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INDICATORS OF INHABITANT, HOUSEHOLD, FAMILY AND ECONOMIC GROWTH:
SOUTH CAROLINA AND NORTH CAROLINA

by

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FOREWORD

Research contributing to this report was funded by: Center for Real Estate Education and Research, University of South Carolina; South Carolina Agricultural and Forestry Research System, School of Applied Science and Agribusiness and Department of Agricultural and Applied Economics, Clemson University.

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CONTENTS

LIST OF TABLES

INDICATORS OF INHABITANT, HOUSEHOLD, FAMILY AND ECONOMIC GROWTH: SOUTH CAROLINA AND NORTH CAROLINA

INTRODUCTION

Social and economic futures are dependent on numbers of housing units, families, households and individuals, and on many characteristics of aggregate populations. Concern is, of course, directed to geopolitical entities; i.e., geography having permanent administrative boundaries. Research reported in this manuscript is focused on the states of North Carolina and South Carolina, and counties within the two states. Returning to inhabitants' households and families, i.e., the chief concern is *change*; e.g., numerical and percent increase; and in some cases, numerical and percent decline. These dynamics refer to basic components of population: *births, deaths and residential relocation*, and are also be termed fertility, mortality and net migration. Migration/residential relocation certainly is a major construct for demographic research. Individuals and households move to and from nations, states, regions, counties and cities.

Theory and literature from the body of knowledge guided selection of dependent and independent variables. All are basic demographic variables. Dependent variables for this research are: projected percent change in population 1990-2002, projected percent change in housing units 1990-2002, projected percent change in households 1990-2002, and projected percent change in families 1990-2002. Selection of independent variables are based on the literature with particular attention to characteristics of the two respective states. Data were collected and processed for more than 1,800 prospective independent variables. Statistical analyses will determine which are most significant in explaining change in inhabitants, housing units, households, and families for South Carolina and North Carolina.

Forecasts of inhabitants for 1997 and 2002 are used in this research. This range was selected for three reasons. First, forecasts for those years, formulated by scientific methods and procedures which are recommended in the discipline, are available. Forecasts of population numbers may be obtained for the years following 2002, but confidence levels decline dramatically. Third, optimum social and economic characteristics were available, beginning late 1980's, which enhance research design and statistical procedures.

In this report, the source for most of our pre-1997 information is from the United States Department of Commerce, Bureau of the Census. Third Wave Research Group, Ltd. is the source of 1997 and 2002 forecasts.

Information about demographic change in the two states is presented in Table A. Growth rates for North Carolina exceed those for South Carolina in all categories. Rates of growth are substantial in both states for per capita income. With regard to change data, all variables for South Carolina are encouraging. This is particularly true for the income variables. Percent change in housing units is higher in North Carolina because of net in-migration to the state. Similar per capita income change results from higher proportions of young and older households in North Carolina.

Table A

North Carolina and South Carolina,
Six Social and Economic Indicators, 1990-2002

	North Carolina	South Carolina
Percent Change in Population	17.9	14.0
Percent Change in Families	16.2	13.1
Percent Change in Households	15.8	13.4
Percent Change in Housing Units	18.9	15.4
Percent Change in Per Capita Income	18.7	18.5
Percent Change in Median Household Income	17.2	15.9

REVIEW OF LITERATURE

Demographic research by the United Nations (1993) has been used for applied inquiries in many nations, including the United States. Agostini and Richardson (1997) used a United Nations Development Program, Human Development Index (HDI), to formulate quantitative profiles for the 25 largest cities in this country. The HDI comprises *Health Indicators*: life expectancy, child mortality and maternal mortality: *Education Indicators:* mean years of schooling, drop-out rates of all 16-19 year olds, and educational attainment of percent persons 25 years of age and over: *Income Indicators:* real per capita income, adjusted real per capita income, and percent households below the poverty level. The authors were pleased with their index results for the 25 largest U.S. cities and recommend that it be replicated, following each installment of new data for those and additional cities.

Literature about economic development and growth will be discussed. A good

place to start is with a business demography text. Louis Pol (1987) wrote such a book, subtitled: *A Guide for Business Marketers and Planners*. Every chapter is authoritative, via research design suggestions He recommends multivariate analysis methodology to determine significant independent variables for diverse geographic areas. Guidelines appear in three separate chapters about demographic research for small, large and international businesses, respectively. His systematic discussion of families, household size and one-person households facilitate outlines for research design and selection of variables. Professor Pol notes that households and economic characteristics are basic analytical units for demographers.

Phillip Musgrove and Adele Shapanka (1982) published a monograph originating from Resources for the Future, Inc. research thrusts. Their inquiry asked the question, "how might different courses of population growth affect the structure of final demand in the United States economy?" Projections of household numbers, household composition, age distribution, household income, and labor force participation rates were calculated. Demand for housing was based on age, size of household, employment, per capita income, discretionary income, motor vehicles, other transportation and per capita expenditures. Their final demand equation included the following effects: income, age, household composition, education, inflation and health. This research constitutes an original contribution because it embraces a research design using multivariate statistical procedures, fundamental demographic characteristics, standardized economic variables, and projections.

The next reference is concerned with economic development and growth from one of our study states, North Carolina. Kenneth Wink and Steven Ellers (1998) conducted an empirical assessment of public expenditures on income growth in North Carolina counties. Their expenditure categories were education, economic development and physical development. It is hypothesized that federal and state expenditures in urban counties will accelerate economic growth in these counties. The authors noted that, historically, total per capita public expenditures are greater in urban than in rural counties. It is suggested that, in addition to urbanization, per capita expenditures for public education and per capita economic and physical development spending (substantial funding, both categories, from state government) are more likely to result in population growth and income growth in urban counties than in rural counties of North Carolina. Wink and Ellers used multivariate statistical procedures in their research.

Mitch Renkow (1996) provided another inquiry about North Carolina, specifically earnings differentials between rural and urban counties. The author noted that disparity in economic performance of rural and urban areas had widened after 1970. He hypothesized that 20 independent variables, could, in part, be responsible for lack of economic growth and the decline in rural population. Econometric results indicate that educational attainment, unemployment shocks (both transitory and permanent), percent elderly inhabitants and percent non-white population all contribute to lower rates of economic growth in rural areas. Education was the strongest causal variable which suggests that

returns to schooling are larger in urban areas. Renkow recognized, nevertheless, that many young persons move from rural to urban areas following completion of two years of high school. Many high school graduates pursue this migration stream, as well.

A study of land use change for real estate development was conducted by Thomas Donnelly, F. Stuart Chapin and Shirley Weiss, (1964) at the University of North Carolina, Chapel Hill. This classic study, based in Greensboro, produced a probabilistic model for population and economic growth. Greensboro adopted a land use plan in 1943, which guided post World War II land-use change and development. The research is noteworthy for implementing a multi-disciplinary research design, quantifying land use and change in land use, and introducing population density as an independent variable. Additional variables are: land use characteristics prior to and following development, residential and non-residential characteristics, specific business use categories, sewerage and solid waste disposal facilities, and an attraction index based on accessability to work areas, nearest elementary school and nearest unit of a major street system. This research helped set the stage for subsequent basic and applied inquiries.

Dowell Myers (1990,1992) published two reference/texts for demographic research. The subtitle of his book is: *Portraits of Change* and the title of the second is: *Housing Demography*. Myers contributes several chapters as sole author or co-author. Disciplines represented include: demography, economics, geography, human ecology, political science, gerontology and sociology. Myers' writing contributes not only to residential, but to *all* basic demographic and economic growth topics.

Federal Reserve Banks also have concerns about population characteristics and change. Marsh (1996) published a report for the Federal Reserve Bank of Richmond, in which she reviewed community investment opportunities in the Columbia, South Carolina metropolitan region. Variables in her analysis included: number of inhabitants, income, percent crowded dwelling units, cost-burdened home owners and renters, and population per square mile. She concluded that neighborhoods vary significantly by all of these variables. Marsh discusses needs for and consequences of infrastructure investment in this region. She recommends that cost-burdened neighborhoods in this metropolitan area be recipients of private and public sector infrastructure investment.

The final reference on South Carolina is from McLean (1997) who investigated residential relocation, geographic redistribution, and regions in the state which experience growth and those not sharing in this wealth. Economic and population growth is dependent on migration of households from outside the state. County-to-county residential relocation comprises forty percent of all migrants, compared to sixty percent in North Carolina. These mobility patterns are expected to continue. Since modest declines in birth rates are occurring, South Carolina will be more dependent on in-migration for future inhabitants. Larger numbers and proportions of inhabitants will be in the urban residential category and in counties already comprising large numbers of inhabitants. Economic growth will continue to be concentrated in selected urban areas of the state.

METHODS AND PROCEDURES

Geographic areas selected for this research are the combined states (region) consisting of South Carolina and North Carolina and the two respective individual states. Data were retrieved for 46 South Carolina counties and 100 North Carolina counties. Variables were assembled using data from several sources. The majority of the data were from a commercial file, Census CD + Maps. This file utilized data compiled from the United States Department of Commerce, Bureau of the Census, Summary Tape Files; the United States Department of Commerce, Bureau of the Census, *Counties* CD; and from a private sector company, the Third Wave Research Group, Ltd. Ultimate (non-forecast) sources include: United States Department of Commerce, U.S. Department of Health and Human Services, United States Department of Labor, and the Social Security Administration. Variables from these sources were chosen to reflect major demographic constructs such as age, gender and race, vital statistics, education, household and family characteristics. Many economic variables were processed including labor force participation, income, occupation and industry of employment. Also represented on the list of final variables are financial indicators such as banking, housing characteristics and building permits. Variables relating to social programs such as Social Security, health services indicators and public assistance are included.

Variables were standardized according to the universe from which they were drawn. Raw data were converted to percentages, per capita rates or ratio data. State and county data are the most consistent and reliable and therefore the majority of the analyses were conducted on the aggregate level using county data. Analyses were conducted on all the counties of each state individually and on the combined counties of South and North Carolina.

Social scientists are concerned with the many interrelationships between demographic variables of society, especially those of the causal nature. Thus, it is essential to utilize research methodology that addresses this issue. Causality may be difficult to establish because of the interactions and associations between variables. Consequently, for research using demographic data, multivariate analysis is appropriate. Of all the techniques available to social scientists for the study of causal relationships, multiple linear regression is the most widely utilized. Not only does the regression model help predict which variables are influencing the dependent variable, but also indicates the strength of this relationship. The relative importance of each independent variable to the model is represented by the partial regression coefficients. These coefficients explain how much the value of the dependent variable will change when the independent variable increases by one unit and the values of the other independent variables remain unchanged (Halli and Rao, 1992 and Norusis, 1996). Because of the complexity of the issues being addressed and the suitability of the procedure, the most pertinent methodological choice for this project was multiple regression/ correlation analysis.

Regression analyses, based on the following dependent variable *models* were conducted. These variables are based on 1990 Census of Population data and 2002 forecast data: percent population change, 1990-2002; percent change in housing units, 1990-2002; percent change in households, 1990-2002 and percent change in families, 1990-2002.

Statistical procedures were performed to eliminate multicolinearity. Numerous variables which were highly correlated with other variables were removed from the analyses. Second, stepwise regressions were conducted for each model (Halli and Rao, 1992). Third, model selection was predicated, in part, on tolerance values for colinearity diagnosis. Problems with heteroscedasticity in several of the models were addressed by utilizing weighted least squares regression (Cohen and Cohen, 1983).

REGRESSION MODEL FINDINGS
Percent Change in Population: 1990-2002

Region

Regression analysis of North and South Carolina data indicate that population change from 1990-2002 in this region is influenced by multiple variables. Findings from the regression analyses are presented in Table 1, page 12.

Among the predictor variables for the region (all counties both states) are the percent of housing units built 1989-90 ($p = .000$), 1985-88 ($p = .002$) and 1970-79 ($p = .016$). The dependent variable is also influenced by median household income for 1989 ($p = .000$), the sex ratio 1990 ($p = .007$), the percent of population migrating from a different county 1985-1990 ($p = .000$), the percent of population aged 18-34 in 1990 ($p = .009$) and the percent of the population aged 25 or more in 1990 with an associate degree ($p = .012$). This model is statistically significant at the .05 level ($F_{8,130} = 37.574$, $p = .000$, $R = .836$) and represents 69.8 percent of the variance on population change, 1990-2002, all counties in North and South Carolina.

The percent of housing units built 1989-90 and median household income exert equivalent effects on population change in South and North Carolina from 1990-2002 ($\beta = .329$). The percent of residents living in the same state but a different county, 1985-1990 (intrastate migration) affects population growth to a lessor extent ($\beta = .260$) as does the percent of the population aged 18-34 in 1990 ($\beta = -.181$), the sex ratio, 1990 ($\beta = -.167$), percent persons aged 25 years and over with an associate degree in 1990 ($\beta = .157$) and the percent of housing units built 1970-79 ($\beta = .127$).

South Carolina

Analysis of South Carolina data suggests that the percent of housing units built 1970-79 ($p = .003$), the median household income in 1989 ($p = .000$) and the percent of housing units built 1940-49 ($p = .014$) are significant predictors of population change from 1990-2002 ($F_{3,42} = 36.997$, $p = .000$, $R = .852$) and represent 72.5% of the variance on the dependent variable, change in population 1990-2002, South Carolina counties.

Median household income for 1989 has substantial influence on population growth in South Carolina 1990-2002 ($\beta = .624$). The percentage of housing units built 1970-79 and those built 1940-40 have lessor effects ($\beta = .300$ and -.261 respectively).

North Carolina

For North Carolina, results of the regression of the independent variables on population change 1990-2002 indicate that the percent of housing units built 1989-90 ($p = .000$), the percent of housing units built 1980-84 ($p = .000$), the sex ratio, 1990 ($p = .000$), median household income for 1989 ($p = .000$), per capita deposits in banks, 1990 ($p = .04$), and percent migrating from a different county (intra-state migration) 1985-1990 ($p = .002$) are significant predictors of the dependent variable ($F_{6,86} = 36.753$, $p = .000$, $R = .848$), and account for 71.9 percent of the variance in population growth for this period.

Median household income for 1989 has the greatest effect on population change for North Carolina ($\beta = .412$), followed by the percent of housing units built 1989-90 ($\beta = .393$) and sex ratio 1990 ($\beta = -.291$). The percent of housing units built 1980-84 ($\beta = .255$), the percent migrating from a different county 1985-1990 ($\beta = .206$) and per capita deposits in banks, 1990 ($\beta = -.134$) exert somewhat less influence.

Percent Change in Housing Units: 1990-2002

Region

Weighted least squares regression results for North and South Carolina counties indicate that several variables have direct consequences for change in housing units. Results for this model are illustrated in Table 2, page 13. Percent of housing units built 1989-90 ($p = .000$) and those built 1985-88 ($p = .002$) predict the change in housing units as does per capita income for 1989 ($p = .003$), percent migrating from a different county, 1985-1990 ($p = .000$), sex ratio 1990 ($p = .000$) and those inhabitants aged 25 or greater with an associate degree ($p = .007$). This model is significant at the .05 level ($F_{6,126} = 49.545$, $p = .000$, $R = .702$) and 68.8 percent of variance on the dependent variable results from the respective independent variables.

For this region, the percent of housing units built 1989-90 has the greatest effect ($\beta = .379$) followed by percent migrating from a different county, 1985-1990 ($\beta = .250$) and the percent of housing units built 1985-88 ($\beta = .230$). Per capita income for 1989 and sex ratio for 1990, have the same magnitude of influence but in opposing directions ($\beta = .210$ and -.210 respectively). The variable with the least influence, but still significant, is the percent of the population aged 25 and over with an associate degree 1990 ($\beta = .169$).

South Carolina

Although per capita income for 1989 is the most salient predictor ($p = .000$, $\beta = .528$) of percent change in housing units for South Carolina, the dependent variable is also predicted to a large extent, by the age of the housing units. Variables indicating the percentage of housing units constructed 1940-1949 show a negative impact on population growth ($p = .000$) as does the percent change in single family building permits 1990-1994 ($p = .005$). This model is significant at the .05 level ($F_{4,40} = 47.856$, $p = .000$, $R = .909$) and accounts for 82.7 percent of the variation in the dependent variable.

As previously indicated, the independent variable most likely to cause change for South Carolina counties is per capita income for 1989 ($\beta = .528$). Following per capita income is the percent of housing built from 1940-49 ($\beta = -.396$) and housing units built between 1970-79 ($\beta = .261$). Lastly, the percent change in single family building permits 1990-94 was also found to be predictive ($\beta = -.198$) for South Carolina.

North Carolina

In analyzing regression results for North Carolina, it is suggested that the age of housing units is significantly predictive. The percent of housing units built 1989-90 ($p = .000$) and those built 1985-88 ($p = .000$) are both positive indicators of the change in housing units from 1990 to 2002. Negative influences on the number of housing units for North Carolina include the 1990 sex ratio ($p = .000$), the percentage of homeowners experiencing 35% or more of their income for selected monthly costs ($p = .022$), percent migrating from a different county 1985-1990 ($p = .009$), and percent of the population aged 25 and over with an associate degree, 1990 ($p = .009$). This model is statistically significant at the .05 level ($F_{6,81} = 27.151$, $p = .000$, $R = .817$) and explains 66.8 percent of the variation in the change in housing units 1990 to 2002.

For North Carolina counties, the causal power from percent housing units built from 1985-1988 ($\beta = .363$) and from those housing units built from 1989-90 ($\beta = .360$), are similar. Also significant is sex ratio 1990 ($\beta = -.272$), percent migrating from a different county, 1985-1990 ($\beta = .206$), percent aged 25 and over with an associate degree 1990 ($\beta = .184$) and percent of home owners with a mortgage and expending 35 percent or more of their income for selected monthly costs, 1990 ($\beta = -.155$).

Percent Change in Households: 1990-2002

Region

Weighted Least Squares Regression analysis on the dependent variable, percent change in households 1990-2002, results in several significant predictor variables for the region. Findings for this model are presented in Table 3, page 14. Among these variables are the percent of housing units built 1985-1988 ($p = .001$), per capita income for 1989 ($p = .000$), percent of housing units built 1989-90 ($p = .000$), percent migrating from a different county 1985-1990 ($p = .000$), sex ratio 1990, ($p = .001$), percent of housing built 1970-79 ($p = .002$), percent of population aged 25 or older with an associate degree ($p = .004$) and the percent of householders aged 65 or greater ($p = .017$). This model is significant at the .05 level ($F_{8,122} = 27.622$, $p = .000$, $R = .803$) and accounts for 64.4 percent of the variation in the change in households 1990-2002.

Per capita income exerts the most influence on percent change in households 1990-2002 ($\beta = .379$) with the percent of housing units built 1989-90 ($\beta = .293$) and the percent of housing units built 1985-88 ($\beta = .250$) following. Also predictive of change in households for this region are percent migrating from a different county 1985-1990 ($\beta = .241$), percent of population aged 25 and over with an associate degree ($\beta = .201$), sex ratio 1990 ($\beta = -.194$), the percent of housing units constructed 1970-79 ($\beta = .190$) and percent of householders 65 years of age or greater, 1990 ($\beta = .185$).

South Carolina

For South Carolina, predictor variables for change in households 1990-2002 are percent of renter occupied housing without motor vehicles available, ($p = .001$), percent of housing units built 1940-49, ($p = .000$), percent of employed persons 16 years of age or greater, 1990 ($p = .013$) and percent of housing units built 1970-79 ($p = .041$). This model is significant at the .05 level ($F_{4,38} = 28.826$, $p = .000$, $R = .867$) and accounts for 75.2 percent of the variation in the dependent variable.

The two variables having the greatest effect on the change in households for South Carolina are negative. Most adversely affecting number of households is the percent of housing units built 1940-49, ($\beta = -.463$). The percent of renter occupied housing without motor vehicles available is also adversely associated with change in number of households ($\beta = -.387$). While having less influence, the percent of employed persons 16 years of age or greater ($\beta = .273$) and percent of housing units constructed 1970-79 ($\beta = .192$) do have a positive effect on the dependent variable.

North Carolina

Analysis of North Carolina counties reveal that the percent of housing built 1985-88 ($p = .024$) is predictive of change in households, as is the percent of housing units built

1989-90 (p = .000), per capita income 1989 (p = .000), sex ratio 1990 (p = .000), percent migrating from a different county 1985-1990 (p = .018), percent of urban housing 1990 (p = .007) and percent of population age 25 and over with an associate degree 1990 (p = .023). This model is statistically significant at the.05 level ($F_{7,80} = 22.265$, p = .000, R = .813) and explains 66.1 percent of the variation for change in households 1990-2002.

For North Carolina, the independent variable having the greatest predictive power for the dependent variable is per capita income 1989 (β = .333). Other variables having substantial effects are the percent of housing units constructed 1989-90 (β = .307), sex ratio 1990 (β = -.260), percent of urban housing 1990 (β = -.240), percent of housing constructed 1985-88 (β = .236), percent migrating from a different county 1985-1990 (β = .195) and the percent of the population aged 25 and over with an associate degree 1990 (β = .183).

Percent Change in Families: 1990-2002

Region

Weighted least squares regression analysis of this region for percent change in families for 1990-2002 resulted in a parsimonious model. Results for this model are illustrated in Table 4, page 15. Median selected owner occupied housing costs (p = .000) and the percent of housing units built 1989-90 (Bc.444) were found to be strong predictors of change in number of families. This model is statistically significant at the .05 level ($F_{2,131} = 158.564$, p = .000, R = .841), and accounts for 70.8 percent of the variation in percent change in families 1997-2002.

The strongest predictor for the region was median selected monthly owner occupied housing costs 1990, with a beta value of .469. The percentage of housing units built in 1989-90 was slightly weaker with a beta value of .444.

South Carolina

Predictor variables for South Carolina include the percent of housing units constructed 1940-49, (p = .000), median household income, 1989 (p = .000) and percent change in single family building permits 1990-94, (p = .006). This regression model is significant at the .05 level ($F_{3,41} = 81.946$, p = .000, R = .926) and represents 85.7 percent of the variation in the percent change in families from 1990-2002.

Although it has a negative effect on the dependent variable, the percent of housing units built 1940-49 is also the strongest (β = -.615) predictor variable for South Carolina counties. Median household income 1989 (β = .485) and percent change in single family building permits from 1990-94, (β = -.188) are significant independent variables, as well.

North Carolina

Change in number of families in North Carolina is predicted by the percent of housing units built 1985-88 ($p = .007$), and housing units built 1989-90 ($p = .000$), as well as sex ratio 1990 ($p = .000$), median household income, 1989 ($p = .002$) and percent migrating from a different county, 1985-1990 ($p = .004$). This model is statistically significant at the .05 level ($F_{5,83} = 30.309$, $p = .000$, $R = .804$) and represents 64.6% of the variability in change in the percentage of families in North Carolina.

The most influential predictors of change for families in North Carolina counties are percent of housing units built 1989-90 ($\beta = .383$) and percentage of housing units built 1985-88 ($\beta = .266$). Following these variables are sex ratio 1990 ($\beta = -.261$), median household income 1989 ($\beta = .243$) and the percent migrating from a different county, 1985-1990 ($\beta = .227$).

Table 1
Regression Model I
Percent Change in Population, 1990-2002
South Carolina and North Carolina

Area	Variable	$	t	sig.
Region	Constant		-1.517	.132
n = 139	Median Household Income, 1989	.329	4.721	.000
R^2 = .698	Percent Housing Units Built, 1989-90	.329	5.254	.000
	Percent Migrating From a Different County, 1985-1990	.260	4.616	.000
	Percent Housing Units Built, 1985-88	.226	3.201	.002
	Percent Population Aged 18-34, 1990	-.181	-2.644	.009
	Sex Ratio, 1990	-.167	-2.732	.007
	Percent Population Aged 25 and Over with an Associate Degree, 1990	.157	2.548	.012
	Percent Housing Units Built, 1970-79	.127	2.444	.016
South Carolina	Constant		-2.586	.013
n = 46	Median Household Income, 1989	.624	7.02	.000
R^2 = .725	Percent Housing Units Built, 1970-79	.300	3.145	.003
	Percent Housing Units Built, 1940-49	-.261	-2.562	.014
North Carolina	Constant		2.87	.775
n = 93	Median Household Income, 1989	.412	6.268	.000
R^2 = .719	Percent Housing Units Built, 1989-90	.393	5.713	.000
	Sex Ratio, 1990	-.291	-4.573	.000
	Percent Housing Units Built, 1980-84	.255	3.795	.000
	Percent Migrating From a Different County, 1985-1990	.206	3.243	.002
	Per Capita Deposits in Banks, 1990	-.134	-2.082	.040

Table 2

Regression Model II
Percent Change in Housing Units, 1990-2002
South Carolina and North Carolina

Area	Variable	$	t	sig.
Region	Constant		.401	.689
n = 133	Percent Housing Units Built 1989-90	.379	5.746	.000
R^2 = .688	Percent Migrating From a Different County, 1985-1990	.250	4.239	.000
	Percent Housing Units Built 1985-88	.230	3.187	.002
	Per Capita Income, 1989	.210	3.077	.003
	Sex Ratio, 1990	-.210	-3.690	.000
	Percent Population Aged 25 and Over with an Associate Degree, 1990	.169	2.755	.007
South Carolina	Constant		-2.186	.035
n = 45	Per Capita Income, 1989	.528	7.440	.000
R^2 = .827	Percent Housing Units Built, 1940-49	-.396	-4.681	.000
	Percent Housing Units Built, 1970-79	.261	3.216	.003
	Percent Change in Single Family Building Permits, 1990-1994	-.198	-2.945	.005
North Carolina	Constant		2.076	.041
n = 88	Percent Housing Units Built, 1985-88	.363	3.923	.000
R^2 = .668	Percent Housing Units Built, 1989-90	.360	4.781	.000
	Sex Ratio, 1990	-.272	-4.025	.000
	Percent Migrating From a Different County, 1985-1990	.206	2.678	.009
	Percent Population Aged 25 and Over with an Associate Degree, 1990	.184	2.660	.009
	Percent Housing Units with Mortgages Expending > 35 Percent of Income, 1990	-.155	-2.337	.022

Table 3

Regression Model III
Percent Change in Households, 1990-2002
South Carolina and North Carolina

Area	Variable	$	t	sig.
Region	Constant		-2.492	.014
n = 131	Per Capita Income, 1989	.379	4.961	.000
R^2 = .644	Percent Housing Units Built, 1989-90	.293	4.553	.000
	Percent Housing Units Built, 1985-88	.250	3.269	.001
	Percent Migrating From a Different County, 1985-1990	.241	3.835	.000
	Percent Population Aged 25 and Over with an Associate Degree, 1990	.201	2.910	.004
	Sex Ratio, 1990	-.194	-3.279	.001
	Percent Housing Units Built, 1970-79	.190	3.245	.002
	Householders Aged 65 and Over, 1990	.185	2.417	.017
South Carolina	Constant		-.396	.694
n = 43	Percent Housing Units Built 1940-49	-.463	-4.702	.000
R^2 = .752	Percent Renter Occupied Housing Without Motor Vehicles Available, 1990	-.387	-3.540	.001
	Employed Persons Aged 16 Years Old and Over, 1990	.273	2.595	.013
	Percent Housing Units Built, 1970-79	.192	2.111	.041
North Carolina	Constant		.577	.565
n = 88	Per Capita Income, 1989	.333	3.719	.000
R^2 = .661	Percent Housing Units Built, 1989-90	.307	3.788	.000
	Sex Ratio, 1990	-.260	-3.688	.000
	Percent Urban Housing, 1990	-.240	-2.795	.007
	Percent Housing Units Built, 1985-88	.236	2.302	.024
	Percent Migrating From a Different County, 1985-1990	.195	2.425	.018
	Percent Population Aged 25 and Over with an Associate Degree, 1990	.183	2.320	.023

Table 4

Regression Model IV
Percent Change in Families, 1990-2002
South Carolina and North Carolina

Area	Variable	$	t	sig.
Region	Constant		-8.552	.000
n = 134	Median Selected Monthly Owner			
R^2 = .708	Costs, 1990		7.127	.000
		.469		
	Percent Housing Units Built, 1989-90	.444	6.743	.000
South Carolina	Constant		367	.715
n = 45	Percent Housing Units Built, 1940-49	-.615	-8.820	.000
R^2 = .857	Median Household Income, 1989	.485	7.142	.000
	Percent Change in Single Family			
	Building Permits, 1990-1994	-.188	-2.909	.006
North Carolina	Percent Housing Units Built, 1989-90	.383	4.959	.000
n = 89	Percent Housing Units Built, 1985-88	.266	2.743	.007
R^2 = .646	Sex Ratio, 1990	-.261	-3.825	.000
	Median Household Income, 1989	.243	3.228	.002
	Percent Migrating From a Different	.227	2.956	.004
	County, 1985-1990			

REGRESSION SUMMARIES

Regression summaries are presented in Tables 5, 6, and 7, pages 19-21, for the region, South Carolina and North Carolina, respectively.

Two precise statistical procedures are important in evaluating regression models. For example, the measure that best describes the proportion of variability in the dependent variables caused by the independent variables is R^2. This value, the squared correlation coefficient, indicates the percentage of variation in the outcome that is explained by the independent or predictor variables. It is used, in part, in determining the adequacy of regression models. Because of differing units of measure for independent variables, the partial regression coefficients are not used for comparison between these variables. Therefore, Beta coefficients, the standardized regression coefficients are used. These Beta values allow for the comparison of the relative importance of the independent variables for predicting the dependent variable.

For the Region, two models have respectable R^2 values, thus providing predictive power. Model II, Percent Change in Housing Units, has an R^2 of .702 and Model IV, Percent Change in Families, has an R^2 of .708. The independent variable with the highest Beta value, for the Region, is also in Model IV. Median Selected Monthly Owner Costs, 1990, has a Beta value of .469.

For South Carolina, all four models have highly predictive values. Model I, Median Household Income, has an R^2 of .725. Model II, Percent Change in Housing Units, has an R^2 of .827. Model 3, Percent Change in Households, has an R^2 of .752, and Model IV, Percent Change in Families has an R^2 of .857. In Model I, the independent variable, Median Household Income, 1989, has a Beta value of .624. In Model II, the independent variable, Per Capita Income, 1989, has a Beta value of .528.

For North Carolina, Model I, Percent Change in Population, is highly predictive with an R^2 of .719. The highest Beta value is also from Model I. Median Household Income has a Beta value of .412.

Regression models for South Carolina confirm the importance of economic development and economic growth for the state. Models with economy-based dependent and independent variables have significant R^2 values. Two independent variables, Median Household Income and Per Capita Income, produce high Beta values. The future of our state depends, in part, on increasing wages and salaries of our labor force

PREDICTIVE ASSOCIATIONS FROM REGRESSION MODELS

One objective of regression analysis is to implement statistical procedures which provide the best estimates of the relationship of the independent variables to the dependent variable. This procedure allows researchers to estimate the effects of one variable on another by using a variation on the equation for a line, y = mx + b. In the regression equation, $y = a + b_1x_1 + b_2x_2 \ldots b_px_p + e$, y is the predicted value of the dependent variable, a is the constant or intercept when all the independent variables are equal to zero and x represents the independent variables. The regression slope or partial regression coefficient, b, indicates the change in y that would be predicted for a one unit change in x while controlling for the other independent variables. Consequently, it is estimated that for each one unit change in the independent variable, there is a corresponding change, b, in the dependent variable.

An essential aspect of the regression equation is its additive nature. The effects of the independent variables are cumulative and the overall effects of these variables are an aggregate total of the individual changes in each independent variable. Therefore, caution must be used in interpreting the effects of any single variable on a specific outcome (Halli and Rao, 1992).

Tables 8, 9 and 10, pages 22-23, illustrate the partial results of the multivariate analysis using the regression equation. As was previously indicated, interpretation of these variables must be based on the effects of other independent variables on the overall outcome. Table 8, presents the predictive associations of independent variables for the *Region*.

Table 9, page 22, indicates the predictive associations for South Carolina counties. Model I describes factors influencing Change in Population. The most significant independent variable for this model is median household income. Each one thousand dollar increase in median household income is expected to produce a 1.2 percent increase in population 1990-2002. Model 2 is Change in Housing Units and the most significant independent variable is per capita income. Each one thousand dollar increase in per capita income is predicted to result in a 2.8 percent increase in housing units 1990 -2002.

The above are truly significant and relevant dependent and independent variables. South Carolina's population growth and increasing housing stock and families are dependent on the state's economy. Both will depend, in part, on the state's real estate industry. Quality housing stock must be added in South Carolina communities. A viable economy base is, of course, a prerequisite.

Table 10, page 23, presents the predictive associations for North Carolina's most significant independent variables. Model I describes Change in Population and the most significant independent variable is median household income. Each one thousand dollar increase in median household income may produce a 1.2 percent increase in North Carolina population, 1990-2002. Model III describes factors associated with Change in Households and the most significant independent variable is per capita income. Each one thousand dollar increase in per capita income is expected to produce a 1.7 percent increase in North Carolina households, 1990-2002. Model IV is Change in Families and the most significant independent variable is housing units built 1989-1990. Each percent increase in housing units built those two years, is expected to result in a 4.6 percent increase in North Carolina families 1990-2002.

Table 5

Region
Multiple Regression Results, Dependent Variable Models by Significant Independent Variables

Model 1: Percent Change in Population, 1990-2002

Variables	Beta Values
Median Household Income, 1989	.329
Percent Housing Units Built, 1989-90	.329
Percent Migrating From a Different County, 1985-1990	.260
Percent Housing Units Built, 1985-88	.226
Percent Population Aged 18-34, 1990	-.181
Sex Ratio, 1990	-.167
Percent Population Aged 25 and Over with Associate Degree, 1990	.157
Percent Housing Units Built, 1970-79	.127

$R^2 = .698$

Model 2: Percent Change in Housing Units, 1990-2002

Variables	Beta Values
Percent Housing Units Built, 1989-90	.379
Percent Migrating From a Different County, 1985-1990	.250
Percent Housing Units Built, 1985-88	.230
Per Capita Income, 1989	.210
Sex Ratio, 1990	-.210
Percent Population Aged 25 and Over with Associate Degree, 1990	.169

$R^2 = .702$

Model 3: Percent Change in Households, 1990-2002

Variables	Beta Values
Per Capita Income, 1989	.379
Percent Housing Units Built, 1989-90	.293
Percent Housing Units Built, 1985-88	.250
Percent Migrating From a Different County, 1985-1990	.241
Percent Population Aged 25 and Over with Associates Degree, 1990	.201
Sex Ratio, 1990	-.194
Percent Housing Units Built, 1970-79	.190
Householders Aged 65 or Greater, 1990	.185

$R^2 = .644$

Model 4: Percent Change in Families, 1990-2002

Variables	Beta Values
Median Selected Monthly Owner Costs, 1990	.469
Percent Housing Units Built, 1989-90	.444

$R^2 = .708$

Table 6

South Carolina
Multiple Regression Results, Dependent Variable Models by Significant Independent Variables

Model 1: Percent Change in Population, 1990-2002

Variables	Beta Values
Median Household Income, 1989	.624
Percent Housing Units Built, 1970-79	.300
Percent Housing Units Built, 1940-49	-.261

$R^2 = .725$

Model 2: Percent Change in Housing Units, 1990-2002

Variables	Beta Values
Per Capita Income, 1989	.528
Percent Housing Units Built, 1940-49	-.396
Percent Housing Units Built, 1970-79	.261
Percent Change in Single Family Building Permits, 1990-1994	-.198

$R^2 = .827$

Model 3: Percent Change in Households, 1990-2002

Variables	Beta Values
Percent Housing Units Built, 1940-49	-.463
Percent Renter Occupied Housing Units without Motor Vehicles, 1990	-.387
Employed Persons 16 Years Old or Greater, 1990	.273
Percent Housing Units Built 1970-79	.192

$R^2 = .752$

Model 4: Percent Change in Families, 1990-2002

Variables	Beta Values
Percent Housing Units Built, 1940-49	-.615
Median Household Income, 1989	.485
Percent Change in Single Family Building Building Permits, 1990-1994	-.188

$R^2 = .857$

Table 7

North Carolina
Multiple Regression Results, Dependent Variable Models by Significant Independent Variables

Model 1: Percent Change in Population, 1990-2002

Variables	Beta Values
Median Household Income, 1989	.412
Percent Housing Units Built, 1989-90	.393
Sex Ratio, 1990	-.291
Percent Housing Units Built, 1980-84	.255
Percent Migrating From a Different County, 1985-1990	.206
Per Capita Deposits in Banks, 1990	-.134

$R^2 = .719$

Model 2: Percent Change in Housing Units, 1990-2002

Variables	Beta Values
Percent Housing Units Built, 1985-88	.363
Percent Housing Units Built, 1989-90	.360
Sex Ratio, 1990	-.272
Percent Migrating From a Different County, 1985-1990	.206
Percent Population Aged 25 and Over with Associate Degree, 1990	.184
Percent Housing Units with Mortgages Expending More Than 35% of Income for Selected Costs, 1990	-.155

$R^2 = .668$

Model 3: Percent Change in Households, 1990-2002

Variables	Beta Values
Per Capita Income, 1989	.333
Percent Housing Units Built, 1989-90	.307
Sex Ratio, 1990	-.260
Percent Urban Housing, 1990	-.240
Percent Housing Units Built, 1985-88	.236
Percent Migrating From a Different County, 1985-1990	.195
Percent Population Aged 25 and Over with Associate Degree, 1990	.183

$R^2 = .661$

Model 4: Percent Change in Families, 1990-2002

Variables	Beta Values
Percent Housing Units Built, 1989-90	.383
Percent Housing Units Built, 1985-88	.266
Sex Ratio, 1990	-.261
Median Household Income, 1989	.243
Percent Migrating From a Different County, 1985-1990	.227

$R^2 = .646$

Table 8

Region
Magnitude of Dependent Variable Caused by Designated Changes in Significant Independent Variable

Model 1
For each one thousand dollar increase in median household income 1989, there is a related percent increase in population change 1990-2002.

Model 2
For each one percent of increase in housing units constructed during 1989-1990, there is a related 3.6 percent increase in housing units 1990-2002.

Model 3
For each one thousand dollar increase in per capita income 1989, there is a related 1.8 percent increase in households 1990-2002.

Model 4
For each one hundred dollar increase in median selected owner costs 1990, there is a 4.3 percent increase in families 1990-2002.

Table 9

South Carolina
Magnitude of Dependent Variable Caused by Designated Changes in Significant Independent Variable

Model 1
For each one thousand dollar increase in median household income 1989, there is a related 1.2 percent increase in population 1990-2002.

Model 2
For each one thousand dollar increase in per capita income 1989, there is a related 2.8 percent increase in housing units 1990-2002.

Model 3
For each one percent increase in housing units constructed during1940 to 1949, there is a related 2.1 percent decline in households 1990-2002.

Model 4
For each one percent increase in percent of housing constructed during1940 -1949, there is a related 2.9 percent decline in families 1990-2002.

Table 10

North Carolina
Magnitude of Dependent Variable Caused by Designated Change in Significant Independent Variable

Model 1
For each one thousand dollar increase in median household income 1989, there is a related 1.2 percent increase in population, 1990-2002.

Model 2
For each percent increase in housing units constructed 1985-1988, there is a related 1.1 percent increase in housing units 1990-2002.

Model 3
For each one thousand dollar increase in per capita income 1989, there is a related a 1.7 percent increase in households 1990-2002.

Model 4
For each one percent increase in housing units constructed during 1989-1990, there is a related 4.6 percent increase in families 1990-2002.

INTERPRETATIONS

Discussion in this section will focus on how and why independent variables produce changes in dependent variables. Every model will be reviewed and the Region (South Carolina and North Carolina combined counties), South Carolina and North Carolina models will be explained. Independent variables will be discussed by the order of their predictive power.

Model I, Percent Change in Population, 1990-2002

Region

(a) Median Household Income, 1989
This is a basic indicator of household well-being. Households with substantial income are employed, may derive income from other sources and contribute to the economy and culture of their region. Population increase is predicted in areas where household incomes are high.

(b) Percent Housing Units Built, 1989-1990
The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units are likely result in population growth.

(c) Percent Migrating from a Different County, 1985-1990
This is *in-migration* which is the most effective means for population growth. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. People are drawn to employment and population growth is, in part, dependent on migration.

(d) Percent Housing Units Built, 1985-1988
These are relatively new housing units, being added to the housing stock during the past 14 years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable contributes to increases in population.

(e) Percent Population, 18-34 Years of Age, 1990
This may be termed a "notch years of age category." Many individuals are enrolled in post high school education or in the military. The former has no income, the latter has modest income. Married persons and families with children are in the initial and formative stages of their work cycle. Their incomes are low or moderate, and changes in employment may be frequent. Such characteristics

do not contribute to long-term population growth.

(f) Sex Ratio

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Labor force, income and racial distributions contribute to this association. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining inhabitant numbers.

(g) Percent Population Aged 25 and Over With an Associate Degree

Individuals with an associate degree have completed their education and initial family formation stages. They may have had employment prior to earning their associate degree and are assured of employment following receipt of their degree. The region probably has an economic base which utilizes workers with education and training. Increasing inhabitants with an associate degree contribute to population growth.

(h) Percent Housing Units Built, 1970-1979

These are *not old* housing units. The inhabitants purchased their homes, have maintained them and are likely to be home owners. Employed household members have job security and seniority, are near their salary peaks and may have more than one household member in the labor force. These households will probably retire in their current region of residence. Some of these inhabitants are *mature migrants*. They migrate to the area and purchase or rent a home similar to their prior residential experience. Percent housing units built the past 25 years contribute to population growth.

South Carolina

(a) Median Household Income, 1989

This is a basic indicator of household well-being. Households with substantial income are employed, may derive income from other sources and contribute to the economy and culture of their region. Population increase is predicted in areas where household incomes are high.

(b) Percent Housing Units Built, 1970-1979

These are *not old* housing units. The inhabitants purchased their homes, have maintained them and are likely to be home owners. Employed household members have job security and seniority, are near their salary peaks and may have more than one household member in the labor force. These households will probably retire in their current region of residence. Some of these inhabitants are *mature migrants*. They migrate to the area and purchase or rent a home similar to their prior residential experience. Percent housing units built the past 25 years contribute to population growth.

(c) Percent Housing Units Built, 1940-1949

Although there are many housing units in the state built prior to 1940, residential areas with large numbers from that era are problematic. Local economic base

problems are associated with retention of these units. Some construction during and immediately following World War II was hurried and of modest quality. Many of these units should be renovated or removed from the housing stock. Communities with large shares of these housing units are likely to experience stable or declining population.

North Carolina

(a) Median Household Income, 1989

This is a basic indicator of household well-being. Households with substantial income are employed, may derive income from other sources and contribute to the economy and culture of their region. Population increase is predicted in areas where household incomes are high.

(b) Percent Housing Units Built, 1989-1990

The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units are likely to result in population growth.

(c) Sex Ratio, 1990

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Labor force, income and racial distributions contribute to this association. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining inhabitant numbers.

(d) Percent Housing Units Built, 1980-1984

Many residents in this category have built or purchased a better quality home, are near their most productive working years, and have job security. Their children are likely to be in the upper teens, twenties and will soon leave the home or have done so. Other members of this group may be somewhat younger or older but their occupations and futures are similar. Residential relocation to these areas, is common. This independent variable is likely to contribute to population growth.

(e) Percent Migrating from a Different County, 1985-1990

This is *in-migration* which is the most effective means for population growth. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move.

Migration is generally for economic reasons. People move to accept employment and population growth is, in part, dependent on migration.

(f) Per Capita Deposits in Banks

First, large banks are located in urban central cities which are losing population. Large banks may invest reserves in international, national, or regional opportunities

rather than in local infrastructure. Banking functions are information, computer and electronic based. Thus, few employees are added. Financial centers in North Carolina do not enhance population growth.

Model II, Percent Change in Housing Units, 1990-2002

Region

(a) Percent Housing Units Built, 1989-1990
The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents, at their home sites, counted by our most recent census. These households and families are likely to have more than one member in the labor force. They may have migrated from another area to their current region. Future housing stock gains often follow increasing numbers of recently built homes.

(b) Percent Housing Units Built, 1985-1988
These are relatively new housing units, being added to the housing stock during the past 14 years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable contributes to housing stock increases.

(c) Percent Migrating from a Different County, 1985-1990
This is *in-migration* which is the most effective means to enhance housing demand. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. Homes are needed for employed persons and housing stock is, in part, dependent on migration.

(d) Per Capita Income, 1989
Per capita income is probably the optimum measure of economic resources for the population. The human base for this statistic is the entire population and the monetary base is aggregate cash income. Residential areas with moderate and higher per capita income have diversified economic bases, high rates of labor force participation and employment in sought after occupations. Quality of public and private services are more than adequate. Regions with high per capita income are expected to experience housing unit gains.

(e) Sex Ratio, 1990
This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Labor force, income and racial distributions contribute to this association. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining housing units.

(f) Percent Population Aged 25 and Over With an Associate Degree
Individuals with an associate degree have completed their education and initial

family formation stages. They may have had employment prior to earning their associate degree and are assured of employment following receipt of their degree. The region probably has an economic base which utilizes workers with education and training. Increasing inhabitants with an associate degree contribute to housing stock growth.

South Carolina

(a) Per Capita Income, 1989

Per capita income is probably the optimum measure of economic resources for the population. The human base for this statistic is the entire population and the monetary base is aggregate cash income. Residential areas with moderate and higher per capita income have diversified economic bases, high rates of labor force participation and employment in sought after occupations. Quality of public and private services are more than adequate. States with high per capita income are expected to experience housing unit gains.

(b) Percent Housing Units Built, 1940-1949

Although there are many housing units in the state built prior to 1940, residential areas with large numbers from that era are problematic. Local economic base problems area associated with retention of these units. Some construction during and immediately following World War II was hurried and of modest quality. Many of these units should be renovated or removed from the housing stock. Communities with large shares of these housing units are likely to experience stable or declining housing stock.

(c) Percent Housing Units Built, 1970-1979

These are *not old* housing units. The inhabitants purchased their homes, have maintained them and are likely to be home owners. Employed household members have job security and seniority, are near their salary peaks and may have more than one household member in the labor force. These households will probably retire in their current region of residence. Some of these inhabitants are *mature migrants*. They migrate to the area and purchase or rent a home similar to their prior residential experience. Percent housing units built the past 25 years contribute to total housing stock gains.

(d) Percent Change in Single Family Building Permits, 1990-1994

During the 1980s, needs for housing stock additions were perceived in some areas of South Carolina. Thus, substantial additions occurred 1990-1994 in those areas. Some of the dwellings ,which followed those permits, were of higher or lower cost than was the demand from households in those areas.

North Carolina

(a) Percent Housing Units Built, 1985-1988

These are relatively new housing units, being added to the housing stock during the past 14 years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable

contributes to total housing stock increases.

(b) Percent Housing Units Built, 1989-1990

The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents, at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Future housing stock gains are likely to follow increasing numbers of recently built homes.

(c) Sex Ratio, 1990

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Labor force, income and racial distributions contribute to this association. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining housing units.

(d) Percent Migrating from a Different County, 1985-1990

This is *in-migration* which is the most effective means for economic growth. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. Homes are needed for employed persons and housing stock is, in part, dependent on migration.

(e) Percent Population Aged 25 and Over With an Associate Degree

Individuals with an associate degree have completed their education and initial family formation stages. They may have had employment prior to earning their associate degree and are assured of employment following receipt of their degree. The region probably has an economic base which utilizes workers with education and training. Increasing inhabitants with an associate degree contribute to rising housing unit numbers.

(f) Percent Households with Mortgage Expending Greater than 35 Percent of Income

It is reasonable to assume that areas with adequate housing need lending institutions and those purchasing homes need mortgages. There is, nevertheless, a mortgage spending threshold. When mortgage expenditures exceed 30 percent of income, the residential area has problems. The area may have unemployment, low wages and salaries, and limited economic infrastructure. In North Carolina, large proportions of households expending 35 percent or more of their incomes on mortgage payments, contribute to stable or declining population.

Model III, Percent Change in Households, 1990-2002

Region

(a) Per Capita Income, 1989

Per capita income is probably the optimum measure of economic resources for the population. The human base for this statistic is the entire population and the monetary base is aggregate cash income. Residential areas with moderate and

higher per capita income have diversified economic bases, high rates of labor force participation and employment in sought after occupations. Quality of public and private services are more than adequate. Regions with high per capita income are expected to experience household gains.

(b) Percent Housing Units Built, 1989-1990

The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units are likely to result in growth of households

(c) Percent Housing Units Built, 1985-1988

These are relatively new housing units, being added to the housing stock during the past 14 years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable contributes to increases in households.

(d) Percent Migrating from a Different County, 1985-1990

This is *in-migration* which is the most effective means for household growth. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. Employed persons comprise households and household growth is, in part, dependent on migration.

(e) Percent Population Aged 25 and Over With an Associate Degree

Individuals with an associate degree have completed their education and initial family formation stages. They may have had employment prior to earning their associate degree and are assured of employment following receipt of their degree. The region probably has an economic base which utilizes workers with education and training. Increasing inhabitants with an associate degree contribute to household growth.

(f) Sex Ratio

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Labor force, income and racial distributions contribute to this association. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining household numbers.

(g) Percent Housing Units Built, 1970-1979

These are *not old* housing units. The inhabitants purchased their homes, have maintained them and are likely to be home owners. Employed household members have job security and seniority, are near their salary peaks and may have more than one household member in the labor force. These households will probably retire

in their current region of residence. Some of these inhabitants are *mature migrants*. They migrate to the area and purchase or rent a home similar to their prior residential experience. Percent housing units built the past 25 years contribute to growth of households.

(h) Percent Householders 65 Years of Age and Over

The population 65 years of age and older is a diverse group. Some need and use few public services while some require special care. Incomes may range from poverty to wealthy. Many states covet this group, particularly if they age in place or migrate to their new community prior to age 65. Their incomes are higher than state averages and are secure. Higher proportions of persons 65 years of age and older may contribute to growth of total households for the region.

South Carolina

(a) Percent Housing Units Built,1940-1949

Although there are many housing units in the state built prior to 1940, residential areas with large numbers from that era are problematic. Local economic base problems are associated with retention of these units. Some construction during and immediately following World War II was hurried and of modest quality. Many of these units should be renovated or removed from the housing stock. Communities with large shares of these housing units are likely to experience stable or declining households.

(b) Percent Renter Occupied Housing Without Motor Vehicle, 1990

First, renters are somewhat disadvantaged, compared to home owners. Although public transportation is available in some South Carolina cities, the majority of renters in the state do not have that service. Transportation, particularly by motor vehicle, enables households and families to enter and remain in the labor force. Absence of motor vehicles may contribute to declining household numbers.

(c) Employed Persons 16 Years of Age and Older

Employment is essential for a nation, region, state and community. The culture, social system, and economy depend on high rates of employment. This independent variable is crucial for South Carolina. Areas in the state with high proportions of persons 16 years of age and older, are likely to experience household growth.

(d) Percent Housing Units Built, 1970-1979

These are *not old* housing units. The inhabitants purchased their homes, have maintained them and are likely to be home owners. Employed household members have job security and seniority, are near their salary peaks and may have more than one household member in the labor force. These households will probably retire in their current region of residence. Some of these inhabitants are *mature migrants*. They migrate to the area and purchase or rent a home similar to their prior residential experience. Percent housing units built the past 25 years contribute to household growth.

North Carolina

(a) Per Capita Income

Per capita income is probably the optimum measure of economic resources for the population. The human base for this statistic is the entire population and the monetary base is aggregate cash income. Residential areas with moderate and higher per capita income have diversified economic bases, high rates of labor force participation and employment in sought after occupations. Quality of public and private services are more than adequate. Regions with high per capita income are expected to experience household gains.

(b) Percent Housing Units Built, 1989-1990

The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units are likely to result in growth of households.

(c) Sex Ratio

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining household numbers.

(d) Percent Urban Housing

This independent variable reflects the urban, *central city* areas of North Carolina. These residential centers attracted households for a century but are now losing population. It is likely that households will continue to decline in the large urban centers.

(e) Percent Housing Units Built, 1985-1988

These are relatively new housing units, being added to the housing stock during the past ten years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable will contribute to household gains.

(f) Percent Migrating from a Different County, 1985-1988

This is *in-migration* which is the most effective means for growth in households. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. Employed persons comprise households and household growth is, in part, dependent on migration.

(g) Percent Population Aged 25 and Over With an Associate Degree, 1990

Individuals with an associate degree have completed their education and initial family formation stages. They may have had employment prior to earning their associate degree and are assured of employment following receipt of their degree. The region probably has an economic base which utilizes workers with education and training. Increasing inhabitants with an associate degree contribute to house-

hold growth.

Model IV, Percent Change in Families, 1990-2002

Region

(a) Median Selected Monthly Owner Costs, 1990
This is a crucial independent variable because families are more likely to be home owners than non-family households. It is clear that many families in the region have adequate incomes and discretionary funds to improve their homes. Local infrastructure provides all essential services, value of these homes are well above average, and repairs and improvements are expedited when needed. This independent variable contributes to increasing numbers of families.

(b) Percent Housing Units Built, 1989-1990
The 1990 Census of Population and Housing was conducted April 1, 1990. The occupants of these housing units are the newest residents, at their home sites, counted by our most recent Census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units may produce growth in numbers of families.

South Carolina

(a) Percent Housing Units Built, 1940-1949
Although there are many housing units in the state built prior to 1940, residential areas with large numbers from that era are problematic. Local economic base problems are associated with retention of these units. Some construction during World War II was hurried and of modest quality. Many of these units should be renovated or removed from the housing stock. Communities with large shares of these housing units are likely to experience stable or declining numbers of families.

(b) Median Household Income, Income, 1989
This is a basic indicator of household well-being. Households with substantial income are employed, may derive income from other sources and contribute to the economy and culture of their region. Rising numbers of families are predicted in areas where household incomes are high.

(c) Percent Change in Single Family Building Permits, 1990-1994
During the 1980s, needs for housing stock additions were perceived in some areas of South Carolina. Thus, substantial additions occurred 1990-1994 in those areas. Some of these, both permits and completed dwellings, were of higher or lower cost than was the demand from households in those areas.

North Carolina

(a) Percent Housing Units Built, 1989-1990
The 1990 Census of Population and Housing was conducted April 1, 1990. The

occupants of these housing units are the newest residents at their home sites, counted by our most recent census. These households and families often have more than one member in the labor force. They may have migrated from another area to their current region. Increasing numbers of recently built housing units may produce growth in numbers of families.

(b) Percent Housing Units Built, 1985-1988

These are relatively new housing units, being added to the housing stock during the past 14 years. Households and families inhabiting these units are likely to be employed, more than one member in the labor force, above average household incomes, and are middle aged or mature adults. This independent variable will contribute to rising numbers of families.

(c) Sex Ratio, 1990

This independent variable suggests that additional males in a population will result in stable or declining inhabitants. Females live longer than males so the proportion of widows and other single females in a community contribute to this statistical association. Some colleges and universities enroll more males than females and those areas may not grow. Military installations are usually predominantly male. These three types of communities can expect stable or declining family numbers.

(d) Median Household Income, 1989

This is a basic indicator of household well-being. Households with substantial income are employed, may derive income from other sources and contribute to the economy and culture of their region. Increasing numbers of families are predicted in areas where household incomes are high.

(e) Percent Migrating from a Different County, 1985-1990

This is *in-migration* which is the most effective means for population growth. Births add to the inhabitant base but need two decades to be productive. Migration is often household or family based; i.e., two, three, or more persons move. Migration is generally for economic reasons. Rising numbers of families in communities are, in part, dependent on migration.

SUMMARY

Strengths of independent variables in predicting inhabitant increases and economic development are reviewed. With respect to projected population change, 1990-2002, substantial *median household income* and *percent housing units built 1989-1990*, were most likely to contribute to population increase throughout the Region. *Median household incomes* are most significant in predicting population change for counties of North Carolina and South Carolina, as well.

With respect to change in households, 1990-2002, *per capita income* is the most significant independent variable for the Region and for South Carolina. Significant independent variables for South Carolina have produced negative correlations. *Percent housing units built 1940-1949* and *percent renter occupied housing without motor vehicle, 1990*, contribute to decline (stable numbers at best) in numbers of households.

Change in housing units, 1990-2002, is an important dependent variable. For the

Region, *percent housing units built 1989-1990* and *percent persons migrating from a different county in the same state 1985-1990*, were most significant. In North Carolina, *percent persons 25 years of age and older with an associate degree* is significantly related to household growth. Thus, for the Region, disbursements for public education, residential relocation and new housing stock are the chief contributors to population and housing unit growth.

For South Carolina, *per capita income* and *percent housing units built 1970-1979*, have the greatest influence on inhabitant growth. Per capita income is associated with economic and population growth in the nation, region and South Carolina. We, in South Carolina, draw less strength from recently built homes than from those built 20-30 years ago.

NORTH CAROLINA

Magnitudes and rates of growth are more impressive in North Carolina than in South Carolina for several interrelated reasons. In North Carolina, opportunity structures are available for higher wages and salaries; individuals earn associate degrees; households and families migrate, albeit to counties and communities providing employment; demand for housing is created; housing units are built; and household numbers increase.

North Carolina demonstrates strengths through four regression models. Significant independent variables include: median household income; per capita income; percent housing units built, 1989-90; and percent housing units built, 1985-88. Public and private investment in North Carolina has contributed to economic growth and to demand for housing. The independent variable: percent migrating from a different county, 1985-90, is indicative of cultural and institutional dynamics. Many individuals, households and families move from other states to North Carolina each year, and even larger numbers move from county-to-county within the state.

The independent variable, percent population 25 years of age and older with an associate degree, is significant in two of the North Carolina models. Growth is, in part, dependent on education, including that proportion of the adult population earning and benefitting from an associate degree. Provision of employment opportunities, housing and other social infra-structure in the past century certainly establishes foundations for growth in most counties and communities of North Carolina. Nevertheless, the state has declining numbers of middle and upper-class families in several metropolitan and urban centers. Concentrations of poverty-stricken households and neighborhoods displaying income inequality, do exist in those cities.

SOUTH CAROLINA

There is some good news for South Carolina. Regression models for the state include the significant independent variables of median household income and per capita income. Incomes have increased during the recent past in South Carolina and forecasts suggest that growth will continue for the private sector. Another positive result is the independent variable, percent employed persons aged 16 and over, 1990 in Model III. This variable is not a predictor in any region or North Carolina model.

However, the independent variable, percent housing units built from 1940-49, produces significant negative signs in each of the South Carolina models. Housing from this era is located in and affects many communities in the state. This housing stock retains those unwilling to move; households with special needs (e.g., elderly, physically and mentally challenged); and those with incomes below the poverty threshold.

Another problem for South Carolina is the independent variable, percent renter occupied housing without a motor vehicle. This variable is indicative of persistent poverty in many neighborhoods. Acceptable quality of life and economic growth cannot be expedited if potential workers do not have transportation. This is relevant in selected metropolitan, urban, nonmetropolitan and rural areas of the state. Capital improvements are needed in these areas. Additional recommendations follow.

< Increase economic commitments to public education.
< Selectively replace pre-1950 housing stock.
< Promote and implement public transportation to and from poor and working class neighborhoods.
< Enhance statewide information systems about job opportunities.

It is hoped that the latter will increase residential relocation from stable and declining communities to growth communities in South Carolina.

FURTHER RESEARCH

The multivariate, demographic inquiry reported here, has specified variables associated with inhabitant and economic growth. This research, should be replicated following the 2000 Census of Population and Housing. Additional data are available from several Censuses at five year intervals. Other U.S. Department of Commerce data are collected on an annual basis. Data from other federal, state and private sources should be retrieved and processed. Although the authors collected and analyzed a large number of variables, additional entries can and should be investigated. Research of this nature contributes to social science disciplines and particularly to specialities concerned with policy, quality of living, social infrastructure, economic infrastructure, housing demography, residential relocation, economic base, labor force, consumption, income, income inequality, public education, public expenditures, private investment and land use.

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