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The Poverty Balancing Equation: Expressing Poverty of Place as a Population Process

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ABSTRACT The accurate measurement of poverty is essential for the development of effective poverty policy. Unfortunately, approaches that use poverty rates to assess the causes and consequences of poverty do not fully capture the components of change in the poverty population because changes in the conventional poverty rate can occur owing to processes of natural increase, migration, or transitions in and out of poverty. This article presents an accounting framework for changes in poverty within and between places. The framework, termed the poverty balancing equation, generates a series of summary statistics that can be used in place of the conventional poverty rate in future research. The approach is demonstrated using the 2014 panel of the Survey of Income and Program Participation to generate state-level estimates of the poverty components of change for three states in the American South between January and December of 2013. Results show that even when poverty rates remain constant, there is significant dynamism within poor and nonpoor populations. By applying this approach, either completely or in part, researchers can provide more specific and actionable evidence for poverty alleviation policy.

KEYWORDS Poverty • Migration • Mortality • Fertility • SIPP

Introduction

The negative ramifications of poverty for people, both immediate and long term, have been well documented by demographers and other social scientists. Experiencing poverty leads to lower physical and mental well-being (Burton et al. 2013; Desmond and Western 2018; Dreyer 2019; MacTavish 2007; Rhubart and Engle 2017) and decreased social mobility (Chetty et al. 2014; Desmond and Western 2018), while also predisposing individuals to later bouts of poverty and cumulative negative impacts throughout the life course (Barrett et al. 2016; Larrimore et al. 2020; Musick and Mare 2006; Rank and Hirschl 2009). Although poverty occurs at the level of the individual, scholars frequently focus on poverty of place (e.g., the level of poverty in a region). The reason for this is twofold. First, person-level data with detailed geographic information can be difficult to obtain, making aggregate studies a pragmatic approach when geography is of interest. Second, both empirical research and theory often intentionally focus on place-based policies, effects, outcomes, and causes. Research has consistently found that exposure to concentrated poverty, even absent poverty at the individual level, can have a host of negative socioeconomic outcomes

(Chetty et al. 2016; Chetty et al. 2014; Sampson 2008; Sampson et al. 2002). Further, many theories of the causes and consequences of poverty argue that social structure and place-based policies, not individual behaviors, are the ultimate drivers of poverty among populations (Brady 2019; Tickamyer and Wornell 2017).

Although the study of poverty of place is robust, with a vast body of literature, the *accounting* of the dynamics of poverty populations within and between places remains underdeveloped. Scholars have frequently argued about the correct way to determine if someone is poor, with some advocating absolute measures of poverty, others arguing for relative approaches, and some advocating for approaches that move beyond income and account for the capabilities that income provides (Brady 2003; Hutto et al. 2011; Iceland 2005, 2013; Sen 2014). Although the importance of this ongoing conversation regarding poverty determination cannot be overstated, all of the popular approaches generally produce a single threshold of poverty. Poverty of place research uses one of these dichotomous measures at the individual level to produce an aggregate poverty rate—the percentage of those classified as poor relative to the total population—that is generally used as the variable of interest in place-based studies of poverty. Depending on study goals, researchers assess the impact of changes in the poverty rate on outcomes, or changes in independent variables on the poverty rate. Unfortunately, this approach does not fully capture the population dynamics of poverty occurring across space.

The reason the conventional poverty rate is insufficient is because the poverty rate of a place can change through six different factors: births, deaths, in-migration, out-migration, transitions into poverty, and transitions out of poverty. Thus, using the conventional poverty rate as the dependent variable does not tell us *how* poverty is changing within a region. It only tells us that it *is* changing. This poses significant difficulties for both policy design and evaluation. If the goal of a policy is to transition people out of poverty, processes of migration and natural increase could very well mask the efficacy of said policy. Further, a region may have a stable poverty rate while still having a considerable portion of the population transitioning into poverty. This is because transitions into poverty can be masked by a disproportionate in-migration of the nonpoor. Thus, the conventional poverty rate can lead policymakers to incorrectly believe poverty is not on the rise, or is even on the decline, depending on the differential population processes occurring within the poor and nonpoor populations.

In an effort to address these difficulties, this article presents a framework—the poverty balancing equation—that allows researchers to assess these factors individually, and in doing so fully capture the way poverty is changing within and between places. This framework is a valuable and necessary step for advancing poverty research. It provides a common language from which more precise poverty scholarship can proceed, while clearly articulating new summary statistics that can be calculated with both public and restricted data in future model-based and descriptive poverty alleviation efforts. Following the presentation of the framework, I demonstrate the approach using the first wave of the 2014 Survey of Income and Program Participation (SIPP) to generate estimates of the components of change in the poverty population for three states with different poverty trajectories in the American South—a region known for its disproportionately high levels of poverty relative to the rest of the United States (Baker 2020)—between January and December of 2013.

Prior Work on Poverty and Population Processes

Researchers have frequently assessed specific demographic processes among the poor. Although, to the author's knowledge, there is scant work focused on aggregate natural increase of the poor population, the independent factors of mortality and fertility have received significant attention and are often heightened among the population in poverty. Elevated levels of poverty have been consistently related to higher rates of all-cause, cancer-related, child, and infant mortality (Cohen et al. 2003; Fleisch Marcus et al. 2017; Moncayo et al. 2019; Pool et al. 2018; Pritchard and Keen 2016; Sims et al. 2007; Smith and Waitzman 1994; Taylor-Robinson et al. 2019; Toprani et al. 2016). Further, fertility among poor households has been found to be higher than fertility among the nonpoor, with the risk of an infant being born into poverty increasing with each additional child (Thiede et al. 2018), and fertility declining faster among nonpoor households than poor households over the past 50 years (Lichter 1997).

There is also a sizable body of work on migration and poverty, both on the poverty of immigrants (Bárcena-Martín and Pérez-Moreno 2012; Chapman and Bernstein 2003; Crowley et al. 2006; Joo 2013; Kazemipur and Halli 2000; Lichter et al. 2005; Peri 2011; Raphael and Smolensky 2009; Smith and Ley 2008; Thiede and Brooks 2018; Van Hook et al. 2004) and on the migration patterns of the poor (Allard and Danziger 2000; Christiaensen et al. 2019; Cushing 2005; Foulkes and Newbold 2008; Foulkes and Schafft 2010; Frey 1995; Frey et al. 1996; Levine and Zimmerman 1999). Unlike the consistent findings of research on higher fertility and mortality among those living in poverty, research on the migration of the poor has been more varied in findings and focus. Such research related to welfare policy has focused on whether generous welfare policies act as "magnets" for the poor (Allard and Danziger 2000; Cushing 2005; Frey et al. 1996; Levine and Zimmerman 1999). Evidence suggests that generous policies have either modest (Cushing 2005; Frey et al. 1996) or no effect on migration (Allard and Danziger 2000; Levine and Zimmerman 1999). Beyond welfare magnet research, work on North American poverty has found that poverty is generally elevated among immigrant households and the children of immigrants (Crowley et al. 2006; Kazemipur and Halli 2000; Lichter et al. 2005; Thiede and Brooks 2018; Van Hook et al. 2004).

Beyond the bedrock population processes of mortality, fertility, and migration, the poverty rate can also change because of transitions in and out of poverty among those in the population. Although the notion of poverty being a consistent status shared by those in an "underclass" of society persists, this has never really been true and has only become less so in the modern era (Sandoval et al. 2009). Individual periods of poverty are often brief, with most lasting one or two years (Rank and Hirschl 2002). Further, the proportion of the population that will experience at least one bout of poverty in their lives is quite high, with the majority of Americans experiencing at least one bout of poverty by age 85 (Rank and Hirschl 1999, 2001, 2015). As noted by Sandoval et al. (2009), this means that even if the aggregate poverty rate stays constant from year to year, there can be considerable movement in and out of poverty within the population. Although research on transitions in and out of poverty—particularly that by Rank and Hirschl (2015)—has successfully demonstrated the dynamic and widespread nature of poverty, it ultimately maintains a focus on poverty of people, as opposed to poverty of place.

The work that is most methodologically aligned with the framework presented here focuses on the role of population composition in determining the level of poverty within regions (Chapman and Bernstein 2003; Christiaensen et al. 2019; Foulkes and Schafft 2010; Joo 2013; Wright 1996). This work targets the effect of migration on changes in aggregate poverty rates and empirically demonstrates how the poverty rate of a place can change owing to processes besides changes in income. For example, relying on a decomposition technique similar to that advanced by Kitagawa (1955), which both Chapman and Bernstein (2003) and Wright (1996) referred to as a "shift-share" technique, Chapman and Bernstein (2003) decomposed how much of a change in poverty rates was due to changes among migrants versus nonmigrants in the United States; they found that the increase in migrants was not a significant factor in the lack of poverty decline from 1989 to 1999.

Christiaensen et al. (2019) presented an analysis using a similar approach to assess changes in poverty rates due to migration in Tanzania and found that moves from urban to rural areas decreased aggregate poverty more than moves from rural to urban areas. From a different angle, Joo (2013) used a Oaxaca–Blinder regression decomposition to determine how much of the change in U.S. child poverty from 1993 to 2010 was attributable to the increase in children living in immigrant households versus other population factors. Notably, this study found that it did not play a significant role in the changes in poverty rates over the study period. Finally, Foulkes and Schafft (2010) used census migration data to assess the migration patterns of the poor and determine how those patterns reinforced concentrated poverty. Their results showed that migration rates were higher among the poor than the nonpoor, and that the poor moved in a pattern that increased the concentration of poverty within regions.

The work of Foulkes and Schafft (2010), as well as the decomposition studies performed by Chapman and Bernstein (2003), Christiaensen et al. (2019), and Joo (2013), all address the core problem posed by the conventional poverty rate, while providing only partial solutions. The stated studies assessed only the effect of migration on the level of poverty within regions. This focus, while valuable, limits the ability of researchers to compare the various forces driving changes in the poverty level of a region (e.g., migration vs. natural increase vs. changes in resources). Reliance on the decomposition of aggregated data limits the expansion of research questions on this topic, as the conventional poverty rate remains the ultimate dependent variable. Further, the decomposition methods used in these papers, while valuable for comparing migrants to nonmigrants or the poor to the nonpoor, break down when we attempt to account for all of the components of change in the poverty population at once.

In sum, although the demographic processes of the poor have received significant attention in the academic literature, there is a notable lack of work assessing the specific ways the poverty population is changing within and between places. The dearth of literature assessing the population dynamics of poverty of place, as well as the methodological limitations posed by the work that does exist, highlight the need for a more comprehensive approach for assessing changes in poverty. The goal of many poverty alleviation policies is lifting people out of poverty. But if we do not separate changes in aggregate poverty due to transitions in and out of poverty from changes due to migration or natural increase, then any estimates of policy impacts will be biased. To remedy this weakness in the literature, the framework outlined in the next section builds on the demographic balancing equation to provide a more comprehensive framework for assessing poverty dynamics.

Poverty as a Population Process

Components of Population Change in the Poverty Population

Before discussing the specifics of the poverty balancing equation and its relevant counterparts, an introduction to the components of change relevant to the case of poverty is necessary. As with any population, the poverty population is able to change via only a handful of mechanisms: natural increase,[1] net migration,[2] and net poverty transitions. These three processes are composed of six factors: births, deaths, in-migration, out-migration, transitions into poverty, and transitions out of poverty.

When considering the size of the total population in a region, natural increase and net migration are the only processes we need to consider. However, when we shift to the poverty population of a region, there is one more important process—poverty transitions. This process, which I will refer to in formulas as *NPov* and *NAff*,[3] accounts for the entry and exit of individuals from the poor or nonpoor populations through the changing ratio of household income to the poverty threshold among the constant population (i.e., those present in the region at the start and end of the period). The poverty balancing equation framework is agnostic to the measure of poverty used. All that is assumed is that the poor and nonpoor are defined using a dichotomous criterion. Thus, relative measures or absolute measures using any version of income calculation can be applied.

Net poverty transition is presented in Eq. (3), where F represents those who enter into the poverty population because their income fell below the poverty threshold and C represents those who exit the poverty population because their income has climbed above the poverty threshold. Equation (4) presents the inverse of this for net poverty transition among the nonpoor population.[4] These three mutually exclusive

[1] Natural increase is simply the difference between births and deaths in the population and is presented in Eq. (1), where B is births and D is deaths (Rowland 2003). Natural increase tells us how much the poverty population would have grown or shrunk if there were no migration or poverty transitions in the population:

$$NI = (B - D). \tag{1}$$

[2] Net migration accounts for population change due to the difference between in-migration and out-migration of a region (Rowland 2003) and is presented in Eq. (2), where I represents in-migrants and O represents out-migrants. Net migration allows us to isolate the impact of migration on population change within a region:

$$NM = (I - O). \tag{2}$$

[3] Although affluent and nonpoor are not synonymous, I use *Aff* to refer to the nonpoor in the notation of this framework to ensure that the notation can be quickly interpreted, and thus *Aff* functions as a valuable trigger in the same way that *Pov* quickly provokes the idea of poverty.

[4] The term *net poverty transition* is adopted, as opposed to something like net income dynamic, because this process is measured by the ratio of income to the poverty threshold, not changes in personal income. As poverty thresholds adjust for family size, constant residents can enter the poor population by either

processes—natural increase, net migration, and net poverty transition—form the building blocks of the poverty balancing equation framework.

$$NPov = (F - C), \tag{3}$$

$$NAff = (C - F). \tag{4}$$

The Poverty Balancing Equation

The framework I present builds on the standard population balancing equation presented in Eq. (5), where Pop_2 represents the population at time 2, Pop_1 represents the population at time 1, NI is natural increase in the time period, and NM is net migration in the area during the time period:

$$Pop_2 = Pop_1 + NI + NM. \tag{5}$$

Although this formula is used to understand changes in the total population, with minor modifications we can adapt it to the population in poverty. For a given region, the population in poverty in that region can be expressed as the extension of Eq. (5) presented in Eq. (6). In this equation, Pov_2 represents the population in poverty at time 2, Pov_1 represents the population in poverty at time 1, NI_{pov} is the natural increase of the poverty population during the time period, NM_{pov} is the net migration of those in poverty to the region, and $NPov$ is the net poverty transition among those within the population at the start and end of the period:

$$Pov_2 = Pov_1 + NI_{pov} + NM_{pov} + NPov. \tag{6}$$

Although the formula in Eq. (6) fully captures the unique ways an individual can move into or out of the poverty population in a region, it does not fully account for the other changes within a population. Take, for example, the in-migration of those in poverty, captured by NM_{pov}. This in-migration does not have clear meaning unless we also account for the net migration of the nonpoor population. We can express these dynamics of the nonpoor in a manner similar to the way the population dynamics of those in poverty are expressed in Eq. (6). This gives us Eq. (7), where Aff_2 is the population of a region not in poverty at time 2, Aff_1 is the nonpoor population of a region at time 1, NI_{aff} is the natural increase of the nonpoor population, NM_{aff} is the net migration of the nonpoor population, and $NAff$ is the net poverty transition of the nonpoor population:

$$Aff_2 = Aff_1 + NI_{aff} + NM_{aff} + NAff. \tag{7}$$

To understand all the dynamics of the total population while accounting for the unique dynamics of $NPov$ and $NAff$, we can combine these equations to yield Eq. (8),

losing income or increasing the size of their family. For example, if a household of four was above the poverty threshold, but then had a birth that raised their poverty threshold and they did not generate more income, the whole family would now be considered poor. This would be counted at the end of the study period as one poor birth and four increases to the poverty population due to poverty transitions.

which shows that the total population of a region at time 2 is simply the sum of the poor population and the nonpoor population at time 2. After substituting Eqs. (6) and (7) into Eq. (8), we see that Eq. (9) shows that Pop_2 is the sum of two linked balancing equations:

$$Pop_2 = Pov_2 + Aff_2, \tag{8}$$

$$Pop_2 = Pov_1 + NI_{pov} + NM_{pov} + NPov + Aff_1 + NI_{aff} + NM_{aff} + NAff. \tag{9}$$

Importantly, Eq. (9) simply reduces to Eq. (5). This is because the sum of *NPov* and *NAff* will always equal zero owing to their calculation, and the other components sum to the components of change for the entire population. This collapsing nature highlights the full logic of the accounting exercise, while illustrating the fact that we can understand changes in the total population from the perspective of relative changes in the poor and nonpoor populations. Equations (10) and (11) show that the poor and nonpoor components of change sum to the total population components of change and can be arranged to produce the share of each component due to the poor versus the nonpoor. This is presented in terms of births, *B*, and share of births, $B\%_{pov}$, but can also be calculated for deaths, in-migrants, and out-migrants.[5] It cannot be calculated with *NPov* or *NAff* because of their canceling nature. The formulation presented in Eq. (11) allows us to answer the question, "What percentage of births in the overall population is made up of poor births?"

$$B_{pop} = B_{pov} + B_{aff}, \tag{10}$$

$$B\%_{pov} = \frac{B_{pov}}{B_{pop}} * 100. \tag{11}$$

The linked nature of poverty transitions between the poor and nonpoor populations highlights the difficulties the conventional poverty rate poses for a full accounting of the ways poverty of place can change, and thus the necessity of the approach detailed here. Equation (12) shows that the conventional poverty rate, *PR*, is a result of the ratio of the poverty population Pov_2 to the total population Pop_2. As shown in Eq. (8), Pop_2 is simply the sum of both Pov_2 and Aff_2. Thus, when we substitute Eq. (9) into Eq. (12), we end up with Eq. (13). This equation shows the difficulties of accounting for the population processes underlying changes in the conventional poverty rate. Changes in each component of change for the poverty population influence both the numerator and the denominator. Further, changes in the nonpoor population influence the denominator, changing the interpretation of a change in the poverty population captured by the numerator. This changing denominator via linked populations makes traditional demographic decomposition of changes in poverty rates impossible while accounting for all poverty population dynamics. Thus, it is impossible to answer questions such as, "What portion of the change in overall poverty rate

[5] Although Eq. (10) holds for the net components (e.g., natural increase), Eq. (11) becomes uninterpretable when calculated using net components because of the opposing nature of constituent terms (e.g., births and deaths).

is due to the migration of the poor?" while also accounting for the coterminous population processes occurring among the nonpoor segment of the population.

$$PR = \frac{Pov_2}{Pov_1}, \tag{12}$$

$$PR = \frac{Pov_1 + NI_{pov} + NM_{pov} + NPov}{Pov_1 + NI_{pov} + NM_{pov} + Aff_1 + NI_{aff} + NM_{aff}}. \tag{13}$$

Although the conventional poverty rate is limited in its ability to fully represent how poverty is changing in a place, by relating the poverty rate at the end of the interval to the share of each population component contributed by the poor during the interval (e.g., $B\%_{pov}$), we can understand the activity of the poor relative to their presence in the population. This approach is presented for births in Eq. (14), where $B\%_{pov}$ is divided by the poverty rate at the end of the interval PR. This value can be calculated for all non–net population factors. If this value equals 1, then the poor in a region are contributing to the population factor (e.g., births) at a level representative of their prevalence in the population. If it is greater than 1, they are overrepresented, and if it is less than 1, then they are underrepresented.

$$B\%_{pov:PR} = \frac{B\%_{pov}}{PR}. \tag{14}$$

The values generated by Eqs. (11) and (14) are valuable because they cannot only tell us about a single region, but are comparable across regions. As currently presented, this is not true for the raw components of change. In order to facilitate this necessary comparison across regions, the overall, poor, and nonpoor balancing equations can be expressed as rates of change. This means that the initial population is subtracted from both sides of the equation and each term is divided by either the person-years lived in the interval or the midyear population.[6] Equations (15) through (17) present each of the relevant balancing equations in this format, where the individual terms for one region are put in context of its specific total population or subpopulation. This has the benefit of making each term for one region more comparable with another.

$$\frac{(Pov_1 - Pov_2)}{PY_{pop}} + \frac{(Aff_1 - Aff_2)}{PY_{pop}} = \frac{NI_{pov}}{PY_{pop}} + \frac{NM_{pov}}{PY_{pop}} + \frac{NI_{aff}}{PY_{pop}} + \frac{NM_{aff}}{PY_{pop}} + \frac{NPov}{PY_{pop}} + \frac{NAff}{PY_{pop}}, \tag{15}$$

$$\frac{(Pov_1 - Pov_2)}{PY_{pov}} = \frac{NI_{pov}}{PY_{pov}} + \frac{NM_{pov}}{PY_{pov}} + \frac{NPov}{PY_{pov}}, \tag{16}$$

$$\frac{(Aff_1 - Aff_2)}{PY_{aff}} = \frac{NI_{aff}}{PY_{aff}} + \frac{NM_{aff}}{PY_{aff}} + \frac{NAff}{PY_{aff}}. \tag{17}$$

Building on Eq. (15), we can produce one final important statistic for the cross-regional comparison of poverty population dynamics. This statistic, termed *RNPov* and

[6] Although not shown explicitly in these equations, these rates will conventionally be scaled by a constant, as is common for demographic rates (e.g., per 1,000).

presented in Eq. (18), is a special case of *NPov* expressed in rate format for the total constant population, PY_{cpop}, and scaled by a constant *k*.[7] As opposed to using the person-years lived or the midyear population as the denominator, *RNPov* uses the constant population, or the portion of a region's population present at the beginning and end of the time interval. This means the value generated is a summary statistic of the poverty changes due to actual poverty transitions absent the impact of natural increase and net migration among either subpopulation. This value, which more accurately reflects the goals of many poverty policies, allows to us ask, "At what rate did poverty within the population grow, shrink, or stay the same during the time interval due to transitions in and out of poverty?" For example, if *RNPov* was scaled by a constant of 1,000 and equal to 21, the statistic would tell us that for every 1,000 people in the constant population, 21 more were in poverty at the end of the interval owing to transitions in poverty status.

$$RNPov = \frac{NPov}{PY_{cpop}} * k. \tag{18}$$

Summary and Value of the Approach

The formulas and summary statistics presented here comprise the poverty balancing equation framework for documenting the way poverty of place changes over time. All told, I have provided a variety of values that will likely be of interest to researchers and policymakers. These values are summarized in Table 1. The choice of which of these values to estimate and use as an independent or dependent variable will depend on the specific research questions being asked and the policies being tested, and it is not necessary to estimate all values presented to implement this framework. The large number of metrics presented here highlights the inherent complexity, and subsequent shortcomings, of using the conventional poverty rate as a variable of interest. Poverty rates can change or stay the same because of processes of natural increase, migration, or poverty transitions. Thus, an added level of specificity is needed if we are to accurately document the impact of economic shocks or poverty alleviation efforts. By applying this framework, demographers will be able to move beyond the conventional poverty rate and into a more specific understanding of the components of change of the poverty population.

Although all of these summary statistics are valuable for properly characterizing changes in the poverty population in a place, some clear recommendations appear warranted. When using this approach, I recommend demographers use at least one statistic for each component of change. If there is an interest in using just a few indicators, then the indicators that contrast the relative changes in the poverty population with changes in the total population will be the most effective. Thus, there are five indicators I view as the core recommended statistics of this framework: $B\%_{pov:PR}$, $D\%_{pov:PR}$, $I\%_{pov:PR}$, $O\%_{pov:PR}$, and *RNPov*.

It should be made clear that full implementation of this approach is data-intensive and currently not possible with many of the publicly available data sets demographers are accustomed to using, which could limit its immediate uptake. Thus, a brief discussion of why this framework is valuable and warrants usage, in light of current

[7] I have chosen to refer to this in the formulation of *NPov* due to the focus of the framework on the poor, but one could easily represent the rate of net poverty transition as its inverse generated from *NAff*.

Table 1 Poverty balancing equation framework formulas

	Statistic	Formula	Description
Vital Statistic Components	$NI_{pop:pov}$	$\frac{(B_{pov} - D_{pov})}{PY_{pop}}$	Rate of natural increase in the total population attributed to the poor population
	$NI_{pop:aff}$	$\frac{(B_{aff} - D_{aff})}{PY_{pop}}$	Rate of natural increase in the total population attributed to the nonpoor population
	NI_{pov}	$\frac{(B_{pov} - D_{pov})}{PY_{pov}}$	Rate of natural increase in the poor population
	NI_{aff}	$\frac{(B_{aff} - D_{aff})}{PY_{aff}}$	Rate of natural increase in the nonpoor population
	$B\%_{pov}$	$\frac{B_{pov}}{B_{pop}} * 100$	Percentage of total births attributed to the poor population
	$D\%_{pov}$	$\frac{D_{pov}}{D_{pop}} * 100$	Percentage of total deaths attributed to the poor population
	$B\%_{pov:PR}$	$\frac{B\%_{pov}}{PR} * 100$	Share of births among the poor relative to population prevalence of the poor
	$D\%_{pov:PR}$	$\frac{D\%_{pov}}{PR} * 100$	Share of deaths among the poor relative to population prevalence of the poor
Migration Components	$NM_{pop:pov}$	$\frac{(I_{pov} - O_{pov})}{PY_{pop}}$	Rate of net migration in the total population attributed to the poor population
	$NM_{pop:aff}$	$\frac{(I_{aff} - O_{aff})}{PY_{pop}}$	Rate of net migration in the total population attributed to the nonpoor population
	NM_{pov}	$\frac{(I_{pov} - O_{pov})}{PY_{pov}}$	Rate of net migration of the poor population
	NM_{aff}	$\frac{(I_{aff} - O_{aff})}{PY_{aff}}$	Rate of net migration of the nonpoor population
	$I\%_{pov}$	$\frac{I_{pov}}{I_{pop}} * 100$	Percentage of total in-migration attributed to the poor population
	$O\%_{pov}$	$\frac{O_{pov}}{O_{pop}} * 100$	Percentage of total out-migration attributed to the poor population
	$I\%_{pov:PR}$	$\frac{I\%_{pov}}{PR} * 100$	Share of in-migration among the poor relative to population prevalence of the poor
	$O\%_{pov:PR}$	$\frac{O\%_{pov}}{PR} * 100$	Share of out-migration among the poor relative to population prevalence of the poor
Poverty Transition Components	$NPov$	$\frac{(F - C)}{PY_{pov}}$	Rate of net poverty transition in the poor population
	$NAff$	$\frac{(C - F)}{PY_{aff}}$	Rate of net poverty transition in the nonpoor population
	$RNPov$	$\frac{(F - C)}{PY_{cpop}}$	Rate of net poverty transition in the constant population

Notes: B = births; D = deaths; I = in-migration; O = out-migration; F = entrants into poverty; C = exits out of poverty; PR = poverty rate.

methodological difficulties, is warranted. First, the importance of the components of change identified here should not be overlooked simply because of the methodological difficulties imposed by current data sets. Policy evaluation and demographic research presently rely on poverty rates as the dependent variable (whether the Official Poverty Rate, the Supplemental Poverty Rate, or any other) and are likely to draw inaccurate conclusions owing to the complicated influence of the components of change outlined within this framework. As will be highlighted for the case of Florida in the following analysis, it is quite possible to have dramatic movements among the poverty population and still see a stable poverty rate. Thus, the articulation of the framework I have presented represents a call to action for poverty scholars to begin pushing for better data on poverty populations across space, while also encouraging creativity in how poverty scholars generate the statistics they use as their independent and dependent variables.

Second, although not without barriers, at the time of writing, the approach *can* be fully implemented via Federal Restricted Data Centers, as well as with creative usage of resources such as Survey of Income and Program Participation, which I will demonstrate in the next section. That said, even partially implementing this approach with data sets unable to facilitate a full application goes a long way toward improving our understanding of poverty dynamics. Each component of change is valuable for scholars, and the construction of the entire poverty balancing equation is not necessary. For example, calculating just *RNPov* requires only the poverty status of a constant, nonmigratory population at two time periods. While ignoring net migration and natural increase, just calculating this value will allow poverty researchers to assess what is often of interest—the rate of people transitioning out of poverty in a place owing to changes in resources. At the very least, this framework illustrates that any study using the conventional poverty rate should acknowledge that the use of such a measure is a significant limitation because we do not know which underlying process is responsible for any change observed, or not observed, at the aggregate level.

Third, although this approach has clear application for future nationwide model-based analyses of poverty dynamics, it also presents a framework for the applied demographer to characterize poverty dynamics occurring within a city, county, or state. By applying this framework to existing government data, which applied demographers often have access to, researchers can present a clear picture to policymakers of what is, or is not, driving changes in hardship within their geographic area. To demonstrate the value of the approach to our understanding of poverty population dynamics, I will apply the poverty balancing equation to three states in the American South for the period of January to December of 2013 using the first wave of the 2014 Survey of Income and Program Participation.

Empirical Demonstration for Three Southern States

Data and Methods

The data for this analysis come from the 2014 panel of the SIPP, which is a recurring panel study of income dynamics in the U.S. civilian, noninstitutionalized population. Unlike prior panels, the 2014 panel was designed to be representative at the state level—although it should be noted that the first wave was designed to be state-reliable for only the 20 most populous states, and hence the estimates I provide for North

Carolina and Florida should be interpreted as more reliable than those for Arkansas (U.S. Census Bureau 2019). The first wave of the 2014 SIPP asked respondents to provide monthly information on income, residence, and household composition for the prior calendar year (i.e., 2013) (U.S. Census Bureau 2019). I focus on this first wave and estimate changes in the poverty populations of each state in the United States, as well as Washington, DC, between January and December of 2013.[8] The SIPP involves a unique characteristic of the population: a respondent must be alive and in the sampled household at the time of the survey to be included. Because the survey was conducted from February to May of 2014, and all 12 months of 2013 are documented, I am able to generate state-level estimates of in-migrants and out-migrants by comparing where all sampled individuals lived at months 1 and 12 of the reference year. However, I am not able to generate precise estimates of international out-migration because I do not have data on areas outside the United States. If an individual out-migrated internationally in 2013 and returned to the United States by the time of survey administration in 2014, they are included, but otherwise international out-migration is absent. Thus, international migrants are captured in the overall in-migrant estimates but are not fully captured in the out-migrant estimates. More seriously, as a result of this sampling approach there are no reported deaths. This unique characteristic makes it impossible to understand how much of the changes in the poor or nonpoor populations was due to differentials in mortality between the poor and nonpoor. Natural increase cannot be calculated. In its stead, I report the summary statistics for births alone. Given that individuals in poverty generally experience higher rates of mortality (Fleisch Marcus et al. 2017; Moncayo et al. 2019; Pool et al. 2018; Smith and Waitzman 1994), future research should work to implement more robust data on vital statistics.

The issues described above mean that I am unable to separate the error due to generating point estimates from a weighted sample from the number of deaths and international out-migrants in the total population. I account for this by calculating an overall error term for the population between the two reference months. I do so by solving for the death portion of the overall, poor, and nonpoor balancing equations using the point estimates of the other components.[9] Importantly, this value should be viewed as a combination of the number of deaths, the number of international out-migrants, and the error between the components of change in time 1 and time 2 due to weighting. I present this value alongside population estimates for the poor and nonpoor subpopulations, labeled as "error" to avoid confusion.

I calculate the components of the poverty balancing equation framework presented in Table 1 at the state level for the reference months of January and December of 2013. To do so, I determine each individual's monthly poverty status by comparing the total income of their household with their relevant poverty threshold as determined by the

[8] I focus on just the first wave because of the difficulties posed by survey attrition in each additional wave. In subsequent waves, households dissolved and individuals exited the panel. This introduces significant difficulties for this framework owing to the inability to discern whether an exit was due to death, migration, institutionalization, or nonresponse. I also focus on Type 1 individuals because Type 2 individuals—those who lived in the residence during the reference period but not at the time of the survey—do not have their own record in the data, making their inclusion infeasible.

[9] The formula for calculating deaths involves solving for deaths in the standard equation via algebra. Equation (19) demonstrates this for the poverty population:

$$Deaths_{pov} = Pov_1 + Births_{pov} + NM_{pov} + NPov - Pov_2. \tag{19}$$

Official Poverty Measure of the United States. This is an absolute measure that sets a threshold of resources needed to meet material needs across the entire country for a given household size (Iceland 2005)—although it should be noted that the threshold it sets is regularly critiqued for not adequately capturing the needs of families and setting a "low bar" for poverty (Brady 2003; Rodems and Shaefer 2020). I consider an individual to be poor if the ratio of their monthly household income to the poverty threshold was less than 1.0. As indicated above, the Official Poverty Measure of the United States has received significant criticism, and a full discussion of these valid critiques is beyond the scope of this paper (see Iceland (2005) and Jensen and Ely (2017)). Given its status and its dominance in the literature, I rely on this measure. However, it should be noted that the framework presented here can easily be calculated for any dichotomous poverty measure. All that is required is that the method of poverty classification groups individuals as poor and not poor. Thus, fully relative measures such as share of regional median income (Iceland 2013), measures that are calculated using post-tax and post-transfer income (Brady 2003), or quasirelative measures such as the Supplemental Poverty Measure (Warren et al. 2020) could easily be used for this approach.[10]

I generalize to the state level using the provided monthly person weights from the SIPP. Because of the estimation of state subpopulations, I rely on SIPP documentation to generate 95% confidence intervals around point estimates using the SIPP-provided formulas and universe-specific parameters (U.S. Census Bureau 2017). I calculate confidence intervals for all point estimates except ratios of percentages. Although I was able to estimate all values for each state using the SIPP, I present data on only three states in the American South—Arkansas, Florida, and North Carolina—in this article.[11] I use this comparative approach to facilitate an in-depth illustration of the framework. To ensure an illustrative example, I chose these states because of their varying changes in aggregate poverty rates over the study period: Arkansas saw a decrease in the poverty rate, Florida had a generally constant poverty rate, and North Carolina experienced an increase in the poverty rate. To be clear, the goal of this exercise is not to discern the causal reasons for why we see differing poverty dynamics across these three states. Instead, the goal here is to demonstrate the utility of the poverty balancing equation framework for fully describing and accounting for the complex ways poverty changes within places over time.

Results

Total population estimates, along with the underlying sample sizes and poverty rates, are presented in Table 2. All rates were calculated using the midyear population of

[10] An important dimension of poverty of place that is beyond the scope of this paper is the way income needs vary across space (Pacas and Rothwell 2020). Unfortunately, the official poverty measure does not adjust for cost of living in any way beyond family size. While I focus on the official poverty measure of the United States in this analysis owing to the constraints of available data, it should be made clear that the most sophisticated version of this approach would be one that uses the parameters of the poverty balancing equation alongside a poverty measure that adjusts for changing costs of living across space (e.g., the Supplemental Poverty Measure).

[11] Code for replication and generating results for all 50 states and Washington, DC, is available at the corresponding Open Science Framework project for this paper at https://doi.org/10.17605/OSF.IO/6XZ9D.

Table 2 Population and poverty components

Statistic	Arkansas			Florida			North Carolina		
	Estimate	Lower	Upper	Estimate	Lower	Upper	Estimate	Lower	Upper
Population Characteristics									
Poverty rate start	20.39	17.01	23.77	16.68	15.46	17.90	16.30	14.60	18.00
Poverty rate end	17.04	13.89	20.19	16.46	15.25	17.67	17.45	15.71	19.20
Poverty rate via five-year ACS	19.27	—	—	16.54	—	—	17.38	—	—
Population start	2,901.23	2,658.97	3,143.48	19,119.78	18,514.42	19,725.13	9,581.08	9,145.63	10,016.54
Population mid	2,904.28	2,661.90	3,146.66	19,208.36	18,601.69	19,815.02	9,618.50	9,182.22	10,054.77
Population end	2,911.55	2,668.88	3,154.24	19,329.59	18,721.14	19,938.05	9,666.62	9,229.29	10,103.95
Error	74.70	35.65	113.75	272.33	197.80	346.87	209.87	144.43	275.31
Sample size start	2,292.00	—	—	2,926.00	—	—	2,489.00	—	—
Sample size mid	2,313.00	—	—	2,926.00	—	—	2,503.00	—	—
Sample size end	2,370.00	—	—	2,987.00	—	—	2,570.00	—	—
Poverty Components of Change									
NPov	−206.57	−284.70	−128.44	−9.03	−16.12	−1.94	6.09	−3.02	15.20
NAff	48.06	28.15	67.98	2.11	0.45	3.77	−1.12	−2.79	0.56
RNPov	−40.50	−57.34	−23.65	−1.77	−3.16	−0.37	0.98	−0.49	2.46

Notes: Rates and population estimates are reported per 1,000. Confidence intervals were not calculated for ratios of percentages. Lower = 95% CI lower bound; Upper = 95% CI upper bound. ACS = American Community Survey

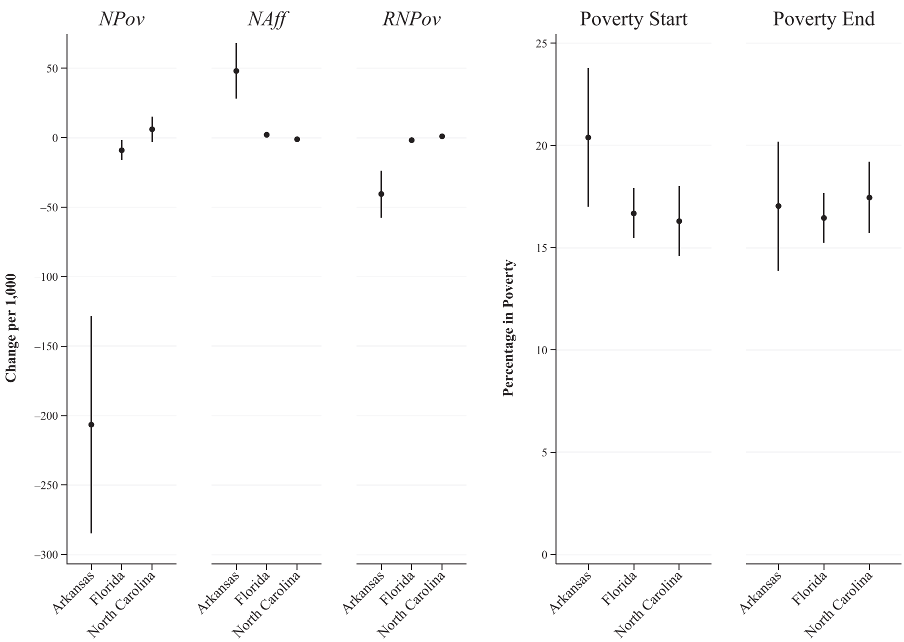

Fig. 1 Estimates of the poverty transition components of change, as well as overall poverty rates, from January to December of 2013 for Arkansas, Florida, and North Carolina, using the first wave of the 2014 SIPP. *NPov* = rate of net poverty transition among the poor population; *NAff* = rate of net poverty transition among the nonpoor population; *RNPov* = rate of net poverty transition among the constant population; Poverty Start = poverty rate at start of interval relative to midyear population; Poverty End = poverty rate at end of interval relative to midyear population. Vertical bars indicate 95% confidence intervals.

the relevant group, from the total population estimated by the SIPP for each state in the sixth month of the reference year (i.e., June of 2013). As can be seen in Table 2, although the sample for the SIPP is notably smaller than that of other sources such as the American Community Survey, the poverty rate estimates for 2013 via the SIPP are very similar to the poverty rates from the 2011–2015 American Community Survey estimates (Manson et al. 2020). The point estimates of poverty rates reflect what was stated earlier, with Arkansas seeing a decrease, Florida seeing a constant level, and North Carolina experiencing a minor increase (Table 2 and Figure 1).

As may be expected, the values of *NPov* varied among the three states, with poverty transitions playing the largest role in Arkansas. In that state, for every 1,000 poor people, there were 206 fewer in poverty at the end of the study period owing to poverty transitions alone. This was matched with an *NAff* of 48.06, meaning that for every 1,000 nonpoor people in the population, 48 were not poor at the end of the study period. These figures correspond with a large negative value for net poverty transition (*RNPov*), where for every 1,000 people in the constant population, 40 fewer were in poverty at the end of the study period. Although we see significant poverty transitions in Arkansas, the other states saw less movement, with the net poverty transition values hovering around zero. This suggests that any change in aggregate poverty rates in Florida and North Carolina over the study period did not occur as a result of poverty transitions among the constant population.

Table 3 Birth components of change

	Arkansas			Florida			North Carolina		
Statistic	Est.	Lower	Upper	Est.	Lower	Upper	Est.	Lower	Upper
B_{pop}	10.41	1.90	18.91	8.16	5.23	11.09	9.79	5.26	14.33
$B_{pop:pov}$	4.33	–1.17	9.84	2.28	0.73	3.84	3.71	0.91	6.51
$B_{pop:aff}$	6.07	–0.44	12.58	5.88	3.38	8.37	6.08	2.50	9.67
B_{pov}	22.96	–5.94	51.87	12.07	3.89	20.26	23.94	6.05	41.83
B_{aff}	7.48	–0.54	15.51	7.25	4.18	10.32	7.20	2.96	11.44
$B\%_{pov}$	41.66	—	—	28.00	—	—	37.88	—	—
$B\%_{pov:PR}$	2.44	—	—	1.70	—	—	2.17	—	—

Notes: Rates are reported per 1,000. Confidence intervals were not calculated for ratios of percentages. Est. = point estimate; Lower = 95% CI lower bound; Upper = 95% CI upper bound.

Table 3 and Figure 2 show the birth components of change for the three states. In the left panel of Figure 2 we see the overall birth rate (B_{pop}), the birth rate of the poor in reference to the whole population ($B_{pop:pov}$), and the birth rate of the nonpoor in reference to the whole population ($B_{pop:aff}$). It bears repeating that $B_{pop:pov}$ and $B_{pop:aff}$ sum to B_{pop}. In all three states, $B_{pop:pov}$ was only slightly lower than $B_{pop:aff}$. Given that the poor population represents a much smaller share of the population than the nonpoor in all three states, this indicates that the birth rate was much higher among the poor than the nonpoor. In fact, the percentage of total births attributed to the poor was 41.7% in Arkansas, 28.0% in Florida, and 37.9% in North Carolina (see Table 3). This is further contextualized in the right panel of Figure 2, where $B\%_{pop:PR}$ is the ratio of the percentage of births that are poor relative to the population prevalence of the poor. In both Arkansas and North Carolina, the poor were overrepresented in births relative to their population prevalence by a factor of greater than 2, while in Florida this overrepresentation was slightly less, at 1.7. These results highlight the fact that if we held net migration and poverty transitions constant, the portion of the population in poverty would have grown in all three states owing to births alone.

It is when we look at migration that we see the most dynamism between the poor and nonpoor populations (Table 4 and Figure 3). Beginning on the right panel of Figure 3, we can see that both in-migration and out-migration varied considerably among the three states. In Arkansas, where we saw the largest change in absolute poverty rate, we see that the poor are overrepresented in in-migration ($I\%_{pov:PR}$), but not out-migration ($O\%_{pov:PR}$). This is in contrast to Florida, where the inverse is true. In that state, we see that the poor are underrepresented in in-migration, but overrepresented in out-migration, which results in the poor population contributing a negative value, or a net out-migration, to the overall net migration. Considering the overrepresented birth rate among the poor and modestly negative level of *NPov* in Florida in 2013, it is likely that this imbalance in migration is responsible for the generally steady level of aggregate poverty over the study period. We can also see significant dynamism in migration in North Carolina, where the poor are overrepresented in both in-migration *and* outmigration. Looking at Figure 3, we can see that the overrepresentation in in-migration is greater than that of out-migration, with $I\%_{pov:PR}$ being 2.25. This overrepresentation is echoed in the left panel of Figure 3, where we see the rate contribution to net migration

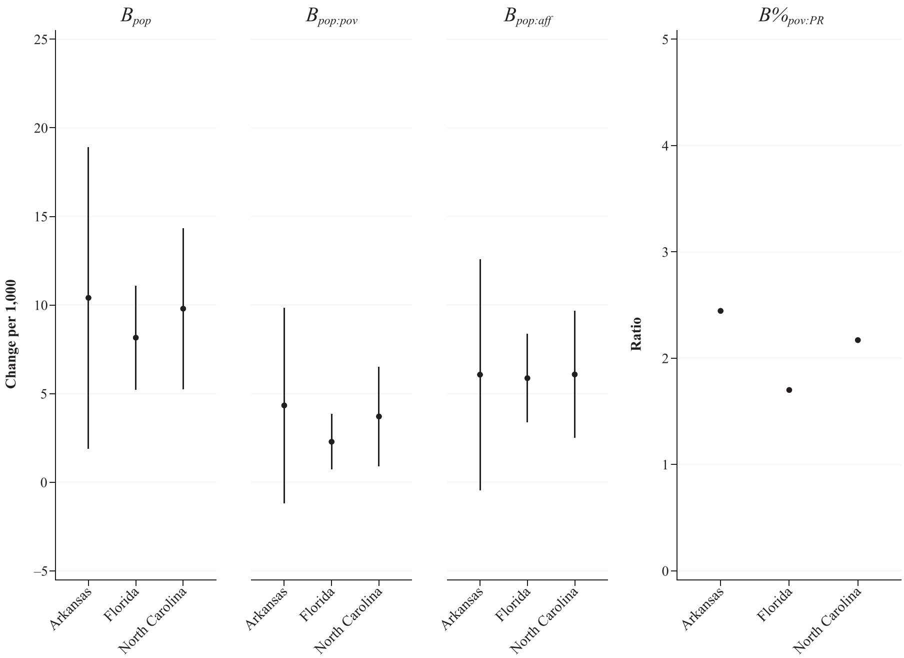

Fig. 2 Estimates of the vital statistic components of change from January to December of 2013 for Arkansas, Florida, and North Carolina, using the first wave of the 2014 SIPP. B_{pop} = total birth rate; $B_{pop:pov}$ = rate contribution to birth rate from the poor; $B_{pop:aff}$ = rate contribution to birth rate from the nonpoor; $B\%_{pop:PR}$ = ratio of percentage of births who are poor relative to population prevalence of the poor. Vertical bars indicate 95% confidence intervals (not calculated for ratios of percentages).

among the poor and nonpoor being almost equal in North Carolina despite the poor representing a much smaller share of the population. This greater overrepresentation of in-migration than out-migration among the poor can likely explain the modest increase in the poverty rate seen in North Carolina over the study period.

Summary

These three examples, while illustrating the benefits of using the poverty balancing equation framework to understand the poverty components of change, also allow us to make some conclusions about how poverty changed, or did not change, within these states over the study period. First, in Arkansas, it is clear that the majority of the decrease in the aggregate poverty rate can be attributed to actual transitions out of poverty among the constant population. We can conclude this because of the large negative rate of *RNPov*, the overrepresentation of the poor in in-migration but not out-migration, and the overrepresentation of the poor in births. Second, although Florida had a generally stable poverty rate, this does not mean people did not become poor in Florida during the study period. The steady poverty rate in Florida appears to be an artifact of an overrepresentation of the poor in out-migration, and an under-representation of the poor in in-migration, which was enough to offset any increase

Table 4 Migration components of change

Statistic	Arkansas			Florida			North Carolina		
	Est.	Lower	Upper	Est.	Lower	Upper	Est.	Lower	Upper
In-migration									
I_{pop}	29.26	15.13	43.39	32.51	26.73	38.29	35.46	26.94	43.98
$I_{pop:pov}$	6.36	–0.31	13.03	3.40	1.50	5.29	13.91	8.52	19.31
$I_{pop:aff}$	22.90	10.36	35.44	29.11	23.63	34.60	21.55	14.86	28.24
I_{pov}	33.70	–1.13	68.52	17.96	8.00	27.91	89.77	56.32	123.22
I_{aff}	28.23	12.81	43.65	35.91	29.17	42.64	25.50	17.60	33.40
$I\%_{pov}$	21.74	—	—	10.45	—	—	39.24	—	—
$I\%_{pov:PR}$	1.28	—	—	0.64	—	—	2.25	—	—
Out-migration									
O_{pop}	10.39	1.89	18.89	15.57	11.53	19.61	14.54	9.03	20.06
$O_{pop:pov}$	0.56	–1.43	2.56	4.57	2.37	6.77	4.68	1.53	7.82
$O_{pop:aff}$	9.83	1.56	18.10	11.00	7.60	14.40	9.86	5.31	14.42
O_{pov}	2.99	–7.55	13.53	24.17	12.66	35.68	30.19	10.16	50.21
O_{aff}	12.11	1.93	22.30	13.56	9.38	17.75	11.67	6.29	17.05
$O\%_{pov}$	5.43	—	—	29.36	—	—	32.18	—	—
$O\%_{pov:PR}$	0.32	—	—	1.78	—	—	1.84	—	—
Net Migration									
NM_{pop}	18.87	7.41	30.33	16.94	12.73	21.15	20.92	14.30	27.53
$NM_{pop:pov}$	5.80	–0.57	12.16	–1.18	–2.29	–0.06	9.23	4.83	13.64
$NM_{pop:aff}$	13.07	3.55	22.60	18.12	13.77	22.46	11.68	6.73	16.63
NM_{pov}	30.71	–2.59	64.00	–6.21	–12.10	–0.32	59.58	31.88	87.28
NM_{aff}	16.12	4.39	27.84	22.34	16.99	27.69	13.83	7.97	19.68

Notes: Rates are reported per 1,000. Confidence intervals were not calculated for ratios of percentages. Est. = point estimate; Lower = 95% CI lower bound; Upper = 95% CI upper bound.

in poverty stemming from an overrepresentation in births. Third, the small growth in the aggregate poverty rate in North Carolina during the study period can be primarily attributed to in-migration of the poor and overrepresentation of births among the poor. It does not appear that poverty transitions among the constant population played a noticeable role in this increase. These three examples highlight the unique and nuanced ways in which poverty of place changes over time, and how we need to look beneath the surface of changing aggregate poverty rates if we are to understand the actual dynamics of poverty.

To take this further, it is necessary to highlight the benefits of this approach for poverty policy. First, these results show that those who are poor are more likely to have children in all three states. This highlights the need to make aid available to growing families while also ensuring reproductive autonomy among women, wherein birth control methods, if desired, are accessible and affordable (Senderowicz 2020). Second, although some of the growth in poverty in North Carolina was clearly driven by in-migration, the poor were more likely than the nonpoor to both move in and out of the state. As moving is both expensive and disruptive to families, this suggests that North Carolina may benefit from a poverty policy that helps those experiencing bouts of hardship stay put where they already live. Third, these results

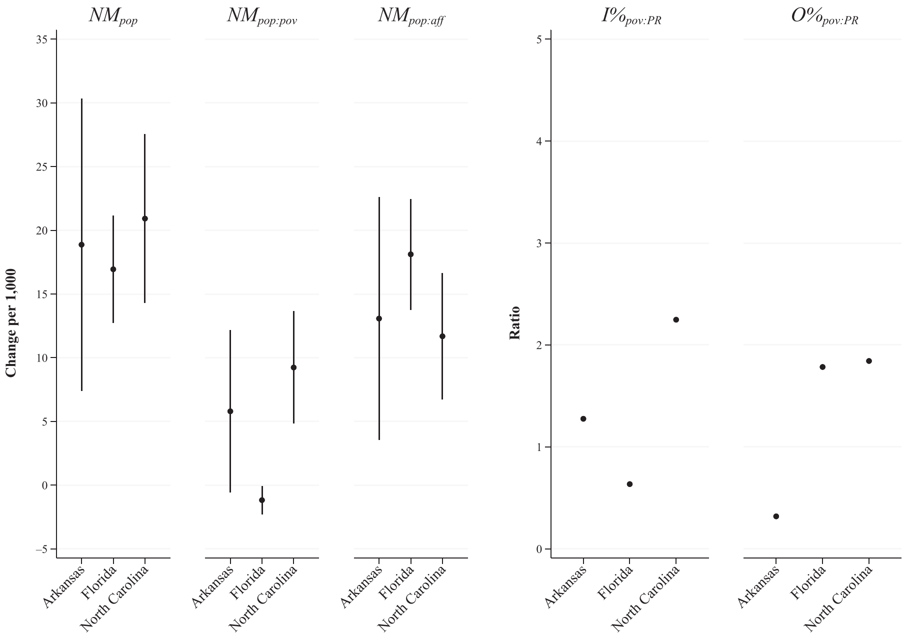

Fig. 3 Estimates of the migration components of change from January to December of 2013 for Arkansas, Florida, and North Carolina, using the first wave of the 2014 SIPP. NM_{pop} = total net migration rate; $NM_{pop:pov}$ = rate contribution to net migration rate from the poor; $NM_{pop:aff}$ = rate contribution to net migration rate from the non-poor; $I\%_{pop:PR}$ = ratio of percentage of in-migrants who are poor relative to population prevalence of the poor; $O\%_{pop:PR}$ = ratio of percentage of out-migrants who are poor relative to population prevalence of the poor. Vertical bars indicate 95% confidence intervals (not calculated for ratios of percentages).

demonstrate that in Arkansas, the year 2013 was marked by a considerable portion of the poor transitioning out of poverty. Although the cause of this is not clear, it shows that these changes were attributable to a very real increase in income relative to family size for Arkansas residents who were previously in poverty. Finally, the results for Florida show that even though the poverty rate does not markedly change, there are still poverty population dynamics occurring that can inform specific ways the state should attempt to reduce poverty. For example, the overrepresentation of the poor among out-migrants suggests that many experiencing spells of poverty are not able to escape poverty while remaining in the state—meaning that Florida may benefit from targeted policies that help families escape bouts of poverty while still remaining where they live.

Limitations

This analysis has two limitations. First, states are quite large for the application of this framework. Although I have been able to demonstrate significant dynamism in the poverty population, the vast majority of migration in the United States is not between states, but instead within and between counties (Molloy et al. 2011). Future work should use restricted data to apply this approach to smaller geographic units to better understand the migration of the poor versus the nonpoor.

Second, because of data limitations, there are no deaths in this sample, and international out-migrants are only partly captured. Future work should apply this framework to data in which deaths and international moves are fully captured. Mortality and migration among the poor are frequently higher than among the nonpoor (Cohen et al. 2003; Fleisch Marcus et al. 2017; Foulkes and Newbold 2008; Foulkes and Schafft 2010; Moncayo et al. 2019; Pool et al. 2018; Pritchard and Keen 2016; Sims et al. 2007; Smith and Waitzman 1994; Taylor-Robinson et al. 2019; Toprani et al. 2016). Thus, we cannot have a true accounting of poverty population dynamics until population processes are fully captured. This limitation highlights the difficulties posed in using this approach with only survey data, and not also with vital statistic data. Survey results will always be more susceptible to bias than more complete forms of data available through restricted data centers. In line with this, it is crucial that any statistics I have presented here be interpreted in tandem with their corresponding measures of uncertainty.

Conclusions

In this article I have presented a framework for a full accounting of the ways poverty changes within and between places. The poverty balancing equation framework improves upon prior approaches by increasing the specificity available to those interested in generating either descriptive or causal statistics of changes in poverty of place. In identifying the key poverty components of change of natural increase, net migration, and net poverty transitions among the poor and nonpoor, the main argument I have made is that the conventional poverty rate, however it is determined, is an insufficient variable for understanding poverty dynamics. Accordingly, this paper represents a call for future researchers to carefully decide whether the conventional poverty rate is the appropriate variable of analysis and to tailor research questions to the specific mechanism of poverty population change in question. If a study aims to assess the efficacy of a policy for raising people out of poverty, then *RNPov* is a more suitable outcome variable. Similarly, if researchers wish to understand how population churn due to migration is, or is not, influencing the persistence of poverty in a region, then metrics such as $I\%_{pov:\mathrm{PR}}$ or $O\%_{pov:\mathrm{PR}}$, which tell us how much the poor are over- or underrepresented in the components of migration, will be more valuable.

This study presents a unique and novel approach to fully understanding how poverty does or does not change within and between places. The framework I present is in many ways aspirational. Current scholars cannot immediately apply the full framework to many popular public data sets because of inherent limitations with the data. To be clear, this does not mean this framework is not valuable or should be ignored; instead, it means that demographers need to utilize the resources that do exist—such as Federal Restricted Data Centers—or be creative with what portions of the framework can be estimated using available public data. It also should be made clear that I am not the first to recognize this discrepancy in the usage of conventional poverty rates, as the work of prior scholars shows otherwise (Chapman and Bernstein 2003; Christiaensen et al. 2019; Foulkes and Schafft 2010; Joo 2013; Wright 1996).

However, what is presented here does push us beyond prior work by asking demographers to deeply consider what we mean when we discuss changing poverty within a place. The poverty balancing equation framework provides a common language by which future theory and study design can proceed. With the articulation provided here, we can begin to more completely chart changes in poverty beyond swings in conventional poverty rates. To do so, we should not only apply this framework to existing data, but should also ensure that future data collection efforts are designed with this framework in mind.

The poverty balancing equation framework does not provide a single summary statistic for researchers to employ. That is by design. Poverty of place is a complicated problem involving a series of specific underlying demographic processes. As I have illustrated in the summaries of Arkansas, Florida, and North Carolina, each place has its own unique puzzle of poverty in need of attention. A decrease in the poverty rate of one area does not correspond to the same decrease in another. If the goal of research is an assessment of how poverty is changing across space, then it is imperative that demographers and other social scientists use the most specific outcome variable possible. Further, if applied demographers are interested in understanding the state of poverty within a given region, decomposing poverty into the components presented here is essential for appropriately documenting the problem and directing change. The solutions to poverty of place require us to ask specific questions and assess specific mechanisms. By employing the poverty balancing equation framework outlined here, future scholars can begin this necessary work. ■

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