition by drawing on data from the Small Areas Income and Poverty Estimates (SAIPE) program of the U.S. Census Bureau, which generates annual county-level estimates of the adult and child poverty rates.<sup>15</sup> These can be aggregated to calculate rural-county child poverty in any given year, for any chosen definition of rural county status. Note that these aggregates need not agree with the official child poverty estimates for the same aggregated regions, because the SAIPE draws on a variety of data sources beyond CPS-ASEC to permit small area estimation. Moreover, the SAIPE definition of child poverty uses the conventional concept of the family resource unit, whereas we rely on the National Research Council's definition. Still, we may use the SAIPE data to calculate the *proportionate* effects of the changing definition of rural status on the change in rural child poverty, and use this proportion to estimate the degree to which reclassification biases our baseline estimate of the increase in rural child poverty between the 2003 and 2007 CPS-ASEC surveys, which use the 1993 and 2003 OMB rural definitions, respectively.

The upper panel of table A.1 presents these rural county aggregates for 2003, according to both the 1993 OMB definition of urban and rural areas and the 2003 definition. The second panel presents the two sets of estimates for 2007. It is clear that the definitional change had very little effect on estimated child poverty in urban areas, but a noticeable effect in rural areas. In the third panel, we see that for 1993-definition rural areas, poverty increased by 1.9 percentage points between 2003 and 2007, while for the 2003-definition rural areas, it increased by 2.1 percentage points. In the third column (mixed definition), we see that if we change our rural definition between the 2 survey years, as we are forced to do when analyzing the CPS-ASEC micro data, we will indeed overstate the increase in rural child poverty as compared with the constant-geography approach, concluding that it rose by 2.5 percentage points. The actual constant-geography changes are thus 15-23 percent below the mixed definition result. We may use these percentages to adjust our CPS-ASEC-based estimates of the change in rural child poverty between 2003 and 2007 (which is 1.4 percentage points) to account for the change in urban definition. This yields the conclusion that the actual increase in rural child poverty between 2003 and 2007 was on the order of 1.1 to 1.2 percentage points, or 0.2 to 0.3 points less than we report.

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<sup>15</sup> See <http://www.census.gov/did/www/saipe/>.

Table A.1

**Effects of changing rural definition on child poverty rates, 2003-2007**

	1993 OMB Definition	2003 OMB Definition	
<b>Child poverty, 2003 (SAIPE)</b>			
Rural	20.0	20.3	
Urban	17.1	17.1	
<b>Child poverty, 2007 (SAIPE)</b>			
Rural	21.9	22.5	Mixed
Urban	17.2	17.2	Definition
Actual change, 2003-2007 (SAIPE)	1.9	2.1	2.5
Actual as percentage of mixed definition (SAIPE)	77	85	
Change, 2003-2007 (CPS, modified official definition)			1.4
Corrected constant geography change, 2003-2007	1.1	1.2	
% point overstatement of rise in rural child poverty, 2003-2007	0.3	0.2	

Notes: SAIPE = Small Area Income and Poverty Estimates. CPS = Current Population Survey, Annual Social and Economic Supplement (CPS-ASEC). "Rural" refers to counties designated nonmetropolitan by the OMB; "urban" counties are metropolitan.

Source: Aggregated by USDA, Economic Research Service from SAIPE county-level estimates, and calculations from the U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC) public-use microdata, 2003 and 2007.

The 2014 CPS-ASEC reflects the partial implementation of the new 2013 OMB metro/nonmetro classification system. Unfortunately, it is not possible to determine which families in the public-use microdata have been designated rural by the 2003 versus the 2013 criteria, so the effect of this partial change in the definition of rural/urban status cannot be estimated by the means just described, but it is likely also to be small.

## Appendix 2: The Danziger-Gottschalk Decomposition

The Danziger-Gottschalk decomposition is conceptually straightforward. The first step asks how poverty would have changed between any 2 survey years (Year 1 and Year 2) if all families had seen their real incomes grow at the average rate. This is not estimated econometrically, but by a direct manipulation of the family income data: First, we calculate the growth rate of average real family income<sup>16</sup> between Years 1 and 2; then we adjust (raise or lower) the income of each family in the Year 1 dataset by this percentage; finally, we compare these adjusted family income values to the Year 1 poverty thresholds (which depend on family size and composition) and calculate a new child poverty rate, which we refer to as the mean-income-adjusted child poverty rate.<sup>17</sup> The difference between this mean-income-adjusted child poverty rate and the actual Year 1 child poverty rate measures how child poverty would have changed if all families had seen their incomes rise or fall by the same percentage that the average family experienced. In other words, it captures the effect on poverty of changing average income, assuming no change in the shape of the income distribution.

The remaining difference between the mean-income-adjusted poverty rate and the *actual* Year 2 poverty rate then logically must be due to changes in the distribution of income around the mean, which occur when incomes grow at different rates at different points in the income distribution. In particular, if income growth at the bottom of the income distribution is slower than average, as we have documented in tables 2 and 3, then the actual poverty rate in Year 2 will be higher than the mean-income-adjusted poverty rate. These changes in the shape of the income distribution can be referred to as changes in income inequality, but they reflect a particular measure of inequality and will not necessarily move in the same direction as other more commonly cited measures of inequality, such as the Gini coefficient.<sup>18</sup>

The next step in the Danziger-Gottschalk decomposition is to calculate the share of the income-distribution effect that can be attributed to changes in demographics. This calculation is achieved by reweighting the mean-income-adjusted Year 1 dataset so that it displays the same demographic proportions as the Year 2 dataset for all of the variables listed in table 4 and by calculating a reweighted child poverty rate (again treating urban and rural areas separately and focusing on families with children).<sup>19</sup> The difference between the mean-income-adjusted poverty rates before and after this reweighting is an estimate of how changing demographic factors altered the child poverty rate,

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<sup>16</sup> In making this calculation, we focus on families with children only, and calculate separate growth rates for urban and rural areas; “family” refers to the modified family units (NRC definition) as described previously.

<sup>17</sup> One could also raise or lower incomes by the *nominal* income growth rate, and then compare the results to the Year 2 poverty thresholds. These two estimates will differ slightly if the poverty thresholds did not grow at the same rate as the Consumer Price Index.

<sup>18</sup> Blank (2011, p. 155) demonstrates that the Gini is relatively insensitive to changes in the poverty rate: bringing all U.S. families up to the poverty level would only reduce the 2007 income Gini from 0.43 to 0.41.

<sup>19</sup> Following this reweighting, a correction is applied so that the average family income remains at its observed Year 2 levels. This ensures that we examine only changes in the income distribution, not changes in average incomes that arise when we alter the demographic proportions.

by altering the distribution of income around a constant mean.<sup>20</sup> This is the effect of demographic-driven changes in income distribution on child poverty.

Finally, we calculate the remaining difference between the actual Year 2 child poverty rate and the Year 1 poverty rate that has been adjusted for changes in average income and in demographic proportions. This change in child poverty must logically result from changes in income distribution that occur for reasons other than changing demographics.

In comparing our decomposition results to those of other researchers, we note that many past analyses of the importance of demographic change do not distinguish its effects on income growth from its effects on income inequality. For example, the effect of demographic change on poverty will appear larger when the longrun decline in the share of children living in married-couple families is effectively allowed to affect the average income level in the full population (as in Lerman, 1996, or Lichter and Eggebeen, 1992 ) than when it is constrained to operate only through its effect on the distribution of incomes around the average (as in this analysis, that of Danziger and Gottschalk, 1995, and that of Mishel et al., 2012). We argue that the latter approach generates more plausible estimates, particularly in times of high unemployment, when the total flow of labor income (the primary source of income for poor and near-poor families) is determined more by demand-side macroeconomic factors than by factors affecting labor supply, such as single parenthood.

The relative importance of average income growth, income distribution, and demographic change will also depend on whether we use national or region-specific income growth rates in our calculations. If rural areas experience lower-than-average income growth in a given period, this will show up as a growth effect if region-specific growth rates are applied in the decomposition (as in our case), but as an effect of inequality if the higher national average growth rate is applied instead. In other words, given that rural incomes have in fact fallen more rapidly than the national average since 2003, our estimate of the importance of rising income inequality in explaining rising poverty would only increase if we used the national growth rate as our measure of average income growth.

As a final step in the analysis, we examine the influence of our education and other demographic variables in more detail. Unfortunately, the Danziger-Gottschalk reweighting technique that we use to determine the *net* effect of all of these education and other demographic changes does not readily lend itself to answering the question of the *separate* marginal effect of each variable. To observe these separate effects, we employ regression modeling of the determinants of poverty, as described in Appendix 3. This approach econometrically estimates the effect of changes in each education and other demographic variable on the poverty rate, holding all else equal.

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<sup>20</sup> Reweighting is accomplished by means of regression analysis of the probability of appearing in each of the 2 years, as a function of the variables just listed. Existing survey weights for Year 1 are multiplied by  $p/(1-p)$ , where  $p$  is the regression estimate of the probability of a child with a given set of characteristics appearing in the Year 2 sample. In these regressions, we take account of the fact that the number of rural observations dropped after 2003; this results in reweighted Year 1 demographic proportions that more closely match the Year 2 values, as desired. Quadratic terms, in the number of adults and children, and quartic terms, in household head's age, are included in the regressions to account for statistically significant nonlinearities in the effects of these factors on poverty rates.

## Appendix 3: The Oaxaca-Blinder Regression Decomposition

The regression estimator used in Table 6 is the familiar decomposition introduced by Oaxaca (1973) and Blinder (1973). This involves estimating a linear probability model of the determinants of poverty status, pooling any 2 years, and including a binary variable to distinguish between years. Covariates in these regressions are as listed in table 4. These regressions are performed separately for urban and rural areas and use the income-adjusted estimates of poverty, meaning that they seek to explain only the portion of the change in poverty that is due to changes in income distribution. However, the marginal effect of an increase in (for example) educational attainment is estimated without correcting for the impact this marginal change would have on average income (a correction we are able to apply under the reweighting approach). This suggests these regression estimates will overstate the absolute value of the effect of a change in any given demographic variable.

The regression equations give us estimates ( $\beta$ ) of the effects of each of the demographic factors ( $X$ ) on the child poverty rate ( $P$ ), holding all other covariates equal. The contribution of *changes* in the level of each variable ( $\Delta X$ ) to the *change* from year 1 to year 2 in the poverty rate ( $\Delta P$ ) is then given by  $\beta(\Delta X)$ . For example, comparing rural areas in 2003 and 2012 and looking only at families with children, other demographic factors being equal, the estimated effect of the head of household being a single woman (as opposed to married) is to raise the probability of her children living in poverty by 16.6 percentage points, so  $\beta_{singlefemale} = 0.166$ . During this period, the share of rural children living in families headed by single women rose from 21.2 percent to 25.0 percent, so  $\Delta X_{singlefemale} = 0.0383$ . The increase in poverty associated with this demographic change is thus  $0.166 * 0.0383 = 0.00636$ , or 0.6 percentage points. The comparable calculation for the rise in single male-headed families yields 0.1 percentage points. These sum to 0.7 percentage points, as reported in table 6, for rural areas, under “Marital status of household head.”