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**Examining Factors Affecting Population Change in the Southern United States: An
Ongoing Case Study**

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Examining Factors Affecting Population Change in the Southern United States an ongoing Case Study

ABSTRACT

Urban sprawl and rural rebound are major foci of recent regional economic studies. Using 1980 and 2000 Census data from 11 southern states, binary logit regressions of population changes in rural-and-metropolitan counties and Black Belt-and-non-Black Belt counties reveal education, poverty, employment, and age differences are related to population changes.

Keywords: African Americans, Black Belt, Census, population change, Rural rebound, Urban Sprawl, Southern

INTRODUCTION

Urban Sprawl and Rural Rebound have both been observed and analyzed in many parts of the United States. Urban sprawl also known as suburban sprawl is the spreading outwards of a city and its suburbs over rural land and to its outskirts. It's characterized as relatively low density, noncontiguous, automobile dependent, residential and non residential development that covers and consumes relatively large amounts of farmland and natural areas (Burchell et al.,1998)

Rural rebound is another phenomenon, which has been observed at the higher rate recently in the USA. Rural rebound is defined as the movement of people from urban areas to suburban regions. Throughout most of the 20th century, people have chosen to migrate from the more rural areas especially younger men and women to metropolitan areas with more economic and social opportunities. While on the other hand, retirees as well as the older generations are deciding to move towards rural cities. Rural regions and communities have changed dramatically because of increased in-migration. The major factors of the rural rebound in many southeastern parts of the USA are associated with the relatively lower cost of living in the rural areas.

"Urban Sprawl" has caused an increased use of urbanized land by fewer people than in the past. Over the past 30-50 years, the density of land used per person has declined drastically. Although

the U.S. population grew by 17 percent from 1982 to 1997, urbanized land increased by 47 percent during the same 15 year period. The developed acreage per person has nearly doubled in the past 20 years, and housing lots larger than 10 acres have accounted for 55 percent of land developed since 1994, according to the American Farmland Trust. How to reduce urban sprawl is a subject of research for regional scientists and geographers and from those seeking balanced regional growth. Urban sprawl, especially caused by the outmigration of the young population from rural counties brings challenges to the stewardship of agricultural labor force, farm lands and food sufficiency in the long run. Similarly, an increasing trend of urban population growth has created demands from more services, drinking water, electricity, infrastructure, and increased property value and taxes as well as increased urban crime rates and pollution. Increased residential concentration of minority population has posed another challenge in the urban centers creating imbalances in the property values, school districts, crime rates, and quality of life.

Rural rebound has been observed in recent decades. Many researchers have considered it as a positive factor to reduce urban sprawl. However, such immigration in rural counties has occurred more among retirees or older people who are not a part of the economically productive population. Race has also become a factor for rural rebound showing residential concentration of a specific race in certain geographic pockets. An increase of specific age group population in rural counties may not contribute positively towards rapid rural development. How to maintain or increase quality or an economically active labor force, create economic opportunities, and enrich human capital in rural areas are yet to be researchable areas.

Research has been done to understand the population change and community resilience. Past research has analyzed the rural outmigration and its impacts on urban sprawl, residential segregation, and quality of life (Albrecht et al., 2007). A healthy community is one that has high levels of social, ecological human and economic capital, collectively called community capital Hancock (1999). The challenge of rural communities in the 21st century will be to increase all four forms of capital simultaneously and increase rural inbound. Several factors influence migration patterns of both rural and urban people. Counties that specialize in specific economic opportunities may attract the young professional age group, while low taxes may attract the baby boomers.

Literature broadly suggests that availability of jobs and better education opportunities are the major factors of rural outmigration especially among younger generation. Research also

suggests that rich natural amenity and low taxes in the rural counties are the major factors for rural inbounds, especially among the retirees or older group of population. Implications of the residential concentration of minority population in urban places have been linked to poverty, crime rate, or community well being. However there are limited studies of residential concentration of minority population and specific age groups and its consequences in rural areas. In addition, the past research has not provided the historical, spatial, and temporal explanations of the patterns of rural-urban or urban-rural migration and residential concentration, especially in the rural counties of the Southern United States. Recent growth in the urban population of metropolitan cities such as Birmingham, Atlanta, Nashville, Memphis, Raleigh, Mobile, Little Rock, and the Golf Coast have shown specific spatial patterns and may have a connection to the community amenities and geographic and economic factors.

PURPOSE AND OBJECTIVE OF THE STUDY

This study will examine what factors cause urban sprawl and rural rebound in the Southern United States. Does this phenomenon have spatial and any geographic patterns in the Southern United States? Utilizing 1980 and 2000 U.S. population census data, we will examine the relationship between population change and its drivers in rural, metro, Black Belt and non-Black Belt Counties in the 11 southeastern States.

The rest of the paper is organized into six sections. Section two provides a summary of the literature in rural rebound and urban sprawl. Section three provides important details of the study area and the data used in the study. Section four is an explanation of empirical model of the population change in the study area. Section five presents the results of a regression model. Lastly, section six provides the conclusions.

LITERATURE REVIEW

Domina Thurston studied migration periods from 1989-2004. She investigated the factors that have predicted migration between metro and nonmetro areas over time and illustrated how those factors have changed. Thurston used the Current Population Survey's Annual Social and Economic Survey. The data was collected by graphing net annual nonmetro migration rates

between the years 1989 to 2004. Each survey year, nonmetro immigration rates are calculated as the number of migrants who moved from metro America to nonmetro America, divided by the total United States nonmetro population. The net metro migration rate is the difference between the nonmetro outmigration rates. The data was analyzed using a series of logistic regression analyses. The single most important factor that caused migration between non metro to metro areas is education attainment. People are looking to thrive in areas where capital is awarded at its fullest potential.

A study conducted by Burchfield, Overman, Puga, and Turner (2005) focuses on the spatial patterns of residential land development in particular whether residential development is sprawling or compact. They measure this by each 30×30meter cell of residential development. Averaging this measure across all developed cells in a metropolitan area gives an index of sprawl for the metropolitan area. The data was constructed from two fine resolution data sets describing land cover and land use across United States for the mid1970s and the early 1990s. The monocentric city model assumes that all employment in the city takes place at a single center, the central business district. Residential development around that center is then shaped by the tradeoff between convenient commuting close to the center and affordable housing further away. A second prediction arising from the monocentric city model is that lower transport costs within a city will result in more dispersed development. The group concluded that that sprawl is positively associated with the degree to which employment is dispersed, the reliance of a city on the automobile over public transport, fast population growth, the value of holding on to undeveloped plots of land, the ease of drilling a well, rugged terrains and no high mountains, temperate climate, the percentage of land in the urban fringe not subject to municipal planning regulations, and low impact of public service financing on local taxpayers.

Another study by Foster (2002) measures social equity by analyzing five indicators related to economic opportunity for low-income individuals. He argues that economic opportunity declines for low-income individuals and communities their capacity to improve their standard of living and reduce inequality is severely constrained. The paper will use a composite index to measure dispersed land use in 1980, and the change from 1980 to 1990. The dispersion index measures two factors relative density and the relative size of the urbanized area. The results presented in this paper suggest that indeed there is an association between sprawl and

social equity. The major implication of this paper is that smart growth strategies aimed at limiting metropolitan growth may not necessarily improve social equity.

Wenk and Hardesty (1993) focus on the effect of rural to urban migration on time spent in poverty and time spent unemployed for young adults. The authors select a sample of young adults from the NLSY between the ages of eighteen and twenty-three who ever lived in a rural area between 1980 and 1988. They estimate accelerated failure time models with the dependent variables measured as time spent in poverty and time spent unemployed for four groups divided by race and gender: black and white women and black and white men. Results from these models suggest that rural to urban moves reduce time spent in poverty for black and white women, all else equal, and reduce time spent unemployed for black and white men.

Rodgers and Rodgers (1991) study found a statistically significant effect of rural out-migration on real annual earnings, hourly wages and annual income both three and six years after such a move. The aforementioned research supports the idea that residential choice affects economic outcomes: living in a rural area increases the risk of being poor through the effects of local labor market characteristics and other factors.

Bolioli (2001) focuses his study on causes of suburban sprawl. This study suggests programs designed to stop sprawl should focus on specific age groups in a population to create more tailored programs. As the research has shown, sprawl, or urban-rural migration, is not just a result of a behavior change but also more significantly a result of changes in the age structure of the population.

STUDY AREA

The majority of the studies on population change are based on the States or multi-state aggregate data, with few examinations in metropolitan areas and counties. This study employs data available at the county level. The area chosen for this study consists of 1010 counties in the entire 11- state southeastern States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee, South Carolina, and Virginia). The study also analyzes population change separately for Black Belt and non Black Belt Counties between 1980 and 2000 and compares the results with entire southern US. Predominant African American counties (African American population 50% or higher) were selected from the entire region (hereafter

Black Belt Counties). These counties were selected because they represent unique sociocultural and economic attributes and indicate high contrast in demographic, urban structure and industrial jobs.

Southeastern region consists of 1010 counties. The total population (2000 US Census) is 67,473,857. The change in population between 2000 and 1980 was an increase of 33%. The black and white and other group population percents are 21%, 76%, and 3%, respectively. There was decline of white population by 2%, and an increase in other group population by 2% between 1980 and 2000. The average median household income in 2000 was \$33,046 and average per capita income in 2000 was 16,741. The percentage of persons below poverty level was 16.32% (USA 12.7%). The unemployment rate in 2000 was 3.6% (USA 4.6%).

EMPIRICAL MODEL

We used binary logit regression model to explore probability of the change in the population in southeastern United States between 1980 and 2000. The following logit model was estimated:

$$L_i = \ln\left(\frac{P_t}{1 - P_t}\right) = z_i = \beta_o + \sum \beta_{i_i} X_{i,t-1}$$

The logit is defined as the natural logarithmic value of the odds in favor of positive change in population between 1980 and 2000. Where L_i is the logarithm of the odds of changes in population, $X_{i,t-1}$ is a vector of change in independent variables, P_i is the conditional probability of a County's change in population given X_i , and β_i denotes parameters to be estimated. Where $y_{i,t} - y_{i,t-1}$ is a County's change in independent variables for a time period between t and $t-1$. The independent variables are the changed conditions of white population, other races population, education (high school and college graduates), age (economic age group and retirees), unemployed population, per capita incomes, and travel time.

The odds of the probability of the population change are determined by the sign and magnitude of β_i . A negative estimate for β supports that the probability of population change in the period (1980 and 2000) is negatively related change in the independent variables.

Definitions of Variables

Descriptive statistics and definitions of the variables used in the logit model are presented in table 1. The dependent variable (POPCHANGE) is a dichotomous variable of increase or decrease in population in a county between 1980 and 2000. A value of 1 was assigned for those counties whose population increased, and 0 was assigned for those counties whose population declined for the 20 years period. Eight hundred one Counties population had increased from 1980 to 2000, and 209 counties population had decreased during the same period.

The independent variables were selected based on previous studies (Table 1). Steady state differences on educational attainment, industrial mix, and other structural factors are common in the southern United States. One of the causes for disparity between rural and urban population growth has been attributed to the industrial composition often found in rural areas. The specialization of rural areas in farming, mining, and in some cases manufacturing, in contrast to the urban places has been discussed in previous studies. Generally in south, agriculture and natural resource sectors have been hit by competitive pressures and unfavorable commodity price swings since the 1970s. Manufacturing sector has been affected most by competitive pressure during the period, both from domestic and from international sources. The result has been declining employment and income levels in the rural counties affecting the out-migration of younger population to urban areas (Hammond 2005)

Table 1. Description of the Variables used

Variables	Description	Variable Type
Change in the Total Population (Binary)	% of total population change in each County between 1980 and 2000 (1 = increase, 0 = decrease)	Dependent (binary)
<u>Change 1980-2000</u>		
Change in white population (WHITECHA)	Difference in % of white population, 1980-2000	Independent
Change in other race population (OTHERCHA)	Difference in % of other race excluding whites and Blacks (between 18 and 64), 1980-2000	Independent
Change in Labor force (ECO_CHAN)	Difference in % of 16-64 age group population, 1980-2000	Independent
Change in retiree population (RETIR_CH)	Difference in % of retired population (65 or over), 1980-2000	Independent
Change in high school graduates (HIGH_CHA)	Difference in the % of high school graduate population, 1980-2000	Independent
Change in college education (COLL_CHA)	Difference in the % of bachelor degree holder population, 1980-2000	Independent
Per Capita Income (PCI) Growth (PCI_CHRE)	Change in PCI of each County between 2000 PCI and real (in 2000 \$\$ value) PCI in 1980.	Independent
Change in unemployment (UNEMP_CH)	Difference in the % of unemployed population, 1980-2000	Independent
Change in persons below poverty level (POV_CH)	Differences in the % of people below poverty level, 1980-2000	Independent
Change in travel time (TRAV_CHA)	Differences in the average travel time to work (in minutes) per person in a county, 1980-2000	Independent

RESULTS

The results of the logit model are reported in Table 2. Measures of goodness of fit indicate the model fits the data fairly well. The coefficient of variation (Nagelkerke R^2) is .692, which shows

the strong relationship suggesting a relationship exists between the probability of a change in the population in a county and the independent variables.

Table 2. Results of the Binary Logit Analysis

Variables	β coefficient	Standard Error	Wald Statistics	Significance Level	Exp(β)
WHITECHA	-.073	.038	3.72	.054	.929
OTHERCHA	.310	.110	7.98	.005	1.364
ECO_CHAN	-.244	.074	10.83	.001	.783
RETIR_CH	-.393	.092	18.43	.000	.675
TRAV_CHA	-.082	.069	1.41	.234	.921
HIGH_CHA	.044	.006	61.95	.000	1.045
COLL_CHA	.059	.006	103.36	.000	1.060
POV_CH	.066	.042	2.49	.114	1.069
UNEMP_CH	.004	.002	3.11	.078	1.004
PCI_CHRE	.001	.013	.011	.917	1.001
Constant	-2.890	.950	9.25	.002	.056

As shown in Table 2, OTHERCHA (change in other race population), HIGH_CHA (change in high School graduates), COLL_CHA (change College graduates population), and UNEMP_CH (change in unemployed population) were positively significant with change in total population between 1980 and 2000. Likewise, WHITECHA (change in whites population), , ECO_CHAN (change in labor force), and RETIR_CH (change in retirees population) were negatively related to change in the total population, other things being equal.

The research is in its preliminary phase . Currently, we are preparing data for further analysis. The preliminary results suggest that both urban and rural population growth has been observed in the southern United States. Increasing trend of residential pockets of minority

population in urban areas is evident. Likewise, in-migration in rural counties has occurred more among retirees or older people who are not economically productive population.

The results of this analysis are generally consistent with findings reported by previous studies. The study provides important insights of the relationship among demographic attributes of the study region for analyzing rural rebound and urban sprawls. This study is in progress and more robust results are expected by including other variables (such as location of industries, road networks, wage disparity, and other social and environmental indicators).

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