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Population Change and Income Inequality in Rural America

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Abstract

This paper examines the effects of population growth and decline on county-level income inequality in the rural United States from 1980 to 2016. Findings from previous research have shown that population growth is positively associated with income inequality. However, these studies are largely motivated by theories of urbanization and growth in metropolitan areas, and do not explicitly test for differences between the impacts of population growth and decline. Examining the effects of both forms of population change on income inequality is particularly important in rural counties of the United States, the majority of which are experiencing population decline. We analyze county-level data (N=11,320 county-decades) from the U.S. Decennial Census and American Community Survey, applying fixed-effects regression models to estimate the respective effects of population growth and decline on income inequality within rural counties. We find that both forms of population change have significant effects on income inequality relative to stable growth. Population decline is associated with increases in income inequality, while population growth is marginally associated with decreases in inequality. These relationships are consistent across a variety of model specifications, including models that account for counties' employment, sociodemographic, and ethno-racial composition. We also find that the relationship between income inequality and population change varies by counties' geographic region, baseline level of inequality, and baseline population size, suggesting that the links between population change and income inequality are not uniform across rural America.

Keywords

income inequality; population decline; rural United States; spatial inequality

Introduction

The contemporary United States is characterized by exceptionally high levels of income inequality relative to historical standards and to other high-income countries (OECD 2017; Saez 2017; VanHeuvelen 2018). The level of income inequality varies greatly across localities, including between rural and urban areas¹. Since 1970, non-metropolitan counties

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Conflict of Interest

The authors declare that they have no conflict of interest.

have tended to have much higher average levels of income inequality than metropolitan counties (Moller et al. 2009; Thiede et al. 2019). Although growth in urban inequality has led to significant rural-urban convergence in county-level income inequality in recent years, high levels of local income inequality have been a disproportionately rural issue over the past half-century (Thiede et al. 2019). Such income disparities represent an important challenge for rural populations and communities given that high levels of local income inequality are associated with a range of adverse social and health outcomes, the concentration of economic and political power, and corresponding challenges to community development (Chetty and Hendren 2018; Dillard 1941; Duncan 2014; McLaughlin and Stokes 2002; Piketty 2014; Smith 2012). Accordingly, high levels of inequality are a critical issue for the United States, particularly rural areas, and should be prioritized in policy discourse and decision-making. We contribute to the academic literature on inequality and seek to inform policy by providing a better understanding of the determinants of income inequality in rural communities.

Concurrent with the inequality trends described above, the rural United States has experienced major demographic changes in the past 50 years, including heterogeneous patterns of population decline and growth (Brown 2014; Lichter and Johnson 2019; Peters 2019; Thiede et al. 2017). Population decline is a characteristic trait of the rural United States: the vast majority of U.S. counties that have depopulated since 1950 are non-metropolitan; as of 2010, approximately two-thirds of non-metropolitan counties have experienced decline from their peak populations; and finally, between 2010 and 2016, rural America in aggregate experienced absolute population decline for the first time in history (ERS 2017; Johnson and Lichter 2019).² However, these aggregate trends mask significant variation between rural counties.³ While many rural areas have experienced persistent population decline via youth out-migration, low birth rates, and population aging, others have experienced significant population growth. Major sources of rural population growth include the in-migration of retirees and service workers to natural amenity destinations (Brown and Glasgow 2008, Johnson and Beale 2002; Johnson and Winkler 2015); new settlement patterns of Hispanic migrants around agricultural and food manufacturing sites (Kandel and Cromartie 2004; Lichter 2012); and the emergence of rural bedroom communities whose residents commute to jobs in adjacent urban centers (Cromartie and Parker 2014). It is important to note, however, that patterns of population decline and growth have not been uniform over time, and that there is temporal variation in these trends even within rural areas experiencing population decline for multiple decades. For example, significant proportions of depopulating rural areas experienced rebounds in population growth in the 1970s and the 1990s due to amenable economic conditions, growth

¹We define rural in terms of population size and integration with metropolitan counties, per the definition provided by the U.S. Office of Management and Budget (OMB). We use the terms “rural” (“urban”) and “non-metropolitan” (“metropolitan”) interchangeably throughout this paper.

²See Johnson and Lichter (2019) for a more detailed discussion on what constitutes depopulation.

³Although our analytical sample is only comprised of non-metropolitan counties, we include a table in the appendix to highlight the differential distribution of metropolitan and non-metropolitan counties across population change categories in our sample (Table 4). Approximately 41% of non-metropolitan counties experienced population decline during the time period, while just over 27% experienced stable growth and 32% experienced high growth. In contrast, only 15% of metropolitan counties experienced population decline, with 28.5% experiencing stable growth, and the majority of metropolitan counties, over 56%, experiencing high growth. Among counties experiencing population decline, 88.4% are non-metropolitan, and only 11.6% are metropolitan.

in employment opportunities, and residential preferences (Brown et al. 1997; Johnson and Lichter 2019; PRB 2014).

Such spatial and temporal variation in population dynamics across rural U.S. counties—including instances of both population decline and growth—provides an opportunity for new analyses of the relationship between population change and income inequality at the local level. We do so here, building on a limited but robust literature on the determinants of county-level income inequality (Brown 1975; Moller et al. 2009; Nielsen and Alderson 1997; Peters 2012, 2013; Van Heuvelen 2018). This prior work has also considered the effects of population change. However, it has largely been framed through the lens of urbanization, with a focus on metropolitan rather than non-metropolitan areas, and an emphasis on the implications of population growth rather than decline. Relatedly, it has tended to assume that the effects of population growth on inequality operate in a linear manner rather than explicitly testing for differences between the impacts of decline and growth.⁴ While the emphasis on urbanization is appropriate for contexts in which population growth is the norm, the prevalence of population gains and losses across the non-metropolitan United States necessitates an analytic strategy that accounts for the potentially differential effects of these changes.

Accordingly, our paper draws on county-level data from Decennial Censuses and the American Community Survey (ACS) to examine the respective effects of population decline and growth on county-level income inequality in the rural United States from 1980 to 2016. In addition to estimating direct effects of population change on income inequality across rural counties, we explore whether and how this association changes after accounting for other variables, such as employment, sociodemographic, and ethno-racial composition, that may be associated with both population change and income inequality. We examine how accounting for these factors modifies the estimated associations between population decline and growth on local income inequality. We then examine whether the relationship between population change and income inequality varies in strength and direction among different subsets of rural counties, as defined by geographic region, baseline level of income inequality, and baseline population size. We conclude with a discussion of policy implications for rural America based on these findings.

Population change and income inequality

Existing literature on the demographic correlates of income inequality posits that urbanization and population growth contribute to increased income inequality by spurring the expansion and diversification of local economies, increased occupational differentiation, and growth in employment sectors with a less equitable income distribution. Kuznets's seminal work "Economic Growth and Income Inequality" (1955) anchors much of the research in this area. Kuznets describes how early stages of urbanization in the

⁴One exception is Parrado and Kandel (2010), whose analysis on population growth and income inequality in rural America includes a category representing "slow growth and decline" counties. Their findings have informed our study. However, Parrado and Kandel focus on changes in income inequality over the course of one decade (1990 to 2000), and their research motivation and modeling strategy emphasizes differences between counties experiencing varying degrees of Hispanic growth. In contrast, our study examines population change over a 46-year-period and focuses on decadal patterns of population growth and decline in the total population (while controlling for variability in ethno-racial composition).

late nineteenth and early twentieth century were characterized by rapid economic and demographic growth in urban areas. According to this argument, emerging urban centers experienced significant economic differentiation as local markets grew in size and large numbers of rural migrants and immigrants arrived to pursue low-wage employment opportunities in manufacturing. Kuznets posits that although there would continue to be a small number of wealthy, well-established urban residents, the increasing number of low-skill and low-wage laborers would result in growing representation at the lower end of the income distribution—thereby contributing to higher levels of income inequality in early-stage industrialization and urbanization. More recent studies have also posited that population growth leads to higher levels of inequality since larger and more diverse economies attract both highly-skilled and low-skilled workers, producing a joint migration stream which leads to higher levels of occupational differentiation and income inequality (Moller et al. 2009; Nielsen and Alderson 1997; Parrado and Kandel 2010; Rey 2018; Van Heuvelen 2018). The implication is that economic and demographic growth places upward pressure on inequality by increasing economic complexity and heterogeneity. However, the work of both Kuznets and contemporary scholars is largely predicated on cases of economic and demographic growth in urban areas⁵. Less is known about the implications of population change on income inequality within rural areas where population decline is more prevalent, or whether population decline has non-symmetric effects on income inequality relative to population growth.

In addition to the direct association between population change and income inequality, rural counties experiencing population decline or growth are characterized by other economic and demographic conditions that are likely to influence localized patterns of income inequality. We expect that three sets of characteristics and processes play particularly important roles. First, population decline and growth may correspond to changes in the economic composition of a given locality. Employment opportunities are not only a major driver of in-and out-migration and subsequent patterns of population decline and growth; employers may also be attracted to (or retreat from) places with a growing (or declining) supply of workers and consumers (Broadway 2007; Johansen and Fuguitt 1979; Johnson 1985; Thiede et al. 2017). For example, highly-mechanized sectors, such as energy extraction, are not dependent on access to a large supply of workers and can therefore operate in places with small or declining populations. In contrast, rural economies based in non-durable manufacturing (e.g., food processing and textiles) and some types of services (e.g., healthcare and education) may be more dependent on access to large and socioeconomically-diverse workforces and consumer bases. These examples suggest that changes in population size and industrial composition may be correlated, with clear implications for local income inequality given wage disparities within and between sectors (Rey 2018). For example, population growth is expected to result in growing inequality if it is correlated with a decline of industries with relatively equal income distributions, (e.g., manufacturing) and

⁵Although Kuznets emphasizes the changing income distribution in urbanizing economies, he also briefly addresses the characteristics of rural economies, which he describes as being smaller, with a lower per capita income, and a narrower income distribution due to the organization of agricultural production around small enterprises. Kuznets also acknowledges, however, that the process of farm consolidation was already underway in the 1950s (1955: 16). He thus draws attention to the process of economic restructuring and sustained depopulation in agricultural-dependent counties that occurred throughout the second half of the twentieth century (Johnson and Lichter 2019).

growing employment in industries with a more polarized income distribution (e.g., services; hospitality, tourism and recreation) (Brady and Wallace 2001; Brown and Glasgow 2008; Peters 2013; Van Heuvelen 2018).

Second, patterns of population growth and decline are associated with changes in sociodemographic composition, such as the age distribution and levels of educational attainment. As discussed above, population growth in some rural counties is fueled by the in-migration of retirement-age populations, which contributes to local population aging (Nelson 2014). Given differences in income levels across the age distribution, such shifts in age structure will lead to changes in the income distribution as well. Furthermore, prior research on migration to rural amenity and retirement destinations demonstrates that in-migrants are often positively selected on income, education, and other socioeconomic factors, which results in increased inequality in comparison with both longer term populations and service workers attracted to these growing rural communities (Brown and Glasgow 2008; Nelson 2014; Winkler, Cheng and Golding 2012). In contrast, population decline is often driven by the out-migration of younger residents, particularly young adults with higher levels of education and higher earnings potential (Carr and Kefalas 2009; Glasgow and Brown 2012). Patterns of youth out-migration and brain drain may leave behind a relatively homogenous population of low-income residents (Nelson 2014). Lastly, increases in the proportion of single-parent families in rural areas – especially female-headed households – has been well-documented over recent decades (Snyder and McLaughlin 2004; Mattingly 2020). Increasing diversity in family structure may lead to increasing inequality between households since single motherhood in particular is associated with economic precarity, and the subsequent concentration of these households in the lower end of the income distribution (Carson and Mattingly 2014; McLaughlin 2002; Moller et al. 2009).

Third, patterns of population growth and decline in the rural United States may be correlated with changes in county ethno-racial composition (Carr et al. 2012; Lichter 2012; Johnson and Lichter 2016; Lichter et al. 2015). For example, many rural counties, especially those with large food processing employers, have experienced increases in population because of growth in their Hispanic populations (Johnson and Lichter 2016; Lichter 2012). Likewise, many rural areas in the Midwest and the South are respectively experiencing the out-migration of younger non-Hispanic white and black residents (Johnson and Winkler 2015), which may result in changes in counties' ethno-racial composition. Due to well-documented processes of racial discrimination and the disproportionate levels of socioeconomic disadvantage among many minority populations (Huffman and Cohen 2004; Laird 2017; McCall 2001), increased ethno-racial heterogeneity is expected to be positively associated with economic heterogeneity and subsequently higher levels of income inequality (Moller, Alderson, and Nielsen 2009). For example, in some locations Hispanic population growth is driven by employment opportunities in agriculture or non-durable manufacturing (e.g., food processing or meatpacking industries), where Hispanic workers may fall lower in the income distribution relative to many of the longer-term residents of these new destinations (Broadway 2007; Lichter 2012; Parrado and Kandel 2010). Increases in ethno-racial heterogeneity can be expected to occur in other instances of population growth and decline so long as income is distributed unevenly between groups. The implication is that the

population growth in such places may result in growing ethno-racial diversity and thus, all else equal, growing income inequality.

Given the discussion above, we expect population growth and decline to be associated with significant changes in county-level income inequality. Population growth is believed to directly increase inequality by increasing the complexity and heterogeneity of local economies. However, less is known about the effects of population decline: are they simply the inverse of population growth effects, or are they fundamentally different? Relatedly, changes in population size and composition may also cause or be correlated with other processes that influence income inequality, thereby obscuring the effect of population change. It is therefore necessary to account for the effects of employment, sociodemographic, and ethno-racial composition to determine if population change, in and of itself, is an important determinant of county-level income inequality in rural America. The extent to which these structural and compositional changes reinforce or offset the direct effect of population change remains an open question, which we address in this paper.

Analytic strategy

Data

We analyze data from the 1970 to 2000 Censuses and the 2006-2010 and 2012-2016 ACS, using county-level summary files extracted from IPUMS-NHGIS (Manson et al. 2018). Counties are selected as the areal unit for this analysis since they represent the smallest unit where consistent census data are available over multiple decades. Although counties are an imperfect proxy of localized economic and social conditions, their use provides a helpful reference to other county-level studies that examine the interplay between localized spatial dynamics and economic, demographic, and social processes, such as poverty and inequality (Curtis et al. 2012; Curtis et al. 2019; Curtis & O'Connell 2017; McLaughlin 2002; Moller et al. 2009; Nielsen and Alderson 1997; O'Connell 2012). We harmonize county boundaries to account for boundary changes and other modifications that have occurred across the study period, and limit the analytic sample to non-metropolitan counties in the continental United States. We classify counties as non-metropolitan using the U.S. Office of Management and Budget (OMB)'s 1993 delineations, which are based on the size of counties' urbanized areas and the degree of commuting to metropolitan cores (Brown et al. 2004). Year 1993 was selected because it represents the approximate midpoint of our study.⁶ We use a fixed definition, applying the 1993 OMB classification to all counties in each year of our analysis to ensure stability of the metropolitan/non-metropolitan status over time.⁷ Our final sample covers 2,264 non-metropolitan counties (74% of total U.S. counties). As described below, we model inequality for the following five intervals (1980, 1990, 2000, 2010, and 2016), producing an analytic sample of 11,320 county-decade observations.⁸ The data are described in Table 1.

⁶We ran a sensitivity analysis using an alternative OMB 2013 delineation, and the results support our main conclusions. Results of this analysis are available upon request.

⁷The fixed approach ensures that we do not confound estimates of rural-urban differences over time with the metropolitanization process as counties experiencing population growth transition from non-metropolitan to metropolitan, or as counties experiencing population decline transition from metropolitan to non-metropolitan (Fuguitt, Heaton, and Lichter 1988).

Measures

Our dependent variable is income inequality, measured in each census or survey year (t). This outcome is operationalized as the Gini index, a widely used measure of income inequality that ranges from 0 to 100—with 0 representing perfect equality and 100 representing perfect inequality (Allison 1978; Firebaugh 1999). The Gini index is typically calculated using a continuous measure of income. However, we analyze public-use summary files, which only provide the number of households that fall within income bins or categories (e.g., respective counts of households with incomes of \$0-\$9,999, \$10,000-\$19,999, ..., \$45,000+). Moreover, we do not know the distribution of households within the income bins or the values that correspond to the upper bounds of the top income bin. Accordingly, we use the robust Pareto midpoint estimator to address these limitations (von Hippel, Hunter and Drown 2017). This method assigns a midpoint to all income bins (e.g., the income bin \$20,000 to \$29,999 is assigned the value of \$25,000) below the top-two intervals. The top income bin does not have an upper bound, and the next highest income category is assumed to have a non-uniform distribution. Following von Hippel and colleagues (2017), we account for the skewed distribution of the upper tail of the income distribution by assuming that household incomes in these bins follow the Pareto distribution. The harmonic mean of household income is then used to calculate the values in these top two bins for each county in a given year. According to these estimates, income inequality across varies greatly across the non-metropolitan county-year observations in our data (Table 1). The mean Gini index is 42.7 (SD = 3.7), with a range of 19.1 to 71.2.

The independent variable of principal interest is the rate of population change during the inter-censal or inter-survey period prior to each census or survey. For each period, non-metropolitan counties were classified as experiencing one of three types of population change: decline, stable growth, or high growth. The thresholds used to define these categories were defined in the context of the average rate of population change for non-metropolitan counties across all periods (4.9%).⁹ A county was classified as “declining” in a decade if it experienced any population loss; as “stable growth” if it had a population growth rate from 0% to 4.9%; and as “high growth” if it experienced a population growth rate of 4.9% or higher. Note that this measure is lagged, capturing the changes in population that occurred during the period prior to and through year t in which inequality was measured. For example, while 1980 is the first year for which we measure income inequality, this outcome is modeled as a function of county population change from 1970 to 1980.

We focus on three sets of control variables representing county-level employment, sociodemographic, and ethno-racial composition. First, in the suite of variables representing employment composition, we include the respective proportions of working-age residents employed in seven major Census-designated industries: services¹⁰, manufacturing, retail

⁸The last time interval between the 2010 census and the 2012-2016 ACS is less than a decade. For ease of interpretation, however, we use “period” and “decade” interchangeably when referring to our county observations and our fixed effects models.

⁹The standard deviation of population change in non-metropolitan counties is 14.5% across all periods. The minimum and maximum values are -44.5% and 232%, respectively.

¹⁰Services is a broad category that consists of several sub-industries: Business and repair services; Arts, entertainment, recreation, accommodation and food services; Professional, scientific, management, administrative, and waste management services; Educational services, health care, and social assistance; Personal services; and Other services, except public administration.

trade, agriculture¹¹, construction, transportation, and public administration. Individually each of these seven sectors employs five percent or more of working-age residents in all county-years of our dataset, and together they employ over 90% of working-age residents. We also include the unemployment rate for each year t among this block of employment composition variables. Second, our measures of socioeconomic composition include the proportion of residents aged 65 or older; the proportion of family households headed by a single mother; and the respective proportions of residents with less than a high school degree and residents with a Bachelor's degree or more. Third, we measure ethno-racial composition as the proportion of the population that is non-Hispanic black, the proportion of the population that is Hispanic, and the proportion of the population that is foreign-born. Each of these variables is measured during the same year t as the outcome variable of population change. Table 1 provides the descriptive statistics of the compositional variables during the 1980-2016 period.

Statistical models

We estimate a series of multivariate regression models in which county-level income inequality is a function of recent population change, other time-varying compositional variables, and both county and decade fixed effects.¹² County-fixed effects control for all time-invariant county characteristics, and decade fixed effects control for all decade-to-decade changes that are common across the sample. We therefore capture the effects of population change using variation within counties as well as changes over time that differ from the average temporal trend across all non-metropolitan counties. Standard errors are adjusted for repeated observations within counties. We begin by estimating so-called naïve models of the relationship between population change and income inequality. This model includes fixed effects but no other control variables. We then estimate three models that respectively introduce sets of variables representing county employment, sociodemographic, and ethno-racial composition. We evaluate whether and how the introduction of such variables changes the coefficients on the population change variables. We do so for each set of items individually, and then estimate a fully-controlled model that includes a full suite of the explanatory variables.

Finally, we estimate a series of interaction models to determine whether the association between income inequality and population change varies by region, baseline level of income inequality, and baseline population size. This step is important given that many social and economic processes unfold unevenly across space and time (Curtis et al. 2019), and we expect that the effects of population change may vary between different types of counties. We define regions using the U.S. Census Bureau's typology, which designates the four regions as the Northeast, Midwest, South, and West. We expect differences in population effects across regions given spatial variation in baseline demographic, economic, and institutional structures (Baker 2019; Duncan 2014; McLaughlin 2002). For example,

¹¹This category encompasses Agriculture, Forestry, Fishing, Hunting, and Mining.

¹²County characteristics are likely to be spatially correlated with the characteristics of neighboring counties. Although this issue is typically addressed by adjusting for spatial autocorrelation in spatial regression analyses, our analytic sample is exclusively comprised of non-metropolitan counties. As such, counties are non-contiguous in our model, and it is therefore not necessary to test for spatial autocorrelation.

the historical racial context of places may shape whether and how population change, and the corresponding shifts in ethno-racial heterogeneity it may entail, influences inequality. The history of slavery, debt bondage, and Jim Crow segregation in the South represents a specific example of the interplay between region, race, and inequality (Curtis and O'Connell 2017; Duncan 2014; O'Connell 2012). Given how we operationalize population decline and growth (see below), regional differences may also capture regional differences in the magnitude of population changes not captured in the independent variables (e.g., rapid population decline in the Great Plains region; Johnson and Lichter 2019). We also test for interactions with baseline inequality to capture potential floor or ceiling effects, below and above which it is unlikely for inequality to increase or decrease. Baseline income inequality is operationalized as the county Gini index in 1980. We anticipate that the effects of population growth and decline may vary by initial population size, since the decadal rates of population growth used to define our independent variables represent different absolute changes in population. We therefore include an interaction term for baseline population, defining the baseline population as the county population size in 1970 (the baseline year for the population change variable of interest).

Results

Overall estimates

The first set of multivariate models are displayed in Table 2. We begin with a naïve model that predicts income inequality among non-metropolitan counties as a function of population change, net of county and decade fixed effects (Model 1). We find that population decline is associated with an approximately 0.264 point-higher Gini index compared to counties experiencing stable growth, as defined above. In contrast, counties experiencing a high rate of population growth have a Gini index that is approximately 0.280 points lower than what would be expected if they were experiencing a stable growth rate. These differences are not only statistically significant but appear substantively meaningful as well. As one point of reference, consider that the average Gini index in rural counties increased from 41.6 in 1980 to 43.3 over the entire 1980-2016 period we examine (data not displayed). The marginal effects of population decline and growth represent more than 15 percent of this overall change.

In the next three models we examine whether and how the relationship between population change and income inequality in the rural United States changes when accounting for county-level employment, sociodemographic, and ethno-racial composition. As we have argued above, such changes are expected given the correlation between population change and other demographic and economic changes that may influence inequality.¹³ We begin by introducing controls for employment composition (Model 2). The absolute size of the coefficient estimate for population decline is reduced from $\beta = 0.264$ in Model 1 to $\beta = 0.215$ in Model 2, and the coefficient for high population growth is reduced from $\beta = -0.280$ to $\beta = -0.171$. These results suggest that if employment composition was not correlated with

¹³Consistent with this paper's theoretical emphasis on the relationship between population change and income inequality, our discussion of the analytical results focuses on the coefficients for population change (decline and growth relative to stability) rather than the significance and direction of the compositional variables.

patterns of population change, the effects of both population decline and growth (relative to stable growth) would have been smaller (absolutely) than observed. The next model controls for sociodemographic composition (Model 3). Similar to the effect of controlling for employment composition, the association between income inequality and population change (decline and growth) decreases in size when these sociodemographic controls are added to the model. The coefficient estimate for population decline decreases in absolute terms from $\beta = 0.264$ in Model 1 to $\beta = 0.203$ in Model 3, and the coefficient estimate for population growth decreases in absolute terms from $\beta = -0.280$ to $\beta = -0.170$. The implication is that changes in employment and sociodemographic composition contributed to the respective inequality-increasing and inequality-reducing dynamics in declining and rapidly growing counties.

Model 4 includes controls for ethno-racial composition. In contrast to the previous models with employment and sociodemographic controls, the coefficient estimate for population decline increases in size when controlling for ethno-racial composition, moving from $\beta = 0.264$ in Model 1 to $\beta = 0.401$ in Model 4. Population decline is associated with a larger increase in inequality when holding ethno-racial composition constant. The implication is that changes in the proportions of Black and Hispanic residents offset the inequality-increasing effect of population decline. Similar to the models with employment and sociodemographic controls, the coefficient for population growth decreases in size when the ethno-racial controls are added to the model, moving from $\beta = -0.280$ in Model 1 to -0.168 in Model 4. In sum, while the inequality-increasing effects of population decline are reinforced when accounting for changes in employment and sociodemographic composition, this effect is offset when accounting for changes in ethno-racial composition among non-metropolitan counties. The inequality-reducing effects of population growth are uniformly reinforced when accounting for changes in employment, sociodemographic, and ethno-racial composition.

In the final model, we simultaneously account for employment, sociodemographic, and ethno-racial composition (Model 5)¹⁴. The coefficient estimate for population decline in this fully-controlled model is $\beta = 0.144$, a full 0.120 points smaller than coefficient estimate from the naïve model ($\beta = 0.264$). Nonetheless, it remains positive and statistically significant, indicating that population decline is associated with increased inequality in and of itself. The coefficient for high rates of population growth is also reduced in absolute terms, moving from $\beta = -0.280$ in Model 1 to $\beta = -0.125$ in Model 5. Of note, the coefficient estimate for rapid growth is only marginally significant ($p < 0.10$) when the full suite of control variables is introduced. In the absence of changes in employment, sociodemographic, and ethno-racial composition, the respective effects of population decline and growth in non-metropolitan counties would have been reduced (absolutely) by approximately 45 percent and 55 percent relative to the naïve models. The implication is that the economic, social, and demographic changes that accompany population change tend to reinforce the effects of population decline and growth on inequality. Importantly, however, the results also suggest that population change – and particularly population decline

¹⁴Of note, the full model explains considerably more variance than the naïve or intermediate models; the overall R^2 increases from 0.030 in Model 1 to 0.382 in Model 5.

– continue to be independently associated with income inequality in non-metropolitan counties even after accounting for many possible confounding factors (Model 5).

Interaction effects

We next examine whether the effects of population decline and growth vary across different categories of rural counties (Table 3). First, we test for regional variation in the effects of population change on inequality among non-metropolitan counties (Model 6). We find evidence that the effects of both population decline and growth vary regionally. Our interaction models show that population decline has null effect in the Northeast and that the effect does not vary significantly between this and other regions. However, additional analyses show that the net effect of population decline is significantly and positively associated with income inequality in the non-metropolitan South (net $\beta = 0.321$) (results not displayed). We find no evidence of similar effects in other regions. We find that rapid population growth is associated with significant reductions in income inequality among non-metropolitan counties in the Northeast ($\beta = -0.492$). However, the absolute magnitude of this effect is significantly smaller in the Midwest (interaction $\beta = 0.364$) and the South (interaction $\beta = 0.494$). Indeed, the net effect of population growth is not statistically significant in the Midwest, South, or West, which indicates that the inequality-reducing effect of rapid population growth is concentrated in the Northeast.

Next, we examine variation in the effects of population decline and growth according to counties' initial level of inequality in 1980 (Model 7). The effects of population decline do not vary significantly according to counties' baseline inequality levels. However, the association between rapid population growth and income inequality does vary significantly between counties that have low or high initial levels of inequality. Point estimates show that population growth would reduce inequality by 4.741 in a place (theoretically) characterized by perfect equality, with a Gini index of 0, at the start of the study period. However, the effect of population growth is moderated by 0.111 points for each one-point increase in the baseline Gini index. For example, the effect of population growth would be just -0.301 for a non-metropolitan county that started the study period with a Gini index of 40 in 1980.

Lastly, we test for heterogeneity in the relationship between population change and income inequality according to the initial (1970) population size of non-metropolitan counties (Model 8).¹⁵ We find some evidence that the effects of population decline and growth vary by baseline population size. The interactions between baseline population and both population decline and growth are at least marginally significant ($p < 0.10$), and operate in a manner that suggests that the respective effects of these changes are concentrated in relatively large non-metropolitan counties. For example, point estimates suggest that population decline has null effect in non-metropolitan counties with the smallest populations, but that this association is strengthened by 0.055 points per every 10,000-person increase in the county's initial population size. Likewise, for every 10,000-person

¹⁵We measure baseline population in 1970, which represents the start of the first inter-censal period over which we measure population change. We also run Model 8 using 1980 as the baseline population year. The interaction term for Decline x Baseline-pop-1980 is statistically significant at the 0.05 level rather than the 0.10 level. The results of the interaction terms for baseline population change are generally robust, however, to using year 1980 or 1970.

increase in their baseline population size, the effects of rapid population growth are offset by 0.146 points. These coefficient estimates should be interpreted with some caution, however, and with reference to the distribution of initial population sizes among the non-metropolitan counties in our sample (mean = 19,125; SD = 17,481; min = 164; max = 160,089). Overall, the results of these interaction models demonstrate that the effects of population change are not uniform across all non-metropolitan counties. They are instead sometimes conditioned upon the existing economic and demographic structure of these counties.

Sensitivity Tests

To test the sensitivity of results to our measure of population change, we estimated several models using alternative independent variables in the appendix (Table 5). As a first alternative, we identified terciles of decadal population change across the sample. The values for decadal population change rates in the three terciles ranged from -58.7% to -0.2% in the bottom tercile; -0.2% to 8.8% in the middle tercile; and 8.8% to 232.0% in the upper tercile.¹⁶ We re-estimate the fully-controlled regression model using the alternative tercile measure as the main predictor (Table 5, Model 9). Rapid population growth remains negatively associated with income inequality among non-metropolitan counties in this specification, but population decline is no longer a significant predictor. The difference between this result and our main model may be due to the fact that a substantial proportion of county-decade units in the middle tercile (approximately 22.5%, N = 850 county-decades) experienced population decline. In contrast, the reference category in the main model (Model 5) does not include any counties experiencing population decline.

Second, we construct a four-category variable that distinguishes between rural counties experiencing large declines in population, modest declines in population, stable growth, and high rates of growth (Table 5, Model 10). This variable was calculated using two different averages in between-period population change among all county-decades in the dataset: the average for all counties that experienced population decline during a given decade (-5.7%) and the average for all counties that experienced population growth (12.2%). A county is classified as experiencing “large decline” in a decade if it was experiencing population loss at a rate of more than 5.7%; “modest decline” if the rate was from -5.7% to zero; “stable growth” (reference) if the rate was zero to 12.2%; and “high growth” if the rate was 12.2% or more. Although the distinction between large-decline and stable-growth counties is not statistically significant, the respective differences between modest-decline counties and rapid-growth counties, relative to stable-growth counties, are statistically significant. Modest decline is associated with increased inequality, and high rates of population growth are associated with reduced inequality. Thus, the results in Model 10 remain broadly similar to our main model.

Finally, we estimate a model that includes a continuous measure of population change, measured concurrent to the outcome and control variables for all periods from 1970 to 2016 (Table 5, Model 11). The coefficient estimate for population change is not statistically significant, reinforcing the importance of explicitly measuring and modeling population

¹⁶The full, non-rounded, value cut points for the three categories are as follows: -.5873953 to -.0015411 (bottom tercile); -.001538 to .0883991 (middle tercile); and .0884002 to 2.320075 (upper tercile).

decline and growth in analyses of income inequality. Continuous measures of population change do not explicitly distinguish between the effects of population decline and growth on income inequality, which our results suggest may not be symmetrical.

Discussion and Conclusion

In this paper, we provide new insights into the relationship between population change and income inequality. Previous studies on population change and income inequality are largely predicated on theories of urbanization in a growing metropolitan context. Our empirical analysis is motivated by classical urbanization theories in income inequality (Kuznets 1955), but we also draw on literature in rural sociology by identifying the distinctive demographic and economic characteristics of rural areas and explicitly modeling the respective effects of rapid population growth and population decline in the rural United States. The spatial and temporal variation in rural population patterns make such an approach appropriate (Johnson and Lichter 2019; Peters 2019). Our results support three major conclusions. First, although decade-on-decade population decline in non-metropolitan counties is associated with increases in income inequality relative to counties experiencing more stable rates of growth, rapid rates of growth are associated with decreases in income inequality. While the latter finding on population growth fades to marginal significance when accounting for other county-level employment, sociodemographic, and ethno-racial characteristics, population decline maintains statistical significance.

Second, the introduction of three suites of control variables across our models suggests that changes in economic structure, sociodemographic characteristics, and ethno-racial composition have, on net, reinforced the effects of population change on income inequality. Changes in employment and sociodemographic structure have reinforced the inequality-enhancing effect of population decline. Notably, however, the intermediate models suggest that changes in ethno-racial composition offset these effects. In contrast, changes in all three sets of compositional factors reinforce the inequality-reducing effect of population growth across the non-metropolitan United States. It is also important to note, however, that the introduction of control variables does not fully explain the association between population change and income inequality within rural counties (although the effect of population growth fades to marginal significance). Our conceptual framework suggests that the remaining independent effects of population change can be explained by population-related changes in economic complexity and diversity. However, the direction of our estimates counters that expectation. This conclusion is also confirmed in a supplementary analysis that controls for an entropy measure of economic diversity, where the coefficient representing economic diversity is not statistically significant (Appendix, Table 6).¹⁷

Thirdly, the effects of population change, particularly population growth, vary systematically among different types of non-metropolitan counties. We find evidence of regional variation

¹⁷This model employs an entropy measure of economic diversity (Brown and Greenbaum 2017), which captures the distribution of civilian workers across the ten industries designated by the census (Table 6, Model 12). The entropy index has a minimum value of 0, which would correspond to a county with only one industry, and is positively associated with the relative diversification of a county's economy. Following Brown and Greenbaum (2017), the economic diversity index for county *i* in a given year is the sum of the absolute value of the product of the proportion employed in each industry (*s*) and the natural log of the proportion employed in each industry:

in patterns of population decline and growth relative to stable rates of population change: the inequality-reducing effects of population growth are centered in the Northeast, and the inequality-increasing effects of population decline are concentrated in the South. The effects of population change also vary by baseline inequality levels. Rapid population growth reduces inequality in counties with initially low levels of inequality, but this effect is moderated and offset among counties with high baseline inequality. This result suggests that high inequality may be persistent, such that population growth within high-inequality areas does not necessarily reduce economic disparities in those areas. Finally, the effects of population growth and decline are concentrated in counties that were relatively populous in 1970. This finding suggests that our results are unlikely to be driven by the smallest counties in our sample.

Although we have established the presence and directionality of these relationships in this paper, more research is needed to understand the underlying mechanisms that drive them. The lack of pre-existing literature on population decline and income inequality gives us less of an idea of what to anticipate for this relationship, but the finding on population growth deviates from previous studies where the relationship between population growth and income inequality is positive. We briefly speculate on possible explanations for our results here. With regards to our finding that population decline is associated with decreasing inequality, depopulating rural communities often experience deteriorating economic conditions (Walser and Anderlik 2004); this dynamic may lead to widening gaps between individuals pushed into the lowest wage brackets (or out of the labor force entirely) and those who are able to attain the well-paying jobs that remain. Although the estimate for population growth lacks precision when a full set of control variables is included in the model, this finding suggests that rural population growth is associated with relatively inclusive economic development. This dynamic would be consistent with other studies of growing rural communities (e.g., rural retirement destinations) that experience an expansion of employment opportunities at a range of wage levels (Brown and Glasgow 2008). We suspect that the distinctiveness of our results may be explained by the delineation between population growth and decline in our model, as well as the non-metropolitan context of this study. Extensions of this research, however, should investigate explanations for these relationships as well as the influence of other factors that were not observed in our data. Accordingly, we propose three areas of research to more closely examine the relationship between population change and inequality in the rural United States.

First, there has been little attention to the particular ways that economic policy and population dynamics interact to influence inequality in rural areas specifically. Factors such as corporate tax incentives, unionization rates, and minimum wage laws have been shown to be predictors of inequality at the subnational level in prior work (Patrick and Stephens 2019; Moller et al. 2009; Van Heuvelen 2018; Western and Rosenfeld 2011), but there are clear

$$\sum_{s=1}^S \left\| \begin{pmatrix} e_{is} \\ e_i \end{pmatrix} \ln \begin{pmatrix} e_{is} \\ e_i \end{pmatrix} \right\|$$

extensions for analyzing the distinctive policy context and employment characteristics of rural America (ERS 2017). For example, urban manufacturing sites relocated to rural areas in the 1980s and 1990s for the lower costs of labor, property, and production (Broadway 2007; McLaughlin 2002).¹⁸ How does inequality change as local and state governments implement policies to retain and attract individuals, families, and businesses? Moreover, how does inequality change as industries contract in rural areas with smaller, less diverse economies and weaker labor protections? Future research should evaluate whether and how the effects of policy environments vary between rural and urban areas. This is especially important given that patterns of population growth and decline are closely tied to economic patterns of growth and contraction (Johnson and Lichter 2019) and that policy environments are likely to buffer or exacerbate the impact of these changes on inequality.

Second and relatedly, extensions in inequality research should consider the question of endogeneity in the relationship between economic and demographic change (Brown and Argent 2016; Hartt 2018). For example, population decline is often assumed to interact with economic change via a feedback loop in which the loss of key industries leads to job loss, population loss, and then further economic decline; the reverse is often assumed to be true for demographic and economic growth. Although our methodology has followed the precedent of other longitudinal analyses by modeling income inequality as the dependent variable (McLaughlin, 2002; Moller, Alderson, & Nielsen, 2009; Nielsen & Alderson, 1997; VanHeuvelen, 2018), we cannot be certain that our estimates are entirely free from such endogeneity bias. Analytical extensions include conducting cross-correlational analyses, exploiting exogenous changes in population, and conducting qualitative case studies that provide insight into historical context and the temporal ordering of demographic and economic change (Hartt 2018), as well as their impact on the income distribution in a given area.

Third, future research should elaborate on how the different components of population change, including migration, contribute to regional patterns of income inequality (Brown and Argent 2016). Our study only examines population change and changes in the proportion of residents with select employment, sociodemographic, and ethno-racial characteristics; we do not explicitly examine net migration patterns or the characteristics of in- and out-migrants. Given that migration is the primary driver of population change in rural America (Johnson and Lichter 2019), we suspect that selective migratory characteristics may contribute to differential trends in inequality even among rural areas within regions experiencing similar population patterns, such as agricultural regions in the South and the Midwest that are experiencing sustained population loss. Thus, our findings underscore the importance of understanding how selective migratory characteristics impact the demography of rural areas via processes such as retirement migration. We plan to build and improve upon this body of research by incorporating net migration data, as well as data on the characteristics of in- and out-migrants themselves in future analyses.

¹⁸The shift to rural manufacturing stimulated demographic and economic growth in these areas. In more recent decades, however, even rural counties with a prominent manufacturing sector have experienced population loss during periods of economic recession as rural residents have sought employment in more urbanized areas (ERS 2017; Johnson and Lichter 2019).

Our results indicate that public policy focused on reducing income inequality should be tailored to differential patterns of economic and demographic change in rural America. In response to our finding that population growth is associated with decreasing income inequality, our first recommendation is for researchers and policymakers to more closely examine “successful” growing rural counties where inequality is decreasing to understand how and why this is occurring. Best practices can then be identified and disseminated. It is important to note, however, that we also found that population growth within rural counties that already have high levels of income inequality does not necessarily reduce inequality in those areas. Therefore, we also recommend that localized development initiatives prioritize industries and policies that promote sustainable and equitable growth, particularly within growing counties that already have a polarized income distribution. A study by Hunter et al. (2005), for instance, found that population growth in rural high-amenities counties was associated with increasing wages, but that these increases did not keep pace with increases in the cost of living. A study by Sherman (2018) in a rural high-amenities county similarly found that long-term residents struggle with increases in the cost of living as wealthier residents move in, particularly since employment opportunities are concentrated in low-paying seasonal and part-time service work. Finally, another study by Patrick and Stephens (2019) found that providing tax incentives for industries with working- and middle-class wages promotes working- and middle-class employment opportunities without inhibiting the growth of high-wage industries. Too much policy emphasis on growth in industries that attract a small number of high-wage employees may not lead to equitable outcomes, particularly in the absence of protective policies and well-compensated employment opportunities for lower- to middle-income residents.

Second, since slow rates of population growth or depopulation are the norm for rural America, policy should anticipate and address how these trends impact the income distribution and subsequent level of economic and social inequality in rural communities. Given the inherent momentum of population dynamics, local population decline can be expected to continue across many parts of the United States, particularly within areas of rural America that have been characterized by sustained out-migration for many decades (Johnson 2011). Accepting that it may not be feasible to reverse these patterns, Peters et al. (2018) and others have provided insight into policies that mobilize community resources to mitigate the most severe consequences of population loss. There are clear extensions in this line of work for anticipating and addressing how population decline will affect the distribution of income in rural communities. For instance, the selective processes of out-migration and staying-in-place alter the composition of residents who remain in depopulating areas, which in turn impacts the tax base and the provision of critical public services, such as healthcare (Thiede et al. 2017). This line of inquiry is pressing given that population decline is associated with increasing income inequality in rural communities – a trend that suggests that income and other forms of wealth (by extension) are becoming increasingly concentrated into the hands of a select few. Moreover, economic inequality results in serious social consequences at the local level. The qualitative research of Duncan (2014) provides vivid examples of rural communities in Appalachia and the South where economic and demographic decline calcifies unequal power structures, which in turn undermines economic development, community cohesion, and social progress.

The well-documented urban bias in social and economic policies overlooks the fact that effective policies are tailored to local context, both as it varies between rural and urban America as well as how it varies within rural America. Our results demonstrate the value of treating such places as distinctive cases, rather than assuming the socioeconomic changes that characterize declining places will mirror those characterized by growth.

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Appendix

Table 4.

Distribution of counties among population change categories (1980-2016), by metropolitan status

Metropolitan Status	Decline	Stable Growth	High Growth	Total
Non-metropolitan	4,624	3,080	3,616	11,320
Metropolitan	605	1,154	2,296	4,055
Total	5,229	4,234	5,912	15,375

Note: Counties' metropolitan status were defined using the fixed 1993 delineation from OMB.

Table 5.

Regression models predicting the Gini index of non-metropolitan U.S. counties, alternative measures of population change

	Model 9 (N = 11,320)	Model 10 (N = 11,320)	Model 11 [†] (N = 13,584)
Independent variable (population change)			
Tercile measure			
Middle tercile (ref)			
Lower tercile	0.104	-	-
Upper tercile	-0.182**	-	-
Four-category measure			
Stable growth (ref)			
Large decline	-	0.103	-
Modest decline	-	0.199**	-
High growth	-	-0.228**	-
Continuous measure			
Population total	-	-	-0.000
Employment composition			
% Employed in Services	-3.850	-3.779	-0.720
% Employed in Manufacturing	-12.844***	-12.727***	-11.016***

	Model 9 (N = 11,320)	Model 10 (N = 11,320)	Model 11 ^I (N = 13,584)
Independent variable (population change)			
% Employed in Retail Trade	-7.230 *	-7.128 *	0.302
% Employed in Agriculture	-1.209	-1.095	2.068
% Employed in Construction	-5.543 *	-5.331 [†]	0.994
% Employed in Transportation	-9.779 **	-9.582 **	-7.465 **
% Employed in Public Administration	-12.447 ***	-12.358 ***	-8.169 **
% Unemployed	0.024	0.134	1.049
Sociodemographic composition			
% Age 65+	11.401 ***	11.343 ***	17.663 ***
% Single mother households	4.838 ***	4.830 ***	5.288 ***
% Less than HS degree	7.573 ***	7.525 ***	8.582 ***
% Bachelor's degree+	5.249 ***	5.240 ***	6.982 ***
Ethno-racial composition			
% Black	6.665 **	6.607 **	7.612 ***
% Hispanic	-0.541	-0.531	0.612
% Foreign-born	-3.815	-3.766	0.636
County Fixed Effects	Y	Y	Y
Decade Fixed Effects	Y	Y	Y
Within R^2	.138	.139	.164
Between R^2	.510	.510	.562
Overall R^2	.382	.381	.417

[†] p .10;
 * p .05
 ** p .01;
 *** p .001

^IThe 2,264 county units multiplied by the six time intervals from 1970 to 2016 equals an N count of 13,584 county-decades for Model A3.

Table 6.

Sensitivity tests using an alternative compositional variable for employment

	Model 12
Population change	
Stable growth (ref)	
Decline	0.172 **
High growth	-0.211 **
Change in employment composition	
Economy diversity	0.245
% Unemployed	1.421
Change in sociodemographic composition	

	Model 12
% Age 65+	13.988 ***
% Single mother households	5.437 ***
% Less than HS degree	5.618 ***
% Bachelor's degree+	5.574 ***
Change in ethno-racial composition	
% Black	4.572 *
% Hispanic	-1.923
% Foreign-born	-1.282
County Fixed Effects	Y
Decade Fixed Effects	Y
Within R^2	.109
Between R^2	.402
Overall R^2	.297
† p .10;	
* p .05	
** p .01;	
*** p .001	
N = 11,320 county-decades.	

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Table 1.

Pooled descriptive statistics for non-metropolitan counties from 1980-2016

Variable	Mean	Std. Dev.	Min	Max
Gini index	42.7	3.7	19.1	71.2
Population change (%)	4.9	14.5	-44.5	232.0
Population change category				
Decline	0.409	-	0	1
Stable growth	0.210	-	0	1
High growth	0.382	-	0	1
% Employed in Services	33.9	9.0	0.0	70.6
% Employed in Manufacturing	16.1	10.4	0.0	61.5
% Employed in Retail Trade	12.9	3.4	0.0	41.7
% Employed in Agriculture	11.1	9.6	0.0	71.8
% Employed in Construction	7.5	2.6	0.0	30.9
% Employed in Transportation	5.8	2.1	0.0	35.0
% Employed in Public Administration	5.3	3.1	0.0	37.3
% Unemployed	6.8	3.4	0.0	33.0
% Age 65+	16.2	4.3	0.0	53.1
% Single mother households	18.5	8.6	0.0	100.0
% Bachelor's degree +	14.2	6.4	1.6	60.4
% Less than HS	26.4	13.8	1.2	74.9
% Black	8.2	14.8	0.0	86.5
% Hispanic	6.0	12.5	0.0	99.0
% Foreign-born	2.5	3.6	0.0	38.5

N = 11,320 county-decades.

Note: Counties' metropolitan status were defined using the fixed 1993 delineation from OMB.

Table 2.

Regression models predicting the Gini index of non-metropolitan U.S. counties

	Model 1	Model 2	Model 3	Model 4	Model 5
Population change					
Stable growth (ref)					
Decline	0.264 ***	0.215 **	0.203 **	0.401 ***	0.144 *
High growth	-0.280 ***	-0.171 *	-0.170 *	-0.168 ***	-0.125 †
Employment composition					
% Employed in Services		-3.421			-3.847
% Employed in Manufacturing		-12.103 ***			-12.861 ***
% Employed in Retail Trade		-11.026 **			-7.237 **
% Employed in Agriculture		-1.765			-1.220
% Employed in Construction		-7.611 *			-5.681 *
% Employed in Transportation		-12.453 ***			-9.772 **
% Employed in Public Administration		-14.489 ***			-12.588 ***
% Unemployed		-0.292			0.039
Sociodemographic composition					
% Age 65+			15.670 ***		11.434 ***
% Single mother households			5.758 ***		4.815 ***
% Less than HS degree			1.643 **		7.581 ***
% Bachelor's degree+			4.339 ***		5.286 ***
Ethno-racial composition					
% Black				6.954 ***	6.591 **
% Hispanic				5.240 ***	-0.445
% Foreign-born				-1.355	-3.789
County Fixed Effects	Y	Y	Y	Y	Y
Decade Fixed Effects	Y	Y	Y	Y	Y
Within R^2	.080	.109	.080	.034	.138
Between R^2	.006	.003	.192	.326	.511
Overall R^2	.030	.024	.139	.227	.382

† $p < .10$;* $p < .05$ ** $p < .01$;*** $p < .001$

N = 11,320 county-decades.

Table 3.

Models predicting the Gini index of non-metropolitan U.S. counties, including interaction terms

	Model 6	Model 7	Model 8
Independent variable			
Stable growth (ref)			
Decline	0.102	−1.045	0.069
High growth	−0.492 ***	−4.741 ***	0.157
Region (interaction)			
Decline x Midwest	−0.131		
Decline x South	0.218		
Decline x West	0.013		
High-growth x Midwest	0.364 *		
High-growth x South	0.494 **		
High-growth x West	0.186		
Baseline Gini (interaction)			
Decline x Baseline-gini-1980		0.029	
High-growth x Baseline-gini-1980		0.111 ***	
Baseline pop size (interaction)			
Decline x Baseline-pop-1970			0.055 †
High-growth x Baseline-pop-1970			−0.146 ***
Economic composition			
% Employed in Services	−3.823	−3.543	−4.057
% Employed in Manufacturing	−12.845 ***	−12.225 ***	−12.694 ***
% Employed in Retail Trade	−7.315 *	−7.052 *	−7.476 *
% Employed in Agriculture	−1.264	−0.890	−1.402
% Employed in Construction	−5.692 *	−5.034 †	−6.012 *
% Employed in Transportation	−9.712 ***	−9.373 *	−9.656 **
% Employed in Public Administration	−12.702 ***	−12.276 ***	−12.593 ***
% Unemployed	0.046	0.476	0.004
Sociodemographic change			
% Age 65+	11.233 ***	11.088 ***	11.813 ***
% Single mother households	4.775 ***	4.797 ***	4.752 ***
% Less than HS degree	7.445 ***	6.927 ***	7.253 ***
% Bachelor's degree+	5.094 ***	5.138 **	5.066 **
Ethno-racial composition			
% Black	6.516 **	6.434 ***	6.299 **
% Hispanic	−0.444	−0.355	−0.392
% Foreign-born	−3.676	−3.506	−3.539
County Fixed Effects	Y	Y	Y

	Model 6	Model 7	Model 8
Decade Fixed Effects	Y	Y	Y
Within R^2	.139	.141	.141
Between R^2	.536	.554	.500
Overall R^2	.399	.412	.375

$\hat{p}$.10;

*
 p .05

**
 p .01;

 p .001

N = 11,320 county-decades.