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*Future conditions with cluster development practices*

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# Carolina Planning

*The Planning Journal of the Southeast*

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**From the Editors:**

"I see *Carolina Planning* as a bridge between planning practice and planning education," says Dr. David Godschalk, faculty advisor to the *Carolina Planning Journal* in an interview that appears in this edition (p. 28). This past spring marked the retirement of Dr. Godschalk from the DCRP faculty after 36 years of dedicated service. In this issue, Godschalk shares a retrospective of the journal since the publication's inception in 1975.

This issue of *Carolina Planning*, like the numerous issues that have preceded it, offers readers an interesting mix of practical and educational content. In the first article of this edition, Dr. Mulatu Wubneh asks, A*re regional economies in North Carolina converging, or are they diverging*? Dr. Wubneh sheds light on this important question of regional income disparity in North Carolina, revealing which regions are experiencing the highest rates of growth, and why.

*You have to see it to...understand it.* In this issue, two planners from the town of Cary, NC — Scott Ramage and Michael Holmes — describe how the town has used photo simulation in recent years to assist in the comprehensive planning process.

Not all parties involved in local land use decisions know about the laws governing *ex parte* communications: private conversations with an impartial decision maker. Such communications, though disallowed by law in certain land use decisions, happen all too frequently, according to Thomas Terrell, Jr. In his article, Terrell offers ways in which the planning community can educate parties involved in a dispute on the laws governing *ex parte* communications so as to level the playing field.

As always, we invite readers to respond to our content and design and to submit manuscripts for publication in future issues. Thank you for your continued support of our efforts.

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# Forging Ahead and Lagging Behind: An Analysis of Convergence and Economic Development in North Carolina

**Abstract**

*This paper analyzes trends in economic development in North Carolina to determine whether there has been evidence of per capita income convergence in the state during the period 1970-2000. The analyses reveal that (a) there has been a process of convergence of per capita income in the state in the past three decades, and (b) income convergence in NC occurred during a period of economic expansion and divergence during economic decline. However, a comparative analysis of metro and non-metro counties as well as among traditional geographic areas indicates that there was a general trend of divergence in metro areas and convergence in non-metro areas. This trend suggests that there are pockets of affluence and pockets of poverty existing side by side in the state. The regression analyses reveal that while the initial level of per capita income, human resource development and population growth had a significant impact on income growth, the impact of urbanization and investment in infrastructure was weak. The analysis on economic structure shows that employment in manufacturing had a major impact but employment in agriculture and services did not.*

**Mulatu Wubneh**

## Introduction

Has there been a narrowing of disparity in income between residents of metro and non-metro counties as well as among the traditional geographic regions – Mountain, Piedmont and Coastal areas – of the state in the last few decades? In other words, are regional economies in North Carolina (NC) converging or diverging?

These are questions that have received surprisingly little attention from academics and policy makers in the state. During the last thirty years, North Carolina policymakers have initiated a number of programs to redress imbalance of growth in the state, including the Rural Initiative Program, the Community Partnership Program, and the Balanced Growth Policy. To date, no evaluation has been conducted to determine the impact of these programs have had in reducing regional income disparities in the state.

The concept of convergence, that is, the tendency for income differences to narrow over time, is important because it can inform policy makers of the need for development policies to promote equity and growth. If regions are converging over time, economic disparities between regions may diminish naturally. On the other hand, an absence of convergence, or convergence at a very slow pace, suggests the need for proactive policies to promote growth and reduce income inequalities.

*Mulatu Wubneh is Chair and Professor of the Department of Planning, College of Technology and Computer Science at East Carolina University. Dr. Wubneh's area of interest focuses on economic development and rural planning, particularly in smaller communities.*

The Piedmont area traditionally has enjoyed a higher per capita income (PINC) than the Mountain or Coastal regions. The substantial investment in infrastructure and education has spawned a thriving economy in the Piedmont area, while the coastal and mountain areas have lagged behind. In the last three decades, the state has tried to stimulate growth in the lagging western and eastern regions by investing in infrastructure, education and health care, but it has achieved limited success in reducing long-standing regional disparities in the state. For instance, in 1970, average real per capita income in the Piedmont area was about 111 percent of the state average, while in the coastal areas it was 87 percent. By 2000, the PINC for the coastal area further declined to 85 percent of the state average, while the average for the Piedmont area remained relatively stable.

In terms of population growth, North Carolina ranks 6th in the nation. The state population grew by 21.4 percent between 1990 and 2000. A look at the population growth between the metro and non-metro counties shows that many of the counties that lost population in the last census or those that lagged in population growth are non-metro counties. According to the 2000 Census, 18 of the 29 counties (69 percent) that experienced a growth rate below half the state average of 21.4 percent between 1990 and 2000 are in the coastal areas (see Figure 1).

North Carolina has made a major stride in reducing the poverty rate in the state. The poverty rate has dropped from an average of 20.3 percent in 1970 to 12.3 percent in 2000. The poverty rate is significantly higher in the non-metro areas than in the metro areas. The eastern region of the state features the highest rates of poverty (Figure 2). The data for 2000 show that four out of five of the counties that have a poverty rate above the state average are non-metro. A full 57 percent of these counties are located in the Coastal area.

High poverty rates in the non-metro areas and the increasing development gap between the metro and non-metro counties may have serious

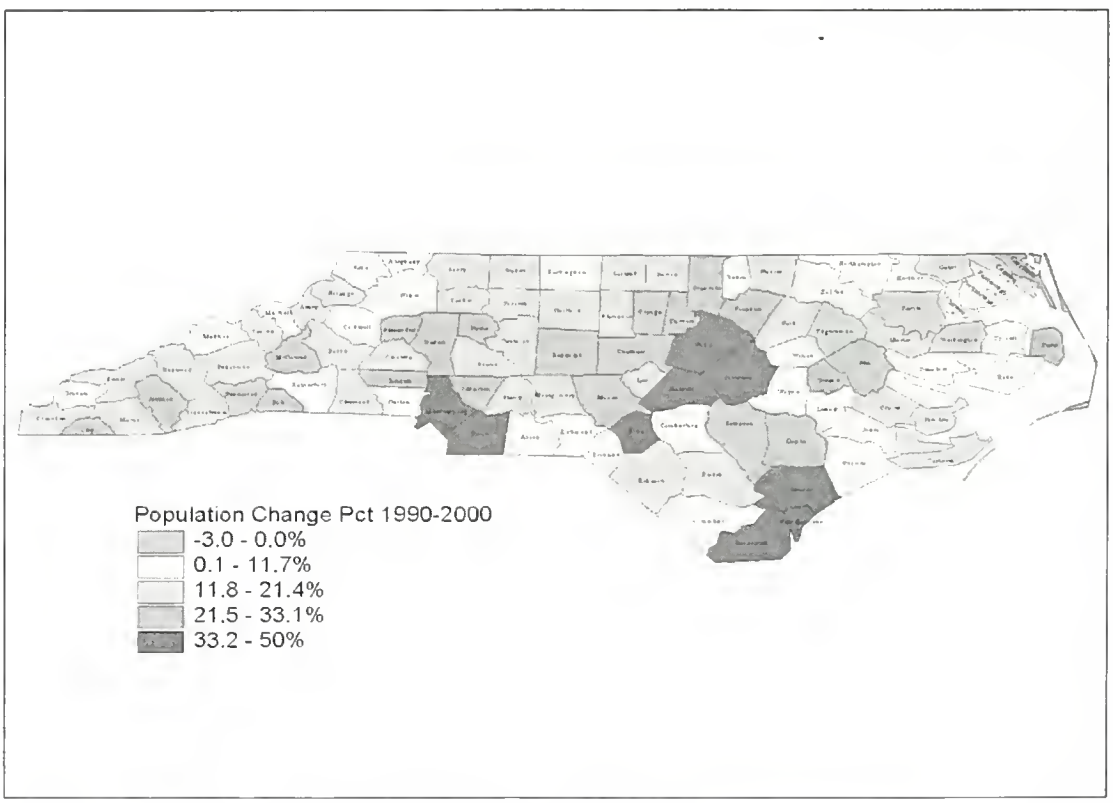



*Figure 1: Population Growth in North Carolina, 1990-2000*

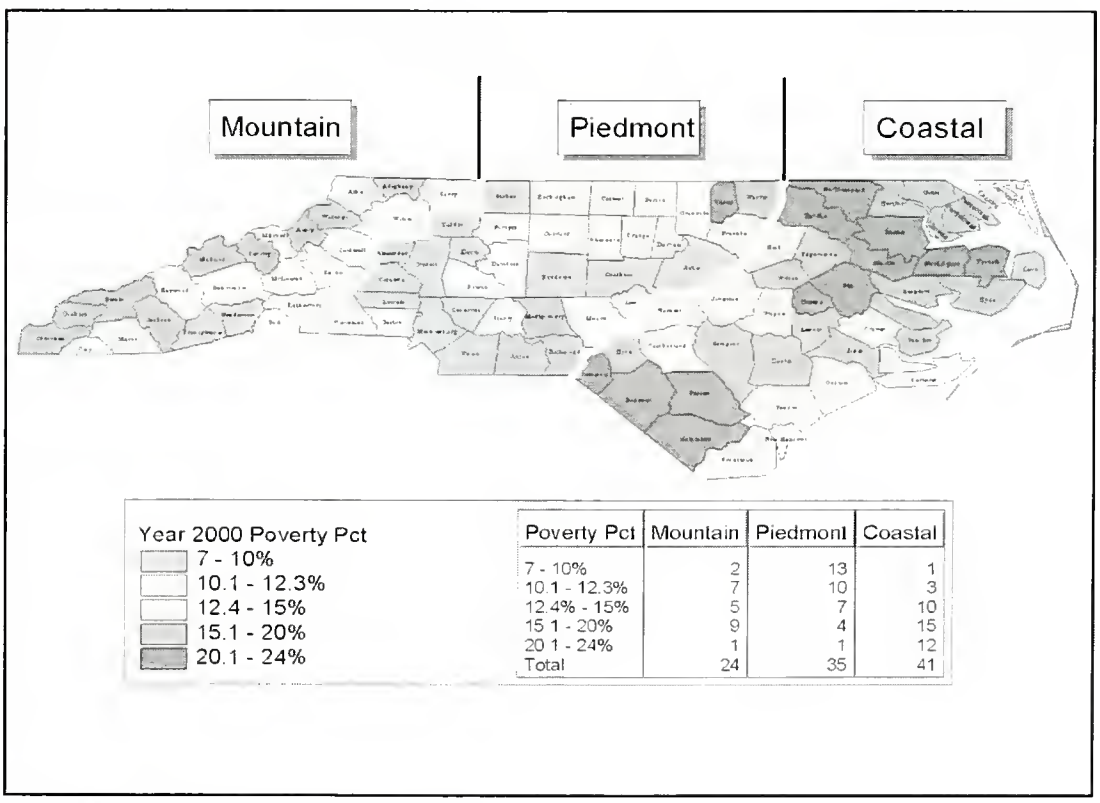
repercussions upon the social, economic and political fabric of the state. A number of community leaders, particularly those from counties that lost population in the last census, are wondering whether economic development in North Carolina is converging or diverging. Hence, the questions regarding economic development trends in the state as well as among the traditional geographic areas are quite appropriate.

The objective of this study is to analyze economic development in the state and to determine if there has been evidence of per capita income convergence during the period 1970-2000. The study also seeks to identify factors that account for differences in income change by examining trends in population growth, urbanization, infrastructure investment, human resource development and employment structure. The analysis employs the economic convergence model (Box 1).

**Regional Disparity in North Carolina**

Regional economic convergence analysis among North Carolina counties will be conducted at three levels. First, regional income difference over the period 1970 to 2000 will be examined by comparing income trends between metro and non-metro counties. This analysis should provide insight into the long-term trend in income growth among the counties resulting from a process of urbanization. Urbanization, which is a good measure of the relative concentration of economic activities, is often associated with large growth potential. The classification between metro and non-metro counties is based on population. According to the Census Bureau, in 1999 North Carolina had 35 counties classified as metro counties (Appendix A).

The second approach will analyze income growth among the three major geographic regions of the state. Geographically, North Carolina can




| Poverty Pct | Mountain | Piedmont | Coastal |
|---|---|---|---|
| 7 - 10% | 2 | 13 | 1 |
| 10.1 - 12.3% | 7 | 10 | 3 |
| 12.4% - 15% | 5 | 7 | 10 |
| 15.1 - 20% | 9 | 4 | 15 |
| 20.1 - 24% | 1 | 1 | 12 |
| Total | 24 | 35 | 41 |

*Figure 2: Poverty in North Carolina, 2000*

**Box 1: Regional Economic Convergence Model - The Debate and Measures**

The question of whether economies exhibit convergence, that is, a tendency of income differences to narrow over time, has been a focus of many studies for several decades. The problem has been examined at the global and national levels and various explanations have been offered on which factors cause convergence or divergence in income among regions. No consensus seems to have emerged on the explanations. Despite the divergence in views, the theory on regional economic convergence can be broadly divided into two major streams of thought.

The first relates to advocates of the convergence theory. Based on traditional neoclassical theory of economic growth, advocates of the convergence theory argue that because of factor mobility and problems of diminishing returns to capital, regional differences in income will decline over time. The tendency for disparities to decline over time is associated with factor costs being lower and profit opportunities being higher in poorer regions than in richer ones. A related argument is that poorer regions have low ratios of capital to labor, hence a higher marginal product of capital. This implies that capital would flow from richer to poorer areas. The expected outcome is that poorer regions will grow faster than richer regions, resulting in the equalization of income between richer and poorer regions. Trade and free flow of factors will also facilitate the equalization of factor prices between the poorer and richer regions

The second , which advocates the views of the divergence theory, maintains that because of problems of cumulative causation, economic development occurring in a leading region goes through a process of self-sustaining and self-reinforcing which leads to divergence in growth among regions. The leading region that takes advantage of agglomeration economies and technology and innovation benefits will grow faster than the lagging regions. Advocates of the divergence theory also argue that factor mobility, for instance labor mobility, may be impeded by high cost of living, infrastructure problems, or inadequate institutional structure and poor managerial skills.

Another important factor associated with regional convergence is related to the economic structure of regions, specifically to the characteristics of industries in the region. For instance, a relatively higher share of agriculture may be problematic for a regional growth potential since prospects for growth in agriculture demand have been limited in the last few decades. On the other hand, a relatively higher share of services in employment can be interpreted as an indication of a more dynamic and diversified regional economy. Therefore, one could hypothesize that the relationship between per capita income growth and employment share in agriculture would be negative whereas the relationship between per capita income and the share of employment in services would be positive. If the hypothesized relationships are valid, then the growth reducing effects of agriculture are stronger than its growth inducing effect. In the case of services, the opposite is true, except when the service sector is dominated by comparatively low-skill, low value-added activities such as hotels, tourism, and retail. If the service sector is dominated by low value-added activities, its growth potential is low, and, therefore, we would expect a negative relationship with income. With respect to manufacturing, a relatively higher share of employment in manufacturing is likely to have a larger growth potential as large number of employees may be engaged

Interest in convergence analysis has led to the development of several ways of measuring convergence often categorized as static and dynamic measures. The static measures provide a snapshot of inequalities at a point in time. One major example of this method is the Gini-coefficient index [1].

The second sets are the dynamic measures, which are used to examine long-term growth/change in income. Two of the major dynamic measures are:

**a. Sigma (ó) Convergence** – This measure tracks the intertemporal change in the level of income among regions. Both the standard deviation and the coefficient of variation (CV) are used in the ó-Convergence. Basically, if the CV (standard deviation divided by the mean) for a group of economies is smaller at the end of a period than at the beginning, then the economies have converged.

**b. Beta (â) Convergence** – This measure focuses on the change in the mobility or position of individual economies within a distribution and it is used to answer the question of whether poorer economies are catching up to richer countries. Another way of looking at this measure is to compare the growth rates of the lowest income economies and the growth rates of the highest income economies. This method is often derived by regressing growth in per capita income on initial income.

*Table 1: Ranking of the Top 10 Counties in the state, 1970-2000*
**(Note:** Ranking based on 1970 PINC. Data refer to real values.)

| County | PINC 1970 | | | County | PINC 2000 | Average Ann Gr. 70-2000 |
|---|---|---|---|---|---|---|
| *Top 10* | | | | | | |
| Mecklenburg | 11099 | | | Mecklenburg | 22041 | 3.29% |
| Forsyth | 10921 | | | Wake | 21404 | 3.20% |
| Guilford | 10777 | | | Forsyth | 18791 | 2.48% |
| Wake | 10436 | | | Chatham | 17774 | 2.34% |
| Durham | 10032 | | | Guilford | 17678 | 2.54% |
| Catawba | 9808 | | | Moore | 17654 | 2.67% |
| Orange | 9442 | | | Polk | 17602 | 2.88% |
| Alamance | 9266 | | | Durham | 17342 | 2.91% |
| Cabarrus | 9083 | | | Davie | 17046 | 2.92% |
| Polk | 9045 | | | Cabarrus | 16955 | 2.92% |
| **NC** | **8494** | | | **NC** | **15665** | **2.81%** |

be divided into three major regions – Mountains, Piedmont and Coastal. These areas are identified based on elevation, and geographers have used the regions to analyze the physical and socioeconomic characteristics of the State (see Lonsdale, 1967). Appendix B depicts the geographic classification of the state. These three areas have developed at different rates with the Piedmont area leading in economic and population growth in contrast to the Mountains or Coastal Regions (see figure 1).

The third level of analysis will look at the growth in income among the metro and non-metro counties within the three geographic areas. This analysis is conducted to further investigate if urbanization or the lack of it had any impact in influencing the growth in income among the three geographic areas.

The analysis will be based on regional real per capita income (PINC) growth for the period 1970 to 2000. Regional per capita levels are the most commonly used indicators for analyzing differences in economic development. The per capita income measures were derived from the North Carolina State Data Center – Log Into North Carolina (LINC). The figures were converted into real values by using the consumer price index (CPI). [2] The succeeding analysis will present trends in income growth based on the different levels.

*Trends in Per Capita Income*

North Carolina counties have experienced steady growth in PINC since the 1970s. While the state has grown at an average of 2.81 percent per annum, growth rates were much lower in some regions, particularly in the coastal areas. What is of interest to our study is whether the growth experience has been shared equally across the state to the extent that the fastest growth has taken place in the counties/regions that were relatively poor at the start of the study period.

As a prelude to the formal investigation of the convergence hypothesis, this section will examine the change in per capita income in the state over the period 1970 – 2000. Table 1 reports the ranking of the top 10 counties in the state based on per capita real income between 1970-2000. Average annual growth rates are also shown for each county for the same period. The table clearly demonstrates that the top 10 counties have grown above the state annual per capita income growth rate of 2.81 percent and counties such as Mecklenburg have maintained their rank

throughout the study period. However, some counties, particularly those in the Piedmont area have shown a tremendous growth. For instance, Wake and Chatam counties moved from 4th and 28th rank in 1970 to 2nd and 4th respectively in 2000. Conversely, Warren and Hoke, which ranked 90th and 88th in 1970 dropped down to 99th and 100th respectively in 2000. The growth rate also indicates that the many of the counties in lower ranking grew at a rate much lower than the state average of 2.81 percent during the same period. For example, Warren and Hoke's annual growth rate was 2.75 and 1.69 percent respectively. Overall, with slight exceptions, there was no major shift in the relative positions of the top 10 counties.

*Metro Vs. Non-metro Areas*

Table 2, Part A, shows the difference in real per capita income between metro and non-metro counties for the period 1970 – 2000. Two important facts can be discerned from the table. First, average real per capita income in non-metro areas has slightly declined from about 85 percent of the state average in 1970 to 83 percent in 2000. The share of income for metro counties has essentially remained the same during this period. Second, the gap in per capita income between metro and non-metro counties has continued to increase from $2,087 in 1970 to $3,904 in 2000. Third, the coefficient of variation shows an increasing trend in metro areas and a slight decrease in the non-metro areas[3]. This trend suggests that there has been a steady state of income levels in the non-metro areas and a trend toward divergence in the metro areas.

*Geographic Areas*

Income difference in North Carolina can also be discerned by examining trends in income growth among the three geographic regions: Mountain, Piedmont and Coastal Areas. As illustrated in Table 2, Part B, the Piedmont area, which has had a history of higher per capita income in the state, has continued to lead throughout the study period. It is interesting to note that this trend has remained the same in the last three decades –

*Table 2: Average Per Capita Real Income Dispersion by Region, 1970-2000*

| | 1970 | | 1980 | | 1990 | | 2000 | |
|---|---|---|---|---|---|---|---|---|
| | Average | %of NC | Average | %of NC | Average | %of NC | Average | %of NC |
| **Region [Part A]** | | | | | | | | |
| **Metro** | 9259 | 108.9% | 10802 | 107.6% | 14377 | 107.7% | 16932 | 108.1% |
| **Non-metro** | 7172 | 85.0% | 8692 | 86.6% | 11337 | 84.9% | 13028 | 83.2% |
| ***NC Average*** | ***8494*** | | ***10038*** | | ***13344*** | | ***15665*** | |
| **Geog Areas [Part B]** | | | | | | | | |
| **Mountains** | 7515 | 88.5% | 9082 | 90.5% | 11995 | 89.9% | 13851 | 88.4% |
| **Piedmont** | 9412 | 110.8% | 11029 | 109.9% | 14864 | 111.4% | 17307 | 110.5% |
| **Coastal** | 7404 | 87.2% | 8800 | 87.7% | 11248 | 84.3% | 13325 | 85.1% |
| ***NC Average*** | ***8494*** | | ***10038*** | | ***13344*** | | ***15655*** | |
| **Metro Counties [Part C] By Geog Areas** | | | | | | | | |
| **Mountains** | 7903 | 93..1% | 9370 | 93.3% | 12443 | 93.2% | 14599 | 93.2% |
| **Piedmont** | 9827 | 115.6% | 11457 | 114.1% | 15473 | 115.9% | 18034 | 115.1% |
| **Coastal** | 8037 | 94.6% | 9350 | 93.2% | 11741 | 88.0% | 14212 | 90.7% |
| ***NC Average*** | ***8494*** | | ***10038*** | | ***13344*** | | ***15655*** | |
| **Non-metro Counties by Geog Areas [Part D]** | | | | | | | | |
| **Mountains** | 7364 | 86.7% | 9062 | 90.3% | 11946 | 89.5% | 13453 | 85.9% |
| **Piedmont** | 7730 | 91.0% | 9261 | 92.3% | 12066 | 90.4% | 13656 | 87.2% |
| **Coastal** | 6801 | 80.1% | 8218 | 81.9% | 10634 | 79.6% | 12394 | 79.1% |
| ***NC Average*** | ***8494*** | | ***10038*** | | ***13344*** | | ***15655*** | |

*Table 3: Poverty in NC, 1970-2000*

| Region | 1970 Average | 1980 Average | 1990 Average | 2000 Average |
|---|---|---|---|---|
| **State (NC) [Part A]** | 20.3 | 14.8 | 13.0 | 12.3 |
| **Metro and Non-metro [Part B]** | | | | |
| Metro | 19.0 | 13.0.7 | 11.9 | 11.6 |
| Non-metro | 28.7 | 19.5 | 17.7 | 15.8 |
| **Geographic Areas [Part C]** | | | | |
| Mountains | 25.2 | 17.9 | 16.3 | 13.9 |
| Piedmont | 18.8 | 13.2 | 11.9 | 11.7 |
| Coastal | 30.9 | 21.0 | 18.5 | 16.9 |
| **Metro Counties by Geographic Areas [Part D]** | | | | |
| Mountains | 19.5 | 14.4 | 13.6 | 13.3 |
| Piedmont | 15.2 | 11.3 | 10.0 | 10.0 |
| Coastal | 26.7 | 18.7 | 15.2 | 14.2 |
| **Non-metro Counties by Geographic Areas [Part E]** | | | | |
| Mountains | 26.4 | 18.6 | 16.8 | 14.0 |
| Piedmont | 24.0 | 16.0 | 14.9 | 14.3 |
| Coastal | 32.3 | 21.7 | 19.6 | 17.7 |

average per capita income in the Piedmont areas in 1970 was 110.8 percent of the state average; the same trend prevails in 2000. However, the gap in income between the Piedmont and other geographic areas has continued to widen. For instance, the gap between the Piedmont and the Coastal areas in 1970 was $2,008; in 2000, this gap has almost doubled to $3,982. Similarly, in 1970, 9 of the top 10 counties in the state were in Piedmont area. A similar situation existed in 2000. The coefficient of variation for per capita income by geographic regions shows an increasing trend in the Piedmont area, a decline in the mountain areas and a relatively stable trend in the Coastal areas [4]. See also Figure 3.

*Metro Counties by Geographic Areas*

The relative share of income for Metro counties [Table 2, Part C] shows that those in the Mountains and the Piedmont areas have essentially maintained their share whereas the metro counties in the Coastal areas have experienced a decline. The coefficient of variation for the metro areas confirms this pattern.

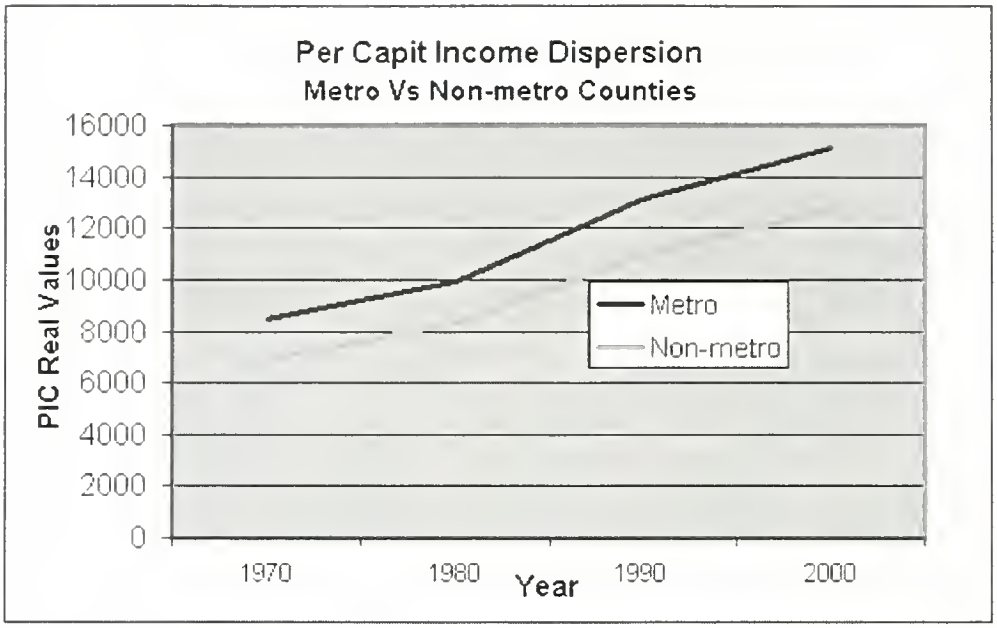
*Non-metro Counties by Geographic Areas*

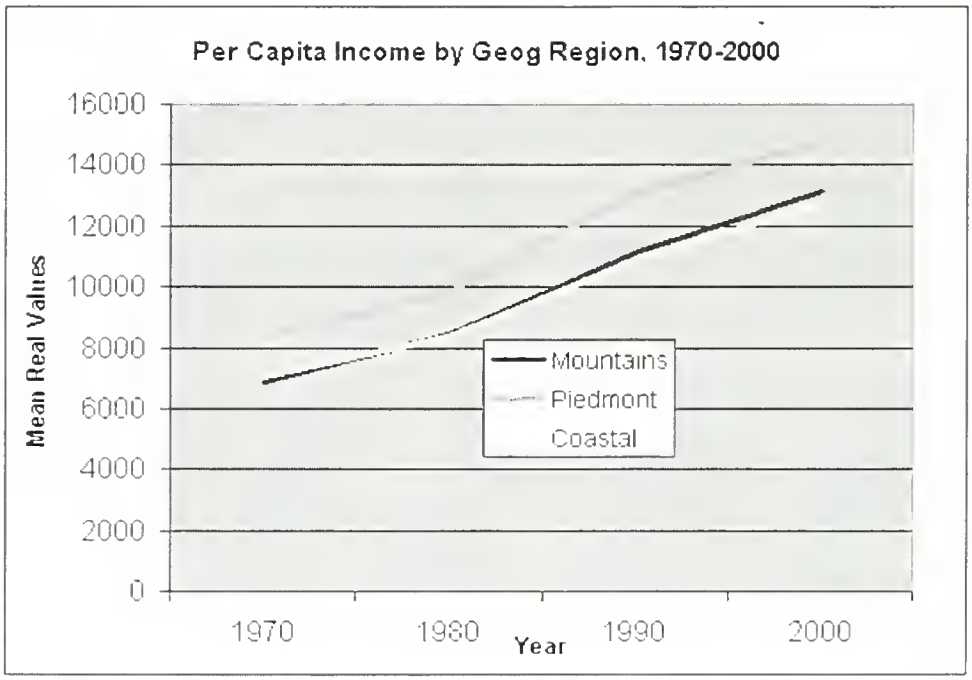
The next level of analysis focuses on the trend in real per capita income growth among non-metro counties in the state. This analysis helps to determine if the rural counties in North Carolina have benefited from the state's income growth in the last three decades. It also helps to examine (a) if there are significant differences in income growth among the rural communities in the three geographic areas of the state, and (b) if the State's rural initiative program has made a significant difference in improving the relative share of the rural communities.

As illustrated in Table 2, Part D the relative share of income among the non-metro counties in the three geographic regions has declined throughout the study period. Even the rural communities in the Piedmont area have not been spared this relative decline (the decline in the Piedmont area was from 91 percent of the state average in 1970 to 87 percent in 2000). By contrast the metro counties in the Piedmont area have managed to maintain their relative share.

An analysis of the poverty rate by metro versus non-metro areas as well as among the three geographic areas also shows a similar trend. As illustrated in Table 3, North Carolina counties in general have done very well in reducing their poverty level; the Mountains and Coastal areas have cut their poverty rate almost in half in the last three decades. The Piedmont area, which has had a relatively low poverty rate, still maintains a rate below the state average of 12.3 percent in

*Figure 3: Per Capita Income Dispersion*



**Box 2: â-convergence Measure**

The literature on economic convergence is largely based on the neoclassical growth theory, which uses concepts such as ó–convergence and â-convergence to evaluate the growth performance of various economies. According to the convergence theory, for ó–convergence to occur, the dispersion in per capita income must decline over time, that is, over a given period, say time t to $t_{t+1}$, $ó_{t+1} < ó_t$ must hold true.

The â-convergence predicts that due to the neoclassical assumption of diminishing returns, poorer economies will grow faster than richer economies, and in due course all economies will converge to the same steady state. This type of economic growth leading to convergence is called the unconditional â-convergence. To test for unconditional â-convergence, the commonly applied equation, which approximates the transitional growth process in the neoclassical model, takes the following form.

$$Yi_{t+1} = a - b \log (Y_{io}) + e_{it} \qquad (1)$$

where $Yi_{t+1}$ = the average growth rate of per capita income over the period t to $t+_1$, log ($Y_{io}$) is the logarithm of the initial level of per capita income, b indicates the rate of â-convergence, and $e_{it}$ is the error term. Convergence in an economy implies that the derivative of growth of per capita income over initial level of income is negative.

$$\frac{d(Yi_{t+1})}{d(Y_{io})} < 0 \qquad (2)$$

A positive sign of the coefficient estimate for log ($Y_{io}$) indicates divergence.

The second type of convergence is called the conditional â-convergence, which argues that only once the determinants of an economy's steady-state growth level are controlled will the economy converge to its individual steady state. To test for conditional â-convergence, a vector of $X_i$ variables that control for cross-economies variation in steady state values are added to equation (1).

$$Yi_{t+1} = a - b_1 \log (Y_{io}) + b_2 X_{it} + e_{it} \qquad (3)$$

A negative coefficient estimate of log ($Y_{io}$) is again interpreted as evidence of convergence.

The literature on convergence theory uses a number of control variables to explain the growth process among various economies and to evaluate if there has been conditional convergence. The control variables have been identified as policy or "core" and economic variables. The core variables serve as proxy for the fundamental determinants of the steady state in the neoclassical model and the economic structure variables are included to further isolate those factors that influence the movement towards the steady state. Some examples of the core variables are infrastructure investment and human resources, and of the economic structure are those representing employment in different sectors of the economy.

The estimation procedure used the pooled time-series method, also known as the panel analysis method. The panel method is used because of its ability to account for the effects of time and space. For the estimation, we selected the ordinary least square (OLS) method. The estimation based on the general least square (GLS) method gave essentially the same results.

2000. The Mountain and the coastal areas have a rate of 14 percent and 17 percent respectively (see also Figure 2).

### III. Methodology

Interest in regional income inequality has led to the development of several ways of measuring income dispersion over time. Box 2 illustrates the regression approach, the most widely used method based on the works of Barro and Sala-I-Maratin (1995).

### VI. Variables and Data

The data used in this study are for the period 1970-2000, grouped into three ten-year intervals as 1970-80, 1980-90, and 1990-2000. This grouping gives the advantage of smoothing the periodic fluctuation and making the data less prone to serial correlation, which is a major problem in using annual data. Data are derived from the North Carolina State Data Center – LINC.

The dependent variable is average annual growth of per capita income (AGPINC) in NC counties for the three periods pooled together. The value of the independent variables represents the initial level of average per capita income for each decade. This approach helps to eliminate the simultaneity bias problem, which is a major issue in convergence analysis.

The core variables include:

*Initial level of per capita income (LPINC).* This variable serves as a proxy for the steady-state level of physical capital, initial resource endowments and technology (Barro 1991). If there is income convergence, we expect the coefficient of LPINC to be negative throughout the study period. A log form of the variable is used in the analysis.

*Total population growth (POPCH).* This variable captures the change in income as a result of change in capital-labor ratio. In the neoclassical growth model, growth in population will cause the level of income (Y) to decline through a lowering of the capital-labor ratio, as capital must spread over a greater population. Therefore, we expect the coefficient of population growth to be negative.

*Urbanization (URBAN).* The share of urbanization (urban as a proportion of total population) serves as a proxy for agglomeration economies, which intensifies growth creating a positive impact on the growth of income (Y). Therefore, we expect a positive relationship between share of urbanization and growth of per capita income.

*High school and college graduates (age 25+) as a percentage of population (EDPOP).* This variable is used as a proxy for human capital. The literature on economic convergence argues that increase in the level of human capital will increase the steady-state level of per capita income by improving the ability of workers to adopt new technology and ideas, thus raising the productivity of labor (Barro and Sala-i-Martin 1995, Coulombe and Tremblay 2000). Based on this assumption, we expect the coefficient of EDPOP to be positive.

*Per capita expenditure on infrastructure (PCEXINF).* This variable includes per capita expenditure on utilities, road and other capital facilities spent by local government. Expenditures in infrastructure are expected to enhance the level and quality of infrastructure and thereby increase the steady-state level of income (Y). Therefore, it is expected that the coefficient of PCEXINF would be positive.

*Total paved mileage of primary and secondary roads (PVDHIGH).* The development of highways is important in enhancing the infrastructure capacity of counties and their potential to increase productivity. Increase in productivity will lead to an increase in income in a region. Therefore, we expect a positive relationship between PVDHIGH and growth in income.

The additional control variables are related to the employment structure of the economy in the region:

*Percent of employment in farming (EMPFRM).* Employment in farming as a proportion of total employment. This variable controls for the level of dependence of the regional economy in agriculture. A relatively lower share of employment in agriculture indicates the shift in the structure of the local economy as employment moves from agriculture to higher productivity sectors such as manufacturing. Hence, we expect a negative sign for the coefficient of EMPFRM.

*Percent of employment in manufacturing (EMPMANF).* Employment in manufacturing as a proportion of total employment. A higher employment in manufacturing has the potential for labor to be engaged in high-value activities. Therefore, we expect a positive relationship between EMPMANF and the growth of income.

*Percent of employment in services (EMPSERV).* Employment in service as a proportion of total employment. This variable serves as an indicator of a more dynamic and diversified economy. Therefore, we expect the coefficient of EMPSERV to be positive.

*Geography (GEOG).* GEOG represents a set of regional variables to account for spatial difference among the three traditional geographical areas. The values are indicted as 1 if within the geographic region, 0 if otherwise. This variable is included to examine if regional variation makes a difference in the growth of PINC.

**Trends in Infrastructure Investment, Human Resources Development and Economic Structure**

This analysis is based on Table 4 which depicts growth tends among the different regions used in the study.

*Metro Vs. Non-Metro Areas*

Metro areas have experienced a significantly higher growth rate in population in the last three decades than non-metro areas. In the last census, metro counties increased at an average of 22 percent compared to 15 percent for non-metro counties.

Urbanization is increasing at a higher rate in metro areas. The percent of urban population increased from 39 percent in 1970 to 54 percent in 2000. The corresponding figures for non-metro counties are 17 and 25 percent respectively.

Per capita local expenditure on infrastructure is at about the same level in both metro and non-metro areas.

There is almost twice as much paved highway in metro areas as in non-metro areas.

About 64 percent of the population (25 + age) in metro areas is high school and college graduates. The corresponding figure for non-metro areas is 59 percent. Figure 5 depicts the geographic distribution of educational level in the state.

Employment in farming and manufacturing has experienced a decline in the last three decades in both metro and non-metro areas. On the other hand, the service sector has continued to increase in both areas.

*Geographic Regions/Areas*

Population increase in the Piedmont area was significantly higher than that in the Mountain or Coastal areas.

The share of urbanization in the Piedmont area in 2000 was 45 percent of the total population whereas that of the Mountain and Coastal areas share was 22 and 33 percent respectively.

The trend in local per capita infrastructure expenditure shows an increasing trend in all regions. The difference in local infrastructure expenditure among the three regions is not significant.

In terms of paved highways, the Piedmont area has about 25 percent more paved highway than the Mountain or Coastal areas. Figure 4 illustrates that in terms of accessibility, 83 percent of the counties in the Piedmont area have over 50 percent of their population within 10 miles of a 4-lane highway. The corresponding figures for the Mountain and coastal areas are 58 and 59 percent respectively.

Over 60 percent of the population (25+ age group) in the Mountain and Piedmont areas have above high school education. By contrast only one out of every three persons in the Coastal area has an above high school education. For a

*Table 4: Trend in Population Growth, Infrastructure, And Human Development*

| | Metro vs. Non-metro | | Geographic Regions | | |
|---|---|---|---|---|---|
| Year | Metro | Non-metro | Mountain | Piedmont | Coastal |
| **Population Change (%)** | | | | | |
| 1970-80 | 19.7 | 14.8 | 17.7 | 17.0 | 15.5 |
| 1980-90 | 15.1 | 5.6 | 5.5 | 11.6 | 8.7 |
| 1990-20 | 22.5 | 15.3 | 15.9 | 21.3 | 16.0 |
| **Share of Urbanization (%)** | | | | | |
| 1970 | 39.2 | 17.0 | 13.3 | 33.7 | 23.8 |
| 1980 | 43.8 | 16.8 | 13.2 | 36.3 | 25.3 |
| 1990 | 45.4 | 17.3 | 14.4 | 36.8 | 26.3 |
| 2000 | 54.0 | 24.6 | 22.3 | 45.5 | 33.2 |
| **Per Capita Infrastructure Expenditure** | | | | | |
| 1980 | 236.1 | 229.8 | 214.5 | 231.0 | 243.1 |
| 1990 | 524.8 | 536.7 | 473.4 | 518.8 | 578.9 |
| 2000 | 1043.5 | 1043.1 | 960.3 | 975.4 | 1149.8 |
| **Paved Highway (in miles)** | | | | | |
| 1980 | 752.4 | 471.3 | 377.5 | 734.3 | 541.7 |
| 1990 | 815.3 | 513.4 | 419.7 | 794.1 | 586.3 |
| 2000 | 928.2 | 593.3 | 525.7 | 898.5 | 658.3 |
| **High School and College Grad as % of Pop** | | | | | |
| 1970 | 23.0 | 19.6 | 21.2 | 22.3 | 23.8 |
| 1980 | 38.0 | 32.9 | 35.3 | 36.7 | 25.3 |
| 1990 | 54.2 | 48.0 | 50.4 | 52.6 | 26.3 |
| 2000 | 63.6 | 58.7 | 62.3 | 62.2 | 33.2 |
| **Emp in Farming as % of Total Emp** | | | | | |
| 1970 | 11.0% | 18.1% | 10.0% | 11.7% | 22.1% |
| 1980 | 6.9% | 12.8% | 9.8% | 8.2% | 13.5% |
| 1990 | 3.5% | 7.3% | 6.3% | 4.5% | 7.2% |
| 2000 | 2.5% | 5.3% | 4.6% | 3.4% | 4.9% |
| **Emp in Manufacturing as % of Total Emp** | | | | | |
| 1970 | 31.3% | 26.6% | 33.0% | 36.0% | 18.8% |
| 1980 | 29.7% | 26.3% | 29.6% | 33.8% | 20.9% |
| 1990 | 25.0% | 24.0% | 25.3% | 29.8% | 19.1% |
| 2000 | 19.3% | 17.3% | 17.2% | 23.2% | 14.0% |
| **Emp in Services as % of Total Emp** | | | | | |
| 1970 | 13.5% | 14.7% | 16.3% | 13.1% | 14.0% |
| 1980 | 14.4% | 14.2% | 15.9% | 14.4% | 13.2% |
| 1990 | 18.8% | 17.8% | 20.2% | 18.5% | 16.6% |
| 2000 | 24.4% | 23.6% | 25.8% | 23.9% | 22.7% |

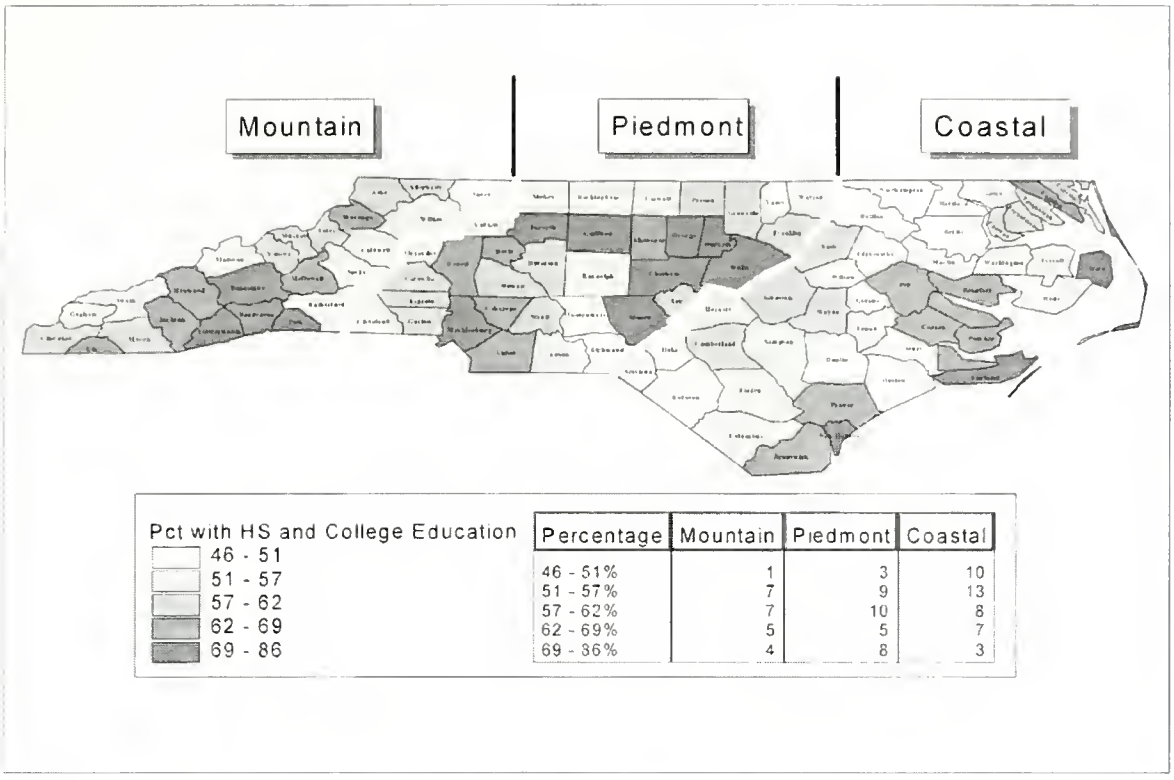



*Figure 4: Education*

distribution of the population by level of education, see figure 5.

〈 Employment in farming has continued to decline in all areas, and in 2000 employment accounted for less than 5 percent of the employment in all regions.

〈 Employment in manufacturing has continued to decline in all areas while employment in services has continued to increase.

**Results**

*ó–convergence*

The ó-convergence was examined by deriving cross-sectional standard deviations of the log of per capita income for the state and the different geographic regions. As illustrated in Table 5, the ó–convergence for the state over the three decades shows that there has been a slight

*Table 5: ó–convergence*

| State | 1970 | 1980 | 1990 | 2000 | Trend |
|---|---|---|---|---|---|
| **NC [State]** | | | | | |
| σ–NC | 0.0191 | 0.0174 | 0.0177 | 0.0170 | Convergence |
| | | | | | |
| **Metro Vs. Non-metro** | | | | | |
| σ–Metro | 0.0151 | 0.0142 | 0.0164 | 0.0159 | Divergence |
| σ–Non-metro | 0.0155 | 0.0149 | 0.0145 | 0.0141 | Convergence |
| | | | | | |
| **Geog Regions** | | | | | |
| σ–Mountain | 0.0187 | 0.0158 | 0.0175 | 0.0142 | Convergence |
| σ–Piedmont | 0.0174 | 0.0166 | 0.0183 | 0.0188 | Divergence |
| σ–Coastal | 0.0144 | 0.0144 | 0.0116 | 0.0138 | Divergence |

*Table 6: Unconditional â-Convergence Across North Carolina Counties*

| State/Region | 1970-80 | 1980-90 | 1990-2000 | 1970-2000 | Trend |
|---|---|---|---|---|---|
| β-NC [A] | -.206*** | -.009 | -.134** | -527*** | Convergence |
| | (-4.127) | (-1.457) | (-2.873) | (-4.576) | |
| **Metro Vs Non-metro Areas [B]** | | | | | |
| β-Metro | -.139* | 0.154* | -0.105 | -236 | Convergence |
| | (-1.851) | (-1.735) | (-1.382) | (-1.072) | |
| β-Non-metro | -.241** | -.279** | -.194* | -.804*** | Convergence |
| | (-2.752) | (-2.793) | (-2.556) | (-4.396) | |
| **Geographic Regions [C]** | | | | | |
| β-Mountains | -.235** | -.002 | -.309** | -.874** | Convergence |
| | (-2.761) | (-.148) | (-3.271) | (-3.492) | |
| β-Piedmont | -.121 | 0.008 | 0..001 | -.122 | Convergence |
| | (-1.590) | -0.899 | -0.028 | (-.570) | |
| β-Coastal | -.277** | -.505*** | -.003 | -.649** | Convergence |
| | (-2.149) | (-4.349) | (-.316) | (-2.981) | |
| * Significant at .05 level | | | | | |
| ** Significant at .001 level. | | | | | |

decrease of the value between 1970 and 1980, then a slight increase between 1980 and 1990 and again a decline between 1990 and 2000. Although there are cyclical changes during each decade, the general trend shows that there has been ó–convergence in income in North Carolina between 1970 and 2000. These findings are important for two reasons. First, the analysis suggests that the economies of the poorer counties are catching up with the richer ones in terms of growth in per capita income. Second, as illustrated by the ó– and â-convergence measures, convergence seems to have occurred during good times and divergence has occurred during bad times. The period 1980-90 was characterized by major economic crises that affected many states in the country. On the other hand, the period 1970-80 was a period of economic growth and 1990-2000 was a period of economic expansion as the national economy spiraled upwards, thanks to the bullish stock market associated with the dot-com economy.

The ó–convergence analysis between metro and non-metro areas and among geographic regions shows mixed results: there was a general trend toward divergence in metro counties and geographically, in the Piedmont and Coastal areas.

The findings of the ó–convergence indicate the presence of unconditional â-convergence in the state, and among the different regions of the state. The implications of these findings are further explored in the next section. The estimates based on the regression equations illustrate the speed of convergence as well as the robustness of the estimates.

*β-convergence*

Table 6 presents regression estimates of the unconditional β-convergence as proposed by the neoclassical growth model. As illustrated in the table, the coefficients of â for the state are negative and statistically significant except for 1980-90. These findings are consistent with the neoclassical growth theory. Therefore, we can conclude that, on the average, there is clear evidence of convergence in the state, that is, counties with low per capita initial income are growing faster than those with initial high per capita income.

The β estimates for the various regions show evidence of convergence and divergence. The estimates for the metro and non-metro areas [Part B] show a trend toward convergence. The result of convergence by geographic area shows mixed results. In the Piedmont area, the rate of

*Table 7 : Conditional â-Convergence with Core and Economic Structure Variables*

| | Core Variables | Econ Structure Variables | Regional Dummy |
|---|---|---|---|
| Constant | 10.4015 | 10.3117 | 10.3117 |
| | | | |
| LPINC | -2.3957*** | -2.3936*** | -.2.408*** |
| | (-15.45) | (-15.48) | (-15.37) |
| | | | |
| POPCHG | -0.3844* | -.4248* | -0.4466** |
| | (-3.06) | (-3.35) | (-3.52) |
| | | | |
| URBAN | -0.0005 | -.0007 | .0007 |
| | (-.75) | (2.05) | (1.07) |
| | | | |
| EDPOP | 0.0119*** | .0128*** | .0124*** |
| | (4.53) | (4.82) | (4.53) |
| | | | |
| PCEXINF | -0.0002 | -0.0002 | -.00008 |
| | (-0.94) | (0.91) | (-0.37) |
| | | | |
| PVDHIGH | 0.00005 | 0.00008 | 0.00006 |
| | (1.20) | (1.67) | (1.31) |
| | | | |
| EMPFRM | | 0.1024 | 0.1239 |
| | | (1.21) | (1.46) |
| | | | |
| EMPMANF | | 0.0299* | 0.0275* |
| | | (1.79) | (1.66) |
| | | | |
| EMPSERV | | -0.0053 | -0.0006 |
| | | (-0.35) | (-0.04) |
| | | | |
| GEOG1 | | | 0.0481 |
| | | | (1.32) |
| | | | |
| GEOG 2 | | | 0.0955** |
| | | | (3.05) |
| $R^2$ Adjusted | 0.7496 | 0.7540 | 0.7598 |
| df | 6, 293 | 9, 290 | 11, 288 |
| F-Value | 150.16 | 102.65 | 86.98 |

Note: The independent variable is average growth of per capita income (AGPINC).

***Statistically significant at .001 level.

**Statistically significant at .05 level.

*Statistically significant at .10 level.

convergence shows a consistent decline over time. On the other hand, the rates in the case of the Mountain show a decline in 1980-90 and then an increase in 1990-2000. In the case of the Coastal areas there was an increase in 1980-90 and then a decrease in 1990-2000. In general, the â estimates show a decline and the conclusion is that the North Carolina counties have experienced an income growth leading toward a similar (not identical) steady state. The extent to which policy variables and a change in the structure of the regional economy have played a role in accelerating convergence can be further examined by including the core and other control variables (mainly economic structure variables) in the regression equation as presented below.

Table 7 depicts estimates of the conditional â-convergence with core and economic structure variables. It reveals that the coefficients of:

LPINC are negative and statistically significant for all the models confirming the findings based on ó–convergence.

POPCHG are negative and significant as postulated in the hypothesis.

Urbanization (URBAN) is negative, opposite to the hypothesized relationship, and statistically insignificant, except for Model 2. The result suggests that urbanization had no significant impact on growth of PINC.

Education (EDPOP) has a positive and statistically significant relationship for all the models as hypothesized.

Infrastructure expenditure (PCEXINF) and mileage of paved highway (PVDHIGH) are not significant suggesting that local governments' expenditure on infrastructure did not have significant impact on growth in PINC.

In terms of the economic structure and regional variation variables:

The coefficients of employment in farming (EMPFRM) are positive but they are not statistically significant. This finding suggests that agriculture had a low growth potential for the region since agricultural demand in the last few decades had been on the decline.

The coefficients of employment in manufacturing (EMPMANF) are positive and statistically significant, which suggests that the manufacturing sector plays a major role in income convergence in North Carolina.

The coefficients for EMPSERV are negative and they are not statistically significant. The result may be an indication of the employment characteristics of the service sector. The service sector in North Carolina is dominated by low value-added and low skill activities such as hotels, tourism and restaurants.

The geography variable representing the Piedmont area (GEOG2) is statistically significant. The variables for other geographic areas are not statistically significant.

## VII. Summary and Conclusion

This study has attempted to shed light on the question of income convergence in North Carolina. A major conclusion of the paper is that there has been convergence of per capita income across the state during the period 1970-2000. The evidence from the data set shows that both in terms of â–convergence and ó–convergence, income inequality among North Carolina regions is narrowing. This result can also be interpreted as an indicator of the high growth potential of the poorer counties. However, an analysis of trends between metro and non-metro areas as well as among traditional geographic areas indicates that there was a general trend of divergence in the metro areas and convergence in the non-metro areas; and among the traditional geographic regions, the Mountain areas have experienced convergence, whereas the Piedmont and Coastal areas have experienced divergence.

The results of both the conditional and unconditional convergence analyses indicate that the initial level of PINC, population growth and human capital development (education) had a significant impact on PINC growth in North Carolina. However, the impact of urbanization and infrastructure investment was minimal. Geographic variation had an effect on the growth of PINC, although not consistent.

With respect to the impact of structural change of the economy on income convergence, the empirical estimates suggest that the growth-inducing effects of agriculture are stronger than its growth-reducing effects as illustrated by the positive values. However, none of the coefficients of employment in agriculture is significant. Therefore, agriculture in North Carolina had no effect in reducing income difference in the State.

In the case of manufacturing and services, a relatively high share of employment in both sectors is considered to be an indicator of a more diversified and dynamic economy. The empirical analyses show that employment in manufacturing had a significant impact on income convergence and its growth-inducing effects are strong. The statistical insignificance of services shows that employment in services had no impact on income convergence. This result also suggests that a large number of employees in manufacturing are engaged in high-value activities whereas those employed in service activities are engaged in low-skill activities such as hotels restaurants and retail trade. The negative relationship between employment in services and growth in PINC also signals that the growth inducing effects of the service sector is weak. The poor performance of the service sector in reducing income divergence can also be explained by the low-paying characteristics of service jobs. This finding is consistent with the argument that many families in North Carolina employed in the service sector are working, but remain poor.

*Policy implications*

First, initial level of income in North Carolina had a significant impact in influencing subsequent income growth rates. Consistent with the neoclassical growth model, North Carolina has experienced income convergence in the last three decades. The convergence process has narrowed income differences among many counties. Nevertheless, the analysis by metro versus non-metro areas as well as among the traditional geographic areas show that North Carolina is far from achieving the goal of reducing long-standing regional disparities in the state.

Second, the trend over the period 1970-2000 suggests that convergence occurred during the period of economic expansion and divergence occurred during the period of decline. North Carolina experienced convergence during the period 1970-80 and 1990-2000, both periods characterized by economic expansion. On the other hand, the period 1980-90 was characterized by economic crises and divergence occurred during this period.

Third, local government expenditure in infrastructure, considered to be an important variable in increasing the growth performance of regions, had very little impact in reducing income inequality in the state. The value for per capita expenditure in infrastructure is not statistically significant throughout the study period. This result should be viewed with caution for two reasons. First, the data on infrastructure expenditure reflect only expenditure by local governments; data on Federal as well as state infrastructure expenditures were not available. A data set that reflects total infrastructure expenditure of local, state as well as Federal Government may give a different result. Additionally, there are problems of simultaneity in using infrastructure expenditure in a regression model. Do economies grow because they spend money on infrastructure or do they invest in infrastructure because they experience economic growth? This issue of chicken and egg has not been successfully dealt with in the literature.

Fourth, the results on the relationship between population growth and PINC are consistent with the argument presented by the neoclassical theory, that is, growth in population will cause the level of PINC to decline since total income has to be spread over a larger population. The results of the urbanization variable are counterintuitive.

Fifth, although there has been PINC convergence in the state, the regional analyses show that the Piedmont and Coastal areas of North Carolina are experiencing divergence as opposed to the Mountain areas. This trend suggests that that there are pockets of affluence and pockets of poverty existing side by side in the state, particularly in the Piedmont and Coastal areas.

The poverty areas, instead of being integrated into the regional economy stubbornly exist as islands of poverty with poor endowment of infrastructure and human capital. Indeed, an analysis of the income difference among the three regions shows that the income range (difference between the lowest and highest income among the counties) in 2000 varies from $12,317 in Piedmont to $7,597 in the Mountain areas to $4,880 in the coastal areas. The trajectory shows that this gap is likely to continue widening in the next decade. This finding underscores the notion that North Carolina's traditional approach of developing broad statewide policies are not effective in eliminating pockets of poverty in the state. It is imperative that the state develops policies that target poverty areas to improve their economic conditions and to enhance their comparative advantage to attract investment.

**Notes**

1. The Gini Index is widely used in measuring income inequality. See Kakwani (1980).

2. The CPI used for deflating are as follows: 1970=38.8; 1980=82.4; 1990=130.7; 2000=172.2. Base year: 1982-84=100.0. See www.minneapolisfed.org/Research/data/US

3. In metro areas, the CV increased from .14 in 1970 to .16 in 2000. Conversely, in the non-metro areas, it dropped from .14 in 1970 to .13 in 2000.

4. Change in the coefficient of variation (CV) by region.

5. The initial equation used by Barro and Sala-I-Martin (1991) takes the following form:

| Region | 1970 | 1980 | 1990 | 2000 |
|---|---|---|---|---|
| Mountain | 0.1726 | 0.1459 | 0.1649 | 0.1346 |
| Piedmont | 0.1555 | 0.1517 | 0.1741 | 0.1856 |
| Coastal | 0.1245 | 0.1258 | 0.1067 | 0.1238 |

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**Appendix A**: North Carolina Metropolitan Counties

| County | Metropolitan Area |
|---|---|
| Alamance | Greensboro-Winston-Salem-High Point, NC MSA |
| Alexander | Hickory-Morganton-Lenoir, NC MSA |
| Brunswick | Wilmington, NC MSA |
| Buncombe | Asheville, NC MSA |
| Burke | Hickory-Morganton-Lenoir, NC MSA |
| Cabarrus | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Caldwell | Hickory-Morganton-Lenoir, NC MSA |
| Catawba | Hickory-Morganton-Lenoir, NC MSA |
| Chatham | Raleigh-Durham-Chapel Hill, NC MSA |
| Cumberland | Fayetteville, NC MSA |
| Currituck | Norfolk-Virginia Beach-Newport News, VA-NC MSA |
| Davidson | Greensboro-Winston-Salem-High Point, NC MSA |
| Davie | Greensboro-Winston-Salem-High Point, NC MSA |
| Durham | Raleigh-Durham-Chapel Hill, NC MSA |
| Edgecombe | Rocky Mount, NC MSA |
| Forsyth | Greensboro-Winston-Salem-High Point, NC MSA |
| Franklin | Raleigh-Durham-Chapel Hill, NC MSA |
| Gaston | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Guilford | Greensboro-Winston-Salem-High Point, NC MSA |
| Johnston | Raleigh-Durham-Chapel Hill, NC MSA |
| Lincoln | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Madison | Asheville, NC MSA |
| Mecklenburg | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Nash | Rocky Mount, NC MSA |
| New Hanover | Wilmington, NC MSA |
| Onslow | Jacksonville, NC MSA |
| Orange | Raleigh-Durham-Chapel Hill, NC MSA |
| Pitt | Greenville, NC MSA |
| Randolph | Greensboro-Winston-Salem-High Point, NC MSA |
| Rowan | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Stokes | Greensboro-Winston-Salem-High Point, NC MSA |
| Union | Charlotte-Gastonia-Rock Hill, NC-SC MSA |
| Wake | Raleigh-Durham-Chapel Hill, NC MSA |
| Wayne | Goldsboro, NC MSA |
| Yadkin | Greensboro-Winston-Salem-High Point, NC MSA |

Source: *US Census Bureau, Metropolitan Counties by State, 1999.*

**Appendix B**: NC Counties by Geographic Area

| # | Mountains | Piedmont | Coastal |
|---|---|---|---|
| | Alleghany | Alamance | Beaufort |
| | Ashe | Alexander | Bertie |
| | Avery | Anson | Bladen |
| | Buncombe | Cabarrus | Brunswick |
| | Burke | Caswell | Camden |
| | Caldwell | Catawba | Carteret |
| | Cherokee | Chatham | Chowan |
| | Clay | Cleveland | Columbus |
| | Graham | Davidson | Craven |
| | Haywood | Davie | Cumberland |
| | Henderson | Durham | Currituck |
| | Jackson | Forsyth | Dare |
| | McDowell | Franklin | Duplin |
| | Macon | Gaston | Edgecombe |
| | Madison | Granville | Gates |
| | Mitchell | Guilford | Greene |
| | Polk | Iredell | Halifax |
| | Rutherford | Lee | Harnett |
| | Surry | Lincoln | Hertford |
| | Swain | Mecklenburg | Hoke |
| | Transylvania | Montgomery | Hyde |
| | Watauga | Moore | Johnston |
| | Wilkes | Orange | Jones |
| | Yancey | Person | Lenoir |
| | | Randolph | Martin |
| | | Richmond | Nash |
| | | Rockingham | New Hanover |
| | | Rowan | Northampton |
| | | Stanly | Onslow |
| | | Stokes | Pamlico |
| | | Union | Pasquotank |
| | | Vance | Pender |
| | | Wake | Perquimans |
| | | Warren | Pitt |
| | | Yadkin | Robeson |
| | | | Sampson |
| | | | Scotland |
| | | | Tyrrell |
| | | | Washington |
| | | | Wayne |
| | | | Wilson |
| **N** | **24** | **35** | **41** |

**Appendix C:**

Definition and sources of variables used. Data for 1970, 1980, 1990 and 2000 are from LINC (www.linc.state.nc.us) unless otherwise indicated.

| | |
|---|---|
| LPINC | Log of per capita income |
| AGPINC | Average annual growth of per capita income |
| POVERTY | Percentage of population in poverty |
| POPCHG | Population growth between censuses |
| URBAN | Urban population as a percentage of total population |
| EDPOP | High school and college graduates (25+ age) as percentage of total population |
| PCEXINF | Per capita infrastructure expenditure by local governments. The variable was derived by dividing total expenditure on roads, utilities and other services by total population |
| PVDHIGH | Total mileage of primary and secondary roads |
| EMPFRM | Employment in farming as a proportion of total employment |
| EMPMANF | Employment in manufacturing as a proportion of total employment |
| EMPSERV | Employment in services as a proportion of total employment |

**Appendix D**: Per Capita Income, 1970-2000 (nominal values)

| County | METRO | GEOG | PINC70 | PINC80 | PINC90 | PINC20 |
|---|---|---|---|---|---|---|
| Alamance | 1 | 2 | 3577 | 8792 | 17574 | 25932 |
| Alexander | 1 | 2 | 3034 | 7262 | 15688 | 23738 |
| Alleghany | 2 | 1 | 2475 | 6529 | 13923 | 25413 |
| Anson | 2 | 2 | 2394 | 6339 | 14214 | 21883 |
| Ashe | 2 | 1 | 2192 | 5788 | 13333 | 22681 |
| Avery | 2 | 1 | 2179 | 5889 | 13710 | 24162 |
| Beaufort | 2 | 3 | 2771 | 7503 | 14941 | 22530 |
| Bertie | 2 | 3 | 2213 | 6088 | 12695 | 21436 |
| Bladen | 2 | 3 | 2455 | 6208 | 12511 | 21494 |
| Brunswick | 1 | 3 | 2864 | 6783 | 14091 | 21707 |
| Buncombe | 1 | 1 | 3236 | 8468 | 17971 | 27221 |
| Burke | 1 | 1 | 3216 | 7630 | 15760 | 21729 |
| Cabarrus | 1 | 2 | 3511 | 8195 | 18027 | 28961 |
| Caldwell | 1 | 1 | 3145 | 7450 | 15173 | 24707 |
| Camden | 2 | 3 | 2395 | 7771 | 13808 | 22755 |
| Carteret | 2 | 3 | 2832 | 7857 | 15214 | 26090 |
| Caswell | 2 | 2 | 2538 | 5967 | 12613 | 19494 |
| Catawba | 1 | 2 | 3787 | 8637 | 18781 | 27937 |
| Chatham | 1 | 2 | 3133 | 8339 | 18534 | 30386 |
| Cherokee | 2 | 1 | 2242 | 5825 | 12176 | 18323 |
| Chowan | 2 | 3 | 2636 | 6884 | 14797 | 23532 |
| Clay | 2 | 1 | 2258 | 5786 | 12927 | 21292 |
| Cleveland | 2 | 2 | 3008 | 7900 | 15721 | 22259 |
| Columbus | 2 | 3 | 2505 | 6379 | 13228 | 21640 |
| Craven | 2 | 3 | 3149 | 8273 | 15888 | 25342 |
| Cumberland | 1 | 3 | 3190 | 7912 | 15141 | 24899 |
| Currituck | 1 | 3 | 3054 | 7928 | 15628 | 24515 |
| Dare | 2 | 3 | 3276 | 7174 | 16270 | 25454 |
| Davidson | 1 | 2 | 3321 | 8113 | 16536 | 25327 |
| Davie | 1 | 2 | 3176 | 8616 | 19346 | 29156 |
| Duplin | 2 | 3 | 2650 | 5577 | 14381 | 20560 |
| Durham | 1 | 2 | 3890 | 9663 | 20272 | 29739 |
| Edgecombe | 1 | 3 | 2767 | 7084 | 13530 | 20827 |
| Forsyth | 1 | 2 | 4211 | 10521 | 22218 | 32291 |
| Franklin | 1 | 2 | 2654 | 6449 | 14291 | 23276 |
| Gaston | 1 | 2 | 3230 | 8240 | 16628 | 25006 |
| Gates | 2 | 3 | 2594 | 6754 | 13566 | 19260 |
| Graham | 2 | 1 | 2160 | 6363 | 10464 | 18732 |
| Granville | 2 | 2 | 2540 | 6774 | 14051 | 21650 |
| Greene | 2 | 3 | 3120 | 6449 | 15055 | 20894 |
| Guilford | 1 | 2 | 4170 | 10121 | 21302 | 30372 |
| Halifax | 2 | 3 | 2407 | 6428 | 13003 | 19674 |
| Harnett | 2 | 3 | 2605 | 6270 | 13404 | 19781 |
| Haywood | 2 | 1 | 2917 | 7622 | 15229 | 22571 |

**Appendix D, cont.:** Per Capita Income, 1970-2000 (nominal values)

| County | METRO | GEOG | PINC70 | PINC80 | PINC90 | PINC20 |
|---|---|---|---|---|---|---|
| Currituck | 1 | 3 | 3054 | 7828 | 15628 | 24515 |
| Dare | 2 | 3 | 3276 | 7174 | 16270 | 25454 |
| Davidson | 1 | 2 | 3321 | 8113 | 16536 | 25327 |
| Davie | 1 | 2 | 3176 | 8616 | 19346 | 29156 |
| Duplin | 2 | 3 | 2650 | 5577 | 14381 | 20560 |
| Durham | 1 | 2 | 3890 | 9663 | 20272 | 29739 |
| Edgecombe | 1 | 3 | 2767 | 7084 | 13530 | 20827 |
| Forsyth | 1 | 2 | 4211 | 10521 | 22218 | 32291 |
| Franklin | 1 | 2 | 2654 | 6449 | 14291 | 23276 |
| Gaston | 1 | 2 | 3230 | 8240 | 16628 | 25006 |
| Gates | 2 | 3 | 2594 | 6754 | 13566 | 19260 |
| Graham | 2 | 1 | 2160 | 6363 | 10464 | 18732 |
| Granville | 2 | 2 | 2540 | 6774 | 14051 | 21850 |
| Greene | 2 | 3 | 3120 | 6449 | 15055 | 20894 |
| Guilford | 1 | 2 | 4170 | 10121 | 21302 | 30372 |
| Halifax | 2 | 3 | 2407 | 6428 | 13003 | 19874 |
| Harnett | 2 | 3 | 2605 | 6270 | 13404 | 19781 |
| Haywood | 2 | 1 | 2917 | 7622 | 15229 | 22571 |
| Henderson | 2 | 1 | 3304 | 8895 | 18365 | 26593 |
| Hertford | 2 | 3 | 2454 | 6732 | 12280 | 20384 |
| Hoke | 2 | 3 | 2295 | 5424 | 11445 | 13408 |
| Hyde | 2 | 3 | 2474 | 6086 | 13597 | 20600 |
| Iredell | 2 | 2 | 3096 | 8508 | 16826 | 25767 |
| Jackson | 2 | 1 | 2419 | 6501 | 13683 | 21221 |
| Johnston | 1 | 3 | 2907 | 7443 | 15952 | 24851 |
| Jones | 2 | 3 | 2199 | 5259 | 12272 | 20032 |
| Lee | 2 | 2 | 3092 | 8400 | 17183 | 26983 |
| Lenoir | 2 | 3 | 2945 | 7554 | 15450 | 22953 |
| Lincoln | 1 | 2 | 3122 | 7850 | 16091 | 20899 |
| McDowell | 2 | 1 | 2600 | 6964 | 13556 | 22979 |
| Macon | 2 | 1 | 2397 | 6951 | 14459 | 20279 |
| Madison | 1 | 1 | 2219 | 5984 | 12719 | 20638 |
| Martin | 2 | 3 | 2829 | 6890 | 13780 | 20374 |
| Mecklenburg | 1 | 2 | 4300 | 10455 | 23297 | 37737 |
| Mitchell | 2 | 1 | 2399 | 6680 | 13067 | 20510 |
| Montgomery | 2 | 2 | 2923 | 6658 | 13456 | 20766 |
| Moore | 2 | 2 | 3094 | 8566 | 20751 | 30238 |
| Nash | 1 | 3 | 3093 | 8166 | 17141 | 27024 |
| New Hanover | 1 | 3 | 3275 | 8560 | 17806 | 27588 |
| Northampton | 2 | 3 | 2133 | 6351 | 12266 | 20487 |
| Onslow | 1 | 3 | 3403 | 7189 | 13151 | 22847 |
| Orange | 1 | 2 | 3636 | 9012 | 21424 | 28864 |
| Pamlico | 2 | 3 | 2709 | 7519 | 14211 | 22788 |
| Pasquotank | 2 | 3 | 2766 | 7672 | 14715 | 22701 |
| Pender | 2 | 3 | 2446 | 6770 | 14045 | 20044 |

**Appendix D, cont.**: Per Capita Income, 1970-2000 (nominal values)

| County | METRO | GEOG | PINC70 | PINC80 | PINC90 | PINC20 |
|---|---|---|---|---|---|---|
| Perquimans | 2 | 3 | 2312 | 5963 | 12385 | 20056 |
| Person | 2 | 2 | 2824 | 6805 | 15205 | 22015 |
| Pitt | 1 | 3 | 2887 | 7695 | 16438 | 24599 |
| Polk | 2 | 1 | 3500 | 9039 | 20823 | 30161 |
| Randolph | 1 | 2 | 3405 | 7996 | 15987 | 23548 |
| Richmond | 2 | 2 | 2749 | 6606 | 13618 | 20643 |
| Robeson | 2 | 3 | 2390 | 5753 | 11638 | 17473 |
| Rockingham | 2 | 2 | 3444 | 8348 | 15521 | 21989 |
| Rowan | 1 | 2 | 3302 | 8372 | 15995 | 23327 |
| Rutherford | 2 | 1 | 2824 | 7349 | 14282 | 21101 |
| Sampson | 2 | 3 | 2564 | 6693 | 15338 | 20437 |
| Scotland | 2 | 3 | 2803 | 7156 | 13058 | 20714 |
| Stanly | 2 | 2 | 3343 | 7785 | 15769 | 23090 |
| Stokes | 1 | 2 | 2953 | 7571 | 15277 | 22429 |
| Surry | 2 | 1 | 3297 | 7666 | 16282 | 23319 |
| Swain | 2 | 1 | 2069 | 5870 | 10593 | 17160 |
| Transylvania | 2 | 1 | 2774 | 7938 | 16497 | 25254 |
| Tyrrell | 2 | 3 | 2093 | 5135 | 13563 | 19257 |
| Union | 1 | 2 | 3046 | 8174 | 16957 | 24356 |
| Vance | 2 | 2 | 3012 | 6749 | 14394 | 20923 |
| Wake | 1 | 2 | 4016 | 10468 | 22488 | 36581 |
| Warren | 2 | 2 | 2280 | 6306 | 11323 | 16779 |
| Washington | 2 | 3 | 2824 | 6612 | 13722 | 19443 |
| Watauga | 2 | 1 | 2603 | 6321 | 14367 | 23328 |
| Wayne | 1 | 3 | 3071 | 7158 | 14202 | 21550 |
| Wilkes | 2 | 1 | 2821 | 7221 | 15641 | 24162 |
| Wilson | 2 | 3 | 2938 | 8333 | 16382 | 24477 |
| Yadkin | 1 | 2 | 3058 | 7527 | 15883 | 22816 |
| Yancey | 2 | 1 | 2008 | 5611 | 12390 | 19383 |
| North Carolina | 0 | 0 | 3285 | 8247 | 17367 | 26882 |

Source: NC State Data Center - LINC
Metro: 1= Metropolitan, 2= Non-metropolitan counties
GEOG: 1= Mountain, 2= Piedmont, 3= Coastal counties


www.secretary.state.nc.us/kidspg/geog.htm

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# *Carolina Planning*:
## Bridging the Practice-Education Gap

David Godschalk, FAICP
Stephen Baxter Professor

*David Godschalk has served as the faculty advisor for Carolina Planning since the journal was launched in 1975. He now shares his experience with the CP community.*

I see *Carolina Planning* as a bridge between planning practice and planning education. Like all bridges, it is a combination of art, structure, and budget. However, the *Carolina Planning* bridge is unique in that it must be continuously rebuilt. Every year, a new team of editors must select important current articles, design the layout, arrange for printing, and collaborate with the North Carolina APA officers on a publication budget and distribution plan. Remarkably, this challenging enterprise has succeeded year after year for almost three decades.

Over its history, *Carolina Planning* has steadily contributed to planning knowledge. As a faculty advisor to the student editorial staff, I have been privileged to take part in this publication since its first issue in 1975. Student initiative led to its creation, and it has always been a student-edited, student-written, and student-managed publication. As such, it is the oldest and, in my opinion, the best continuously-published student planning journal in the nation, and probably, in the world.

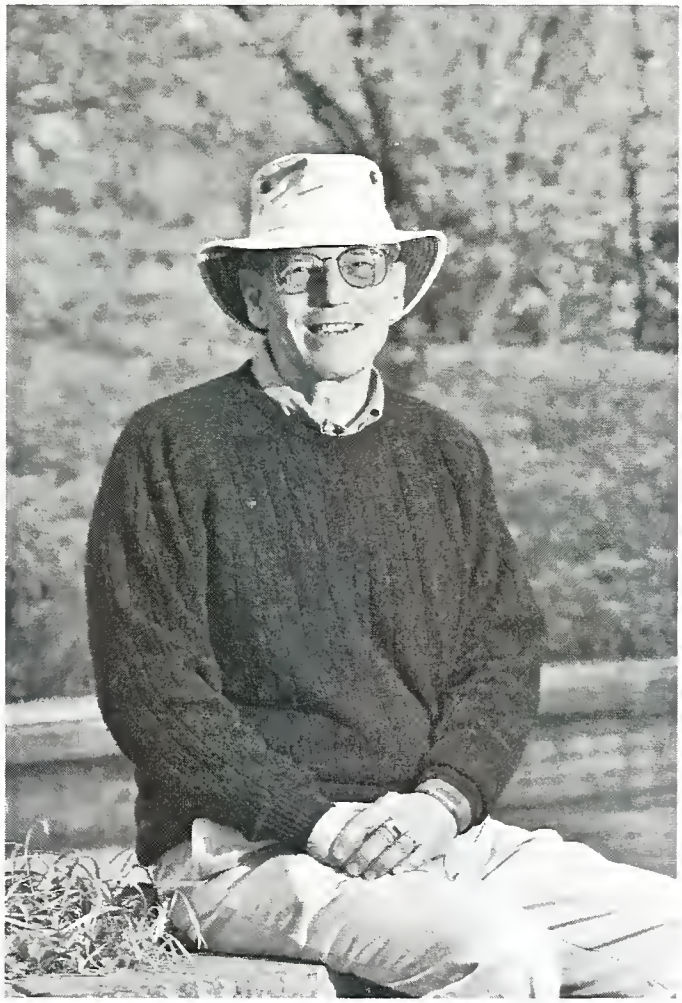
The first editor, Nancy L. Grden, described the publishing vision. Planning students will be the primary contributors, but contributions from faculty and professional planners will also be encouraged. She laid out the objectives of the publication:

1) To provide a forum for the discussion of planning problems, issues, and techniques related to the practice of planning in North Carolina;
2) To enhance the awareness public officials have about planning in North Carolina and elsewhere; and
3) To provide for the improvement of exchange of planning information between the Department of City and Regional Planning and other governmental and academic institutions in the state and nation.

*Carolina Planning* editorial teams have been remarkably true to that initial vision. From the start, its editors have focused on providing a forum for connecting planning practice and planning education. For example, the first issue covered such topics as water and sewer extensions as a technique for guiding development, a comparison of land use legislation in western North Carolina and Vermont, regional planning in the North Carolina coastal area, and an analysis of the effects of the state's industrial mix on labor force earnings. Articles in the recent Spring 2003 issue covered manufactured housing in North Carolina, the effect of commute time on employment, and case studies of sustainable development in Charlotte and Atlanta. In between, authors have looked at a rich and diverse slate of relevant planning topics.

What has made *Carolina Planning* so successful for so long? Advisors to student publications from other planning schools often ask this question. I believe that success stems from three elements. The first is the vision of linking the content to practice, rather than simply to theory and academic views, which broadens the audience. The second is the imagination and creativity of the student editors and contributing authors, which ensures that the articles embody solid analysis and best practice. And the third is the unique funding arrangement, in which the Department of City and Regional Planning provides editorial assistantships from the John A. Parker Trust, while the NC APA Chapter pays for a group subscription for planning departments in the state, which provides for the printing budget.

*Carolina Planning* set out to be a forum for discussion of planning in and for North Carolina. Its first two years were funded by a grant from the Z. Smith Reynolds Foundation, as well as contributions from the Department's Alumni Association. Since then, it has learned to sustain itself, including broadening its scope to the southeast region. With continued collaboration among its stakeholders, *Carolina Planning* will remain a sustainable bridge linking planning practice and education on through the twenty-first century.



# A Case Study in the Use of Photo Simulation in Local Planning


## Abstract

*The Town of Cary employed photographic simulations in four separate comprehensive planning projects during the period 2000-2003. The four projects covered a range of downtown, suburban, and rural planning environments within Cary's planning jurisdiction, making Cary's experience applicable to most types of local jurisdictions. This paper describes how photographic simulation was used in three of these planning projects, and evaluates the effectiveness, tips, and lessons learned for each project.*



**Scott F. Ramage, AICP and Michael V. Holmes**




### Introduction

Photographic simulation is the practice of taking a photograph of an existing urban or rural scene, and then digitally altering it to create a photo-realistic image depicting a proposed change to that environment. For example, photo simulation can be used to show how a downtown street might look if a proposed building were built or if new street trees were planted.

The use of photo simulation within the planning profession is gaining ground as a powerful aid to local planning. Photo simulation has been employed by communities in North Carolina as diverse as New Bern, Raleigh, Smithfield, and Cary, as well as by the Triangle J Council of Governments and campus planners at NC State University.

In the practice of comprehensive planning, photo simulations can be used to: (1) increase public understanding of a proposed plan or ordinance; (2) engage the public and get constructive feedback on draft plan concepts or recommendations; (3) achieve community consensus on the desired future; (4) demonstrate or evaluate the feasibility of proposed plan recommendations; or (5) evaluate competing alternatives. A given set of photo simulations may serve multiple purposes during the course of a project, depending on the project phase or the nature of the target audience (e.g., the public, property owners, land developers, public officials, etc.).

The following sections describe Cary's use of photo simulation in developing: (1) a master plan for the downtown area, (2) a master plan and special zoning district for redevelopment along a suburban thoroughfare, and (3) Cary's Open Space and Historic Resources Plan. For each project, two or three of the photo simulations developed for the project are shown and discussed as representative examples of the varied purposes to which photo simulation may be applied to planning practice. The photo simulations for all three of these projects were developed by the Design Research Laboratory (DRL) in the College of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Design at NCSU, under contract to the Town of Cary.

**Case 1: Redevelopment and Infill with Cary's Downtown Area Plan**

***Project Backgrounnd***

Development of Cary's master plan for its downtown area occurred in 1999-2001. It was Cary's first planning project to employ photo simulation. One of the principal goals of the plan is to encourage higher densities of mixed-use development and redevelopment within the "heart of the downtown" – an area of about four-to-five square blocks within roughly a quarter mile walking distance of a planned regional rail transit station – while still maintaining the downtown's historic "small town" charm and character. The plan was developed with the advice and consent of a twelve-member Citizen Advisory Committee, appointed by the Town Council.

Midway through the project, in early 2000, it was decided to incorporate photo simulations into the planning process in order to: (a) help the Citizen Advisory Committee understand and envision the draft land use and urban design recommendations that were emerging, so that staff could verify whether there was consensus on the plan vision; (b) help the advisory committee come to closure on their land use recommendations for a couple of downtown areas where they were torn between two or more competing alternatives; and (c) help the advisory committee come to closure as to the preferred residential densities for several downtown areas where a range of densities were under consideration.

It also was anticipated that the photo simulations could serve the larger purpose of communicating the draft plan to the public, the Town Council, and the Planning Board, to help achieve overall community-wide understanding of and consensus on the downtown vision.

Bearing in mind the goals and purposes for using photo simulations in this project, DRL and planning staff selected eight downtown locations for photo simulations, and made preliminary assessments of the preferred photographic viewpoint for each location. Numerous ground-level and aerial photographs (taken from a chartered low-flying aircraft) were taken of each location, and from these the DRL and planning staff selected the photographs to be used in the simulations. DRL and town staff then identified the parameters and characteristics of the changes to the built environment that would be shown in each simulation. Three of the photo simulations used in the project are described below, each representing a different aspect of the use of photo simulation in such a project.

***Photo Simulation 1: "Main Street" Redevelopment***

Figure 1A is a westward-looking photograph of existing conditions on E. Chatham Street, which is the downtown's "main street." Figure 1B shows a photo simulation of the street after redevelopment consistent with the plan's recommendations. This simulation was used to confirm and get feedback on the draft land use and design recommendations for the commercial district. A ground-level photograph was used, to help place the viewer in the street from the familiar point of view of a motorist traveling through the downtown. Multiple elements were tested in this simulation: the overhead utility lines were removed and buried; brick sidewalks were added; underdeveloped or vacant lots were redeveloped with buildings brought to the sidewalk; ornamental light poles and streetlights were added; and new street trees and landscaping were added.

This simulation garnered extremely positive feedback from the advisory committee, the public, and Town officials. The Town staff was able to confirm that the committee liked the "build to the street" design recommendations of the draft plan; that two to three-story buildings were acceptable to the community (there had been resistance); that the draft plan recommended an appropriate level of density; that mixed-use buildings having ground-level retail and second and third floor housing or offices were desired; that the public realm of the streetscape (sidewalks, trees, lights, utility poles, etc.) has an enormous effect on the desirability of the vision; and that the community was willing to take bold moves to achieve the vision. This simulation achieved virtually unanimous buy-in on all of these concepts.

*Figure 1A: Looking west on East Chatham Street - existing conditions*

*Figure 1B: Photo simulation of the street after redevelopment*

***Photo Simulation 2: Downtown Park vs. Infill Housing***

Figure 2A is a northward-looking photograph of existing conditions in a square block in the middle of the downtown, north of Walnut St., between S. Academy St. to the west and S. Walker St. to the east. There is a large undeveloped area in the center of the photograph, where the advisory committee debated between a recommendation for infill housing or a future downtown park. Photo simulations were prepared to help the committee decide between the two uses. An aerial photograph was used since it allowed us to capture the entire 14-acre area and its context in a single photo, which also enables the viewer to consider the relationship of the site to Cary Elementary and the Cultural Arts Center, located in the lower left of the photo.

Figure 2B shows a photo simulation of how the area might look if developed as a public park (with 88 surface parking spaces for joint use with the Cultural Arts Center). Figure 2C shows how the area might look if developed instead with 66 multifamily units (plus 50 satellite parking spaces for the Cultural Arts Center). Both the park and the infill housing simulations were based on conceptual site plans developed by DRL.

These simulations enabled the advisory committee to settle quickly on a recommendation for a park at this location, rather than additional downtown housing. The simulations also were shown to the community later in the year, and achieved the same near-unanimous buy-in for the park recommendation. The Town has subsequently done a detailed design study for the park, and Cary is currently in the process of acquiring the park land.

***Photo Simulation 3: Alternative Residential Densities and Design***

Figure 3A is a northwestward-looking aerial photograph of existing conditions in and around an 8-acre infill and redevelopment area in the downtown. The area is located immediately north of the Norfolk-Southern Railroad corridor (running

*Figure 2A: Looking north at middle of downtown*

*Figure 2B: Photo simulation of how the area might look if developed as a public park*

*Figure 2C: Photo simulation of how the area might look if develoed with 66 multifamily units*

from the middle left to lower right of the photo), and immediately west of N. Harrison Avenue, a major north-south thoroughfare that bisects the downtown. The future downtown Cary regional rail transit station will be located immediately to the east of N. Harrison Avenue, just off the lower right of the photograph. For the eight acre infill area in the center of the photograph, the advisory committee debated between different types and densities of infill housing. Photo simulations were prepared to help the committee decide on a preferred residential density. An aerial photograph was used since it enabled us to capture the entire area and its context in a single photo.

Figure 3B is a photo simulation of how the area might look if developed with about 48 medium-density town homes. Figure 3C shows the same area developed with 288 garden apartments or condominiums, utilizing a mix of surface and under-unit parking. Figure 3D shows the area developed with 307 high-density condominium units, but using fewer and taller buildings than in Figure 3C, and making greater use of under-building parking, allowing the inclusion of a private pocket park between the buildings. Once again, all three simulations were based on conceptual site plans developed by DRL.

These simulations generated a great deal of debate and discussion as to the preferred residential density and types of buildings, not only by the advisory committee, but also later by the public, the Planning Board, and Town Council members. In general, most advisory committee found all of the simulated densities acceptable, but preferred the higher densities shown in either Figures 3C or 3D. Reaction from the general public was mixed when they viewed the images at an open house some months later, although citizens who lived in the nearby neighborhoods preferred the lower densities of Figure 3B and the suburban-looking buildings of Figure 3C over the more urban-looking buildings shown in Figure 3D. A number of Town Council members felt strongly that the urban style of Figure 3D represented the kind of downtown urban environment they desired. The final adopted plan encourages the higher densities shown in Figures 3C or 3D, and not the medium densities shown in Figure 3B. The plan does not

*Figure 3A: Northwestward-looking aerial photograph of existing conditions in and around an 8-acre infill and redevelopment area in the downtown*

*Figure 3B: Photo simulation of how the area might look if developed with about 48 medium-density town homes.*

*Figure 3C: Area developed with 288 garden apartments or condos*

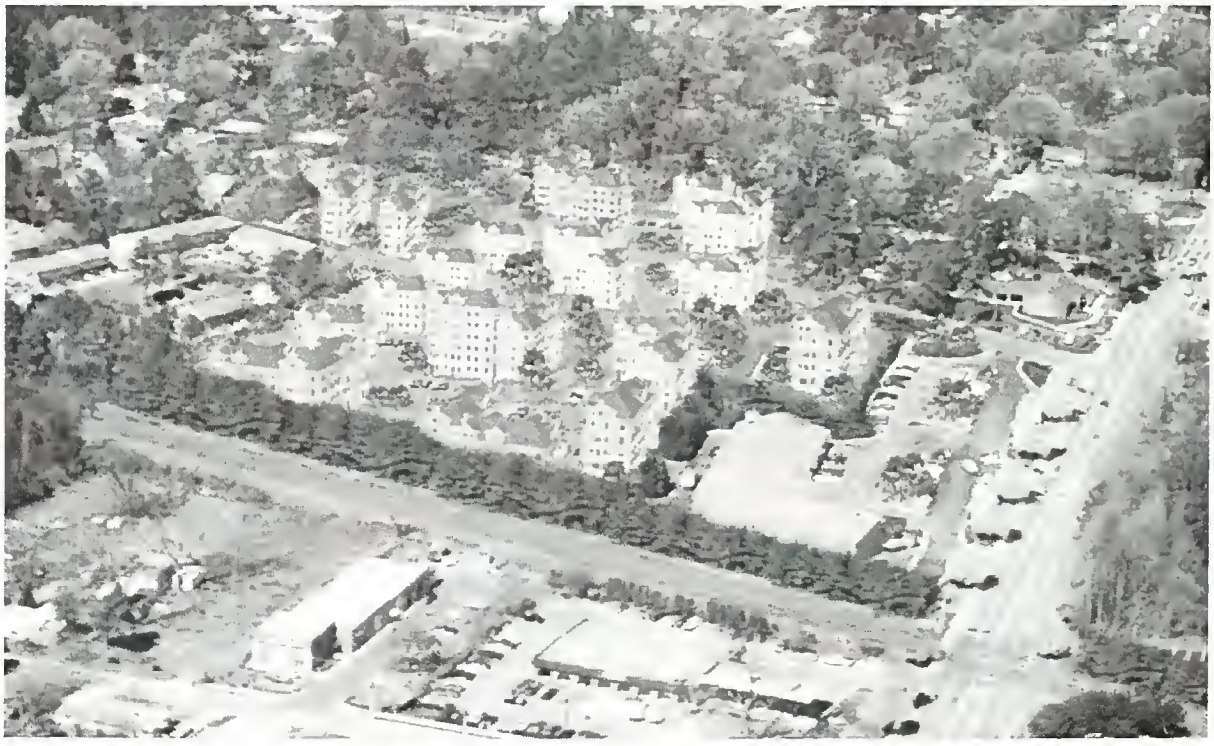

*Figure 3D: Area developed with 307 high-density condominium units*

specify a specific type of building or site design, thereby allowing designs such as those shown in either Figure 3C or Figure 3D, in addition to other creative designs.

**Case 2: Redevelopment along a Residential Thoroughfare**

***Project Background***

Around 1990, one of Cary's principal streets, Walnut Street, was widened from a three-lane road to a five-lane boulevard along a mile-long section that runs from a regional shopping mall (Cary Towne Center) in the west to an interchange with US Hwy. 1/64 in the east. This section of Walnut Street is lined with 1960's suburban single-family homes fronting the street, with lots ranging in size from quarter-acre to about one acre. By the late 1990's there were steady complaints from the homeowners on Walnut Street that their homes had become unlivable due to the widening and increased traffic impacts. Individual homeowners began to press for commercial rezonings so they could sell their lots for nonresidential uses, enabling them to move. This pressure intensified in 2000, after the adoption of a new Comprehensive Transportation Plan that indicated Walnut Street would eventually need to be widened again, to six lanes with a planted median.

In response, the Town adopted a special land use plan for the corridor in 1998. The plan recommended that individual home lots fronting Walnut Street be allowed to convert or redevelop to office, institutional, or very low intensity commercial uses, subject to specific guidelines. More intense redevelopment would be allowed at either end of the mile-long corridor, and less intense redevelopment – using residentially-compatible scale and architecture – would occur along the middle of the corridor.

Then, in late 2001, staff began development of a special corridor zoning district to implement the recommendations of the 1998 Plan, and to amend and refine the 1998 Plan as needed. From 2001-2002, staff worked closely with the affected property owners and adjacent residents and neighborhoods to develop the zoning district and refine the plan, holding a series of neighborhood meetings with each of three separate affected neighborhoods.

In the earliest stages of this effort, in early 2002, staff realized that the use of photo simulations would be extremely valuable in order to: (a) help citizens understand and envision the draft zoning district and plan amendments; (b) facilitate community feedback on the draft plan and district, to guide refinements to the recommendations; and (c) help reach consensus between the affected property owners, adjacent neighborhoods, and public officials on a unified vision for the corridor.

DRL and planning staff selected three locations along Walnut Street for ground-level photo simulations, plus one perspective aerial photograph of the corridor. After taking and selecting the best photograph of each of these sites, DRL and planning staff developed the specifications and characteristics of the redevelopment that would be shown in each simulation. For these simulations, DRL first created conceptual site plans for the redevelopment areas shown in the photographs, in order to guide the creation of the photo simulations. The site plans were based on the requirements of the draft corridor district, in order to ensure that the final simulations represented feasible scenarios.

Two of the photo simulations used in the project are described next.

***Photo Simulation 4: Redevelopment of Residential Lots on a Widened Thoroughfare***

Figure 4A is a photograph of existing conditions for several home lots on the north side of Walnut Street, at the western end of the mile-long corridor, just a block east of Cary Towne Center Mall. Figure 4B shows a photo simulation of the lots redeveloped according to the draft ordinance. A ground-level photograph was used, since most citizens experience the corridor from the point-of-view of a motorist or pedestrian. Multiple elements were tested in this simulation: Walnut St. was widened from a four-lane road with a center two-way turn lane to a six-lane boulevard with an 18-foot landscaped median. The existing homes were removed and replaced with two-story office buildings of about 5,000-10,000 square feet each, with buildings brought up to the street and parking placed to the sides or rear. Driveway access points onto Walnut St. were consolidated. Finally, street trees and median landscaping were added.

This simulation garnered quite positive feedback from the community. The owners of the depicted lots were satisfied with the potential they saw for their properties, although some of them wished that the ordinance allowed for commercial uses as well as office. Community residents felt the depicted buildings were of a scale and design that fit in well along the boulevard, and did not result in a "strip development" feel. We were also able to confirm that the community and

*Figure 4A is a photograph of existing conditions for several home lots on the north side of Walnut St., at the western end of the mile-long corridor, just a block east of Cary Towne Center Mall.*

*Figure 4B shows a photo simulation of the lots redeveloped according to the draft ordinance.*

public officials liked the "build to the street" recommendations of the draft ordinance, the consolidation of the driveway access points, the location of parking to the rear of the sites, and the inclusion of a planted median with the next widening of Walnut Street.

***Photo Simulation 5: Cumulative Redevelopment of Residential Lots on a Widened Thoroughfare***

Figure 5A is an aerial photograph of existing conditions along a half-mile section of Walnut Street, looking westwards to a shopping center in the distance on the south side of Walnut Street, immediately across from Cary Towne Center Mall, which is off-photo to the upper right.

Figure 5B shows a photo simulation of the corridor redeveloped according to the draft zoning district. An aerial photograph was used in order to: (a) show the cumulative effects of corridor redevelopment along the length of Walnut Street (which is not feasible when using a ground-level image), (b) provide an image that includes the neighborhoods located immediately behind the redeveloped Walnut Street lots, and (c) show the rear-yard elements of the redeveloped Walnut St. lots, such as parking lots situated behind the buildings and rear-yard buffers next to the adjacent neighborhoods.

The simulation also shows the impact of eventually widening Walnut St. to six lanes with a planted median, and of consolidating driveway access points. Figure 5B also depicts the less intense and more residentially-compatible redevelopment that the 1998 Plan recommended for the middle section of the boulevard, seen in the center of the photo. The more intense type of redevelopment recommended for the ends of the corridor – as depicted in Figure 4B – can be seen at the western end of Walnut Street., in the upper half of the photo.

This simulation proved to be very valuable in helping citizens and public officials "see the big picture" as to how redevelopment could actually work along this corridor, and it was key in answering questions about the location of parking and impacts on adjacent neighborhoods. For residents in the adjacent neighborhoods, the rear-yard parking shown in the photo-generated community debate about the desired type of rear-yard buffer or separation, and resulted in specific landscaping and fencing requirements. For the Walnut Street lot owners and interested developers, the simulation helped demonstrate that reasonable office products could be built along the corridor under the proposed district guidelines.

**Case 3: Rural & Historic Environments: Cary's Open Space & Historic Resources Plan**

*Figure 5A: Aerial photograph of existing conditions along a half-mile section of Walnut Street*

*Figure 5B: Photo simulation of the corridor looks redeveloped according to the draft zoning district.*

***Project Background***

In 2000-2001, planning staff developed Cary's *Open Space and Historic Resources Plan* (OSHRP), a master plan for the protection of key natural resources, open spaces, and historic areas within the planning jurisdiction, as part of Cary's smart growth initiatives. The plan includes an inventory and map of the most important open space and historic resource areas where preservation efforts should be focused. The plan also includes specific recommendations for regulatory and policy approaches that can be used to preserve open space and historic areas.

During the early stages of plan development, it became apparent that cluster or conservation subdivision design would likely be one of the foremost tools for open space preservation. Staff realized, however, that some rural landowners would have difficulty in understanding cluster design or how it could be applied to familiar parcels in their own community. It was decided, therefore, to use photo simulations to help illustrate for rural landowners, other citizens, and public officials, how cluster subdivision design could be used to protect open space areas, using local rural sites as examples. DRL and planning staff selected three well-known rural locations for perspective aerial photographic simulations of conventional vs. cluster subdivision development. One of these three photo simulations is described below as Photo Simulation 6.

Another challenge facing the planning team concerned the recommendations for the two National Register Historic Districts located in the rural extraterritorial jurisdiction. Both districts are examples of small, early-20th century rural crossroads communities. A photo simulation was used to convey to the community the recommendations and opportunities for contextually sensitive infill development and redevelopment within the historic districts. DRL and planning staff selected a location within the heart of the Carpenter Historic District for this

photo simulation, which is described below as Simulation 7.

***Photo Simulation 6: Cluster vs. Conventional Subdivision Design***

Figure 6A is a northward-looking perspective aerial photograph of existing conditions in the Carpenter Area, a rural part of Cary's extra-territorial jurisdiction (about two miles south of Research Triangle Park) that includes the Carpenter Historic District. The historic central crossroads of the Carpenter Historic District is located just left-of-center in the photograph. On the left side of the photo, a CSX Railroad line can be seen running from the top to the bottom of the photo. An aerial photograph was used since it enabled us to capture the entire area and its context in a single photo.

Figure 6B shows a photo simulation of how a farm located in the lower right quadrant of the photo might look if developed using conventional subdivision design, with the entire site – except for regulatory stream buffers – built out with single-family homes on 12,000 square foot lots. Figure 6C shows the same farm developed with a cluster subdivision design that achieves 40% of the site in open space while still attaining the same number of dwellings as in Figure 6B. This is done by altering the housing stock to include a mix of smaller-lot single-family detached housing (on 8,000 square foot lots) and single-family attached housing (town homes, duplexes, triplexes).

These images were initially used at community meetings designed to get public feedback on the draft Open Space & Historic Resources Plan. At those meetings, the simulations fully achieved the goal of conveying cluster subdivision concepts to the community and landowners, greatly increasing public understanding. For many citizens, Figure 6B made clear the degree to which conventional subdivision development might encroach upon and threaten the historic rural context of the Carpenter Historic District. However, most citizens at the community meetings indicated that while they wanted the preserved open spaces shown in the cluster simulation of Figure 6C, they also wanted the larger-lot housing of the conventional

*Figure 6A: Aerial photograph of existing conditions in the Carpenter Area, a rural part of Cary's ETJ .*

*Figure 6B: Photo simulation of how a farm located in the lower right quadrant of the photo might look if developed using conventional subdivision design.*

*Figure 6C: Farm developed with a cluster subdivision design.*

*Figure 7A: 360-degree panorama of existing conditions at the historic crossroads - Carpenter Historic District.*

*Figure 7B: Photo simulation of how the area could be redeveloped in a contextually-sensitive and compatible manner.*

subdivision of Figure 6B. That is, the public wanted to preserve open space, but did not want to have smaller lots or attached housing in order to get it. Thus, there was mixed public buy-in to the use of cluster subdivisions as a tool for preserving open space.

***Photo Simulation 7: Contextually Sensitive Infill Development in a Rural Historic District***

Figure 7A is a 360-degree panorama of existing conditions at the historic crossroads in the heart of the Carpenter Historic District, where there is a cluster of historic structures, including a general store, a farm supply store, a storage building, and a former antique store. Figure 7B shows a photo simulation of how the area could be redeveloped in a contextually sensitive and compatible manner. The elements tested in the image include the addition of sidewalks, a planted traffic island, street trees, landscaping, facade renovations to an existing building, and the addition of an infill restaurant building with outdoor seating.

This simulation received universally positive public support at the community meetings held to gain feedback on the draft plan, as well as in meetings with public officials.

**Tips and Guidelines for using Photo Simulations in Local Planning**

The tips and guidelines presented below are based not only on the experience of Cary's planning staff, but also on the broad experience gained by the staff of NCSU's Design Research Laboratory doing photo simulation work for numerous communities in North Carolina.

***A. Develop specific parameters for each simulation.***

At the outset of work on a simulation, carefully identify the characteristics or parameters of the changes to the environment that will be shown in the photographic simulation. For example, if a simulated building is to be added to a photograph, determine in advance the specific type of building that is desired, including its size and architectural style, and the desired placement and orientation of the building within the photograph. Try to identify all of the peripheral elements that are desired in the simulation, which may include adding people, vehicles, trees, and so forth, to the image.

***B. Develop a site plan for each simulation scenario.***

A sketch site plan should be developed for each scenario to make sure the program represented in the simulation is realistic and achievable under existing or proposed development ordinances. An otherwise valuable simulation can be discredited if, for example, it violates the zoning ordinance's setback, height, buffer, or appearance standards. Once the sketch site plan is developed, the next step in building the simulation is to skew and overlay the scanned site plan into the initial photograph. This becomes the base map upon which the simulation is built. Figure 8 shows the subdivision plan created as the first step in developing Figure 6B, skewed into the proper perspective and then superimposed on the base photograph of Figure 6A.

***C. When presenting simulations, indicate the program-specific quantities visualized.***

Validity can be given to a simulation scenario by indicating the specific development program that is depicted in the simulation, such as the total lot yield, gross residential density, site FAR, building square footage, parking counts, etc. The development program data should be based on and obtained from the sketch site plan prepared for the simulation. If this information is not provided to the viewer when the image is displayed, then one must at least be prepared to answer such questions when asked, or else run the risk of losing credibility in the eyes of the public. If the simulation only covers part of a subject site, one may need to be able to describe not only the quantities shown in the simulation photo, but also the quantities that occur off-photo on the balance of the site.

***D. The initial photograph should be from a view that captures an appropriate area to demonstrate the relevant issues.***

Selecting the correct photograph to start with is important to the success of the simulation. Take numerous photographs of each location from a variety of angles. A good rule of thumb is that the changes in the simulation should cover from 1/3 to 2/3 of the existing photograph (see Simulations 2, 3, and 6). This leaves enough of the photograph

*Figure 8: Subdivision plan created as the first step in developing Fig. 6B*

unchanged in the final simulation to provide context for the audience to orient themselves and quickly identify the changes made to the existing environment. Note that while it appears at first that more than 2/3 of the base photo for Simulations 1 and 4 have been changed, the roadway is in fact the unchanging element that orients the viewer.

Use ground-level photographs for smaller sites where the simulation is addressing issues from the automotive or pedestrian experience. Aerial photographs are best used to demonstrate relationships between nearby or adjacent land uses and for programming decisions for larger sites. Perspective aerial photographs tend be understood more easily by the public than plan-view orthophotos. Aerial photographs may require additional explanation or labeling about their location.

Be aware that the broader the geographic area shown in the photograph, the less detail can be shown in the simulation. For example, the high level of finishing and detail shown in Simulations 1, 4, or 7 – including building fenestration, café tables, and ornamental street lights – could not be feasibly shown in Simulations 2, 3, 5, or 6.

***E. Limit simulation detail to that necessary to address the defined issues.***

Too much photorealism or detail can cause the viewer's focus to shift from design and planning concepts to design details. The level of detail needed in a simulation is a function of the issues that the simulation is addressing. Less photorealism and detail are appropriate when illustrating issues concerning broad land use issues, such as in Simulations 3 and 6, while a higher degree of detail and photorealism is required for the evaluation of design issues, such as in Simulations 1 and 4.

When presenting a simulation, it is necessary to keep the viewers focused on the pertinent issues. For example, when Simulation 1 was shown to the public at a community meeting, a number of people expressed concerns about building colors, materials, and architectural styles. In response, the planning staff quickly explained that the focus of the simulation was to get feedback on the overall concept for downtown redevelopment, rather than on details of the individual buildings.

***F. When photorealism is called for, pay attention to peripheral simulation details.***

The realism of a simulation can be greatly enhanced through the inclusion of peripheral details in a photograph, especially details that suggest human activity. For example, in Scenario 1 pedestrians and a sidewalk café table were added to the scene, in order to increase the realism, vitality, and visual appeal to the image. The inclusion of pedestrians and vehicles in a photograph can also help the viewer to understand the scale of buildings and other elements in the scene.

***G. Review photo simulations during their draft stage.***

As in other design or planning projects, interim review is important in order to minimize the time and cost in preparing a simulation. It is recommended that the planning project team review the development of a simulation once the sketch site plan upon which the simulation will be built is complete, and then again, when the simulation is 25 percent and 75 percent complete. These interim reviews allow one to catch mistakes or change the simulation parameters at an early stage – which sometimes happens if the interim product reveals that the original concept would not achieve the desired effect.

***H. Limit the complexity / number of issues demonstrated in a single simulation.***

The more complex a simulation is, the more difficult it is for the public to understand. Focus on one or two issues per simulation, whenever possible. Limit each simulation to one site in the photograph. Simulations demonstrating alterative land uses or site programs should be limited 2 or 3 alternatives per simulation, such as in Simulations 2, 3, and 6, in order to not confuse the viewer.

***I. When presenting simulations, show them in a series of incremental changes.***

Photo-imaging software allows individual elements of the photo simulation to be isolated and

saved into separate digital photographic overlay "layers." By adding these layers incrementally to the simulation, a series of photographs can be developed, with each successive image adding another element to the simulation. In this way, planners can introduce proposed changes to the environment one or two at a time when presenting the simulation to the public. This technique increases public comprehension of the changes made to the environment, as well as how each individual element contributes to the final outcome. This technique can also be used to evaluate public perception of a single element by showing the simulation with and without that element.

For example, Simulation 1 was first shown to the public as a series of seven photographs in a PowerPoint presentation. The first photograph showed the existing scene (Figure 1A). The second photograph only showed the overhead utility lines removed and buried, and a brick sidewalk added. The third and fourth photographs added the new infill buildings – first in the background block, and then in the foreground block, respectively. The fifth photo added ornamental streetlights and traffic lights, and the sixth photo added street trees. The final photo populated the scene with pedestrians and sidewalk cafe tables (Figure 1B). Moreover, during the PowerPoint presentation planners could flip back and forth between adjacent photographs in the series, in order to highlight the impact associated with adding a particular visual element.

***J. When presenting simulations, indicate if the scenario is site-specific or typical to an area.***

The need for a photo simulation can be driven by opportunities at a specific location or by a more generalized issue that affects an area or the community as a whole. For example, Simulation 2 is site-specific, and was driven by land use opportunities specific to the area in the photo. In contrast, Simulation 6 addresses alternatives for suburban development in a rural landscape – an issue not limited to the farm in Figure 6A. That simulation was designed to be "typical" of development alternatives that could occur throughout the area. Nevertheless, some citizens and landowners inferred from the simulation that the town was advocating for development of this particular site, and town staff had to explain that the simulation was not specific to the site.

## Conclusions

Photo simulation can be an extremely effective tool for local planning. It is likely to be a technique that will gain ground among planners in coming years, as the cost of photo simulation services comes down and the availability of software tools increases. When outsourced, a single simulation may take anywhere from several days to several weeks or more to complete, and can cost anywhere from $500 to $2,000 or more (as of 2003), depending on the complexity of the simulation. As technology improves it may become more likely that larger municipalities will bring such capability in-house, reducing costs and turn-around time, which should help make these techniques more commonplace within the profession.

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*Town Center Area Plan,* Town of Cary, NC, Aug. 2001

*Open Space and Historic Resources Plan,* Town of Cary, NC, Aug. 2001

*Walnut Street Corridor District – Standards and Guide, Town* of Cary, NC, Nov. 2002.


***WEBSITE LINKS***

**Town of Cary**

www.townofcary.org

**North Carolina State University, College of Design, Design Research and Extension Program**

www.ncsu.edu/www/ncsu/design/sod5/research/index.html

**New Bern, NC: Visioning Streetscapes and Neighborhoods**

www.ncsu.edu/www/ncsu/design/sod5/research/projects/community/newbern2/

**Triangle Visioning II: Alternative Development Forms Along River Corridors**

www.ncsu.edu/www/ncsu/design/sod5/research/projects/land_use/triangle_visioning2/index.html

**Triangle Visioning: Opportunities for Urban Nodes**

www.ncsu.edu/www/ncsu/design/sod5/research/projects/land_use/triangle_visioning/index.html

# Bending the Judge's Ear: *Ex Parte* Contacts in Quasi - Judicial Land Use Decisions

**Abstract**

*Land use decisions by local government often affect property rights. Under certain conditions, the decision-making process is held to quasi-judicial standards. These standards include restricting communication between affected parties and the decision-makers to an official hearing. Not all affected parties, such as neighborhood residents, may know about these ex parte rules and might unintentionally violate them. This article explores ways to educate participants in the process to limit ex parte communication and ensure a fair process for all involved.*

**Thomas E. Terrell, Jr.**



## Overview

In some land use decisions, local governing bodies are required to follow rules that protect an individual's constitutional rights to procedural due process. Among these rights is the right to an impartial decision-maker. *Ex parte* (private) contacts with that decision-maker are prohibited to ensure fairness. However, the rules that are imposed to create a level playing field between proponents and opponents sometimes work in reverse, making the process inherently *un*fair. This is especially true in cases where one side is represented by an attorney who follows the rules strictly, while the other side is either unaware of the rules or choses not to follow them. There are some ways to make this playing field fairer for all.

## What are Quasi-Judicial Decisions?

North Carolina's cities and counties control the use of land in a variety of ways. Some of these land use decisions are made using procedures employed in our state's courtrooms in order to protect the constitutional rights of the parties involved. These decisions are described as being "quasi-judicial." *Humble Oil and Refining Co. v. Board of Aldermen*, 284 N.C. 458, 202 S.E.2d 129 (1974).

Quasi-judicial decision-making is required when a local governing body – such as the board of adjustment, planning board or city council – applies pre-existing laws or policies to a specific landowner or situation. *Lancaster v. Mecklenburg County*, 334 N.C. 496, 507, 434 S.E.2d 604 (1993). In these instances, the governing body must determine that certain facts exist, and then use some discretion in applying those facts to the pre-determined laws or policies. For example, when a

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board of adjustment considers whether to allow a variance from a property owner's setback requirements, it must find facts to establish that, among other things, public safety is secured. N.C. Gen. Stat. §§160A-388 and 153A-345. The securing of public safety is the pre-determined law, and the evidence before the board that substantiates the securing of public safety creates the facts.

The most common types of quasi-judicial land use decisions are conditional and special use permits, variances, and appeals of zoning officials' decisions. Conditional and special use permits are sometimes used as interchangeable terms. These terms describe decisions regarding uses that are allowed within certain zoning districts so long as the authorized body (e.g., board of adjustment, planning board or governing body) finds that certain conditions exist to show that the requested location is appropriate.

Because variances and appeals of administrative decisions tend not to incite large and active groups of opponents, *ex parte* contacts in these decisions are not typically a problem. It is usually with conditional and special use permits for potentially controversial uses (e.g. landfills, communication towers, airports, etc.) that such contacts become an issue.

### 3. Procedural Due Process and the Impartial Decision Maker

Quasi-judicial decision-making is employed to protect an individual's rights of procedural due process when a governing body turns its attention from the broader public policy arena and focuses on an individual situation. *Lancaster*; Id. An impartial decision maker is a critical component of this process. *Crump v. Board of Education*, 326 N.C. 603, 392 S.E.2d 579 (1990). North Carolina courts also have held that due process in quasi-judicial decisions mandates "that all fair trial standards be observed when these decisions are made." This includes an evidentiary hearing with the right of the parties to offer evidence; cross-examine adverse witnesses; inspect documents; have sworn testimony; and have written findings of fact supported by competent, substantial and material evidence. *Devaney v. City of Burlington*, 143 N.C. App. 334, 545 S.E.2d 763 (2001), quoting *Lancaster v. Mecklenburg County*, 334 N.C. 496, 507-08, 434 S.E.2d 604, 612 (1993); *Humble Oil v. Board of Aldermen*, 284 N.C. 458, 470, 202 S.E.2d 129 (1974).

By way of contrast, land use decisions applicable to an entire jurisdiction are made through a governing body's *legislative* powers. When acting in a legislative manner, governing bodies may use extremely broad discretion, and public hearings are held merely for public input. The board, however, need not abide by public sentiment at all, and courts are reluctant to disturb or question a legislative decision. See, generally, David W. Owens, *Legislative Zoning Decisions: Legal Aspects*, pp. 10, 38-39 (2nd Ed. 1999). Both board members and citizens often have difficulty jumping from one type of decision-making process to the other. The casualty usually is the formality of the quasi-judicial process.

### 4. *Ex Parte* Contacts

An *ex parte* contact is nothing more than a private conversation with a decision-maker about a matter being adjudicated. Those adversely affected in the proceeding are not present to hear or refute the substance of any statement. *Black's Law Dictionary*, Seventh Edition (1999).

*Ex parte* contacts violate the principles of a fair trial in three basic ways. First, they are not made under oath. Second, by their nature, they are not subject to cross-examination.

The third and perhaps most important reason *ex parte* contacts are prohibited in quasi-judicial land use decisions is because they taint the decision-maker's opinion, encouraging him or her to view the ultimate decision solely through the lens of the speaker. Unlike public hearings where inaccurate or exaggerated statements can be rebutted and witnesses can be cross-

examined, *ex parte* contacts allow speakers to sway the decision-maker in an uncontrolled forum and to color his or her opinion regardless of the true facts that may exist.

Preliminary opinions often tend to become stronger, not weaker, as more evidence is presented. Psychologists and communication experts who study advocacy in jury trials sometimes refer to the "rule of primacy" to describe the human tendency to continue to believe what one first believes, and to perceive subsequently acquired evidence in a manner that corroborates that initial opinion. Numerous studies show that most jurors form an opinion of a case early in the proceeding and pay closer attention to the evidence that supports their view. James E. McElhaney, *Taking Sides: What Happens in the Opening Statement*, 78 A.B.A.J. 80 (May 1992). Subsequent evidence is sought which reinforces initial conclusions. Donald E. Vinson, *How to Persuade Jurors*, 71 A.B.A.J. 72 (Oct.1985).

To the extent that *ex parte* contacts with decision makers tend to pollute both the ultimate decision and the quasi-judicial process itself, *ex parte* communications are a problem to be taken seriously.

**5. Generally, Attorneys Are Not the Problem**

In judicial proceedings, *ex parte* communications are extremely rare. Both judges and lawyers act as their own checks and balances, and such contacts are clearly prohibited and widely known and understood. An erosion in the rule for some would be an erosion for all.

In all fairness, some attorneys who practice only occasionally in the land use arena confuse quasi-judicial hearings with legislative hearings. And in some instances, the "common law" of the local jurisdiction treats all land use decisions as if they were legislative. In those cases, attorneys do engage in *ex parte* communications although technically they are prohibited. In yet other circumstances where the process is less protected and citizens are communicating freely with board members, some attorneys will communicate with them *ex parte* as well if only to be able to protect their client by participating in the process when the real decision might actually be made.

Rule 3.5(a)(3) of the Rules of Professional Conduct of the N.C. State Bar states that a lawyer shall not "communicate *ex parte* with a judge or other official except in the course of official proceedings; in writing, if a copy of the writing is furnished simultaneously to the opposing party; orally, upon adequate notice to opposing party; or as otherwise permitted by law." Comment [8] to RPC Rule 3.5 explains that the purpose for curtailing *ex parte* contacts is to protect the appearance of impartiality as well as impartiality itself: "All litigants and lawyers should have access to tribunals on an equal basis. Generally . . . a lawyer should not communicate with a judge . . . in circumstances which might have the effect or give the appearance of granting undue advantage to one party."

Under Rule 0.3(l) of the Revised Rules of Professional Conduct of the North Carolina State Bar, "'tribunal' denotes a court or a government body exercising adjudicative or quasi-adjudicative authority." In other words, an attorney's ethical code of conduct (which forbids *ex parte* contacts with a tribunal) requires that he or she abide by the same rules when representing clients in land use quasi-judicial proceedings.

Canon 3 A(4) of the Code of Judicial Conduct states that a judge "should accord every person who is legally interested in a proceeding, or his lawyer, full right to be heard according to law, and, except as authorized by law, neither knowingly initiate nor knowingly consider *ex parte* or other communications concerning a pending procedure."

Further, N.C. Gen. Stat. §150B-40(d) states that in a hearing governed by the Administrative

Procedures Act (APA) "a member of an agency assigned to make a decision or to make findings of fact and conclusions of law in a contested case . . .shall not communicate, directly or indirectly, in connection with any issue of fact or question of law, with any person or his representative, except on notice and opportunity for all parties to participate." While the APA does not govern quasi-judicial proceedings in the land use context, it has been held to be "highly pertinent." *Coastal Ready-Mix Concrete v. Board of Commissioners of the Town of Nags Head*, 299 N.C. 620, 625, 265 S.E.2d 379, 382 (1980).

**6. The Political Realities of Land Use Decision-Making**

The reality of hotly debated rezonings and special use permit applications is that what can seem like casts of thousands get involved. Inaccurate information and deliberate distortions of facts swirl through a community. Information – true or not – flows fast and freely. Board members immediately begin to hear claims of "fact" that have no basis in the underlying petition or that are unsupported by objective studies. For example, few jurisdictions in this state have not heard the rumor that one residential subdivision or another was secretly planned as a subsidized public housing project. If unchallenged, false claims become an insidious form of "truth" that lurks in the hearing room or, worse, in board members' heads.

When a landfill or shopping center or new airport hub is proposed, board members' phones start ringing, their fax machines hum, emails pop up, mailboxes fill, and their arms (and ears) are grabbed at church, the grocery store aisles, civic club meetings – anywhere people can catch them. In more cases than not, the board member has never heard about the prohibition against *ex parte* communications, or he or she knows about it but forgets in the moment or just dismisses what has been learned. This is especially problematic when the matter is before an elected board whose members more commonly make legislative decisions and who feel obligated to listen to constituents. It is already difficult enough to maintain a façade of impartiality when board members and the many party advocates and opponents are kin folks, neighbors, customers or clients, childhood chums, business associates, bowling league teammates, Sunday School classmates, or have any of the other ties that bind communities together. *Ex parte* contacts, in this context, are particularly effective in bending a board member's vision to see a petition through one particular lens.

Not only do lay board members generally fail to raise objections to these communications, but the citizen advocates, as a rule, have never heard the term "quasi-judicial" or have any idea what it entails or means. They have not studied the structures of adversary proceedings as attorneys have nor do the Rules of Professional Conduct that apply to attorneys in these proceedings apply to lay advocates. Consequently, while the side represented by an attorney who "knows better" sits idly by waiting for the hearing, the other side (typically zoning opponents) have camped out in board members' yards, making claims and reaching conclusions that have not yet been heard by the other side.

When one side follows the rules while the other side engages aggressively in *ex parte* contacts, the result is a corruption of due process. In some situations, it is minor. In other situations it is quite serious, and the intended result – a biased decision-maker committed to one position – is successful. Consequently, rules intended to create a level playing field by banning out-of-hearing communications in fact create unlevel playing fields where one side is trained to follow the rules and is further bound to follow them through rules of professional conduct that do not apply to their opponents, while opponents are unaware of the basic rules themselves, do not operate under ethical guidelines that serve as a rule overlay, and the rules are seldom explained or enforced.

It is perhaps worth some damage control that board members are required to disclose at

the hearing any *ex parte* contacts they have had with parties and the information received. But this very seldom happens. The disparity between communications received versus those that are disclosed should be evident to anyone with experience in these hearings. In fact, in most jurisdictions disclosure *never* occurs after *ex parte* meetings and communications with parties to a proceeding. Either board members do not know of this requirement, or they know about it but choose to ignore it. After all, disclosure in itself is an admission that the board member was engaging in prohibited conduct.

### 7. Is There a Band-Aid or Fix?

#### A. *The Possibilities*

There are four ways, conceptually, to address the problem of inappropriate *ex parte* communications: 1) focus on the participating advocates and their behavior; 2) focus on the board members and their ethical duty to close the door to these communications; 3) change the entire model; or 4) some combination of the above.

#### B. *The Advocates*

Very few public decisions elicit intense citizen comment or sentiment but the notification of a potential land use change is clearly on that short list of hot buttons. Strong public reaction often stems from general fears of change coupled with the human tendency to protect one's territory from invasion and potential control by outsiders. In the absence of little more than the notification itself, the worst scenario is assumed. It is not an overstatement to say that some land use changes create mild hysteria. Once notified of the proposed change, the understandable first response is often to contact those who will hear and decide the issue.

With respect to non-attorney advocates, the key questions are whether they can be educated in any meaningful way about the rule against *ex parte* contacts and, if educated, whether they will be willing to sit on their hands until the hearing. Given the often conflagratory nature of land change opposition, the best way to begin an education process is with the required notification to adjacent property owners. Except for the added expense of printing an extra page per mailing, there are no compelling reasons why the basic rules and elements of a quasi-judicial proceeding cannot be spelled out in a simple and straightforward manner at this stage. The next line of defense is for staff who answer citizens' inquiries to explain the rule at that time, as well as to explain the ways in which evidence and proof are handled at the hearing.

Attorneys and other professionals who represent applicants will be much more likely to wait and speak at the hearing if they know that board members will not be pressured prior to that time by citizen opponents. To make sure that attorneys and others representing applicants appreciate that they are not advocating within the open political process of a legislative decision, the same type of notification sent to adjacent owners also could be made part of the application itself, requiring the applicant and the applicant's representative to sign a page that articulates the basic rules.

#### C. *Board Members*

It is logically easier to educate board members about the rules of *ex parte* contacts than it is to educate the neighbors or citizen advocates. Board members go through several such hearings during their term while the typical neighborhood opponent rarely has more than one every few years, they have the ready advice of counsel regarding procedures, they can and often do attend seminars sponsored by the Institute of Government, and they usually do not have a vested interest in the outcome of any of the land use change applications. Further, it is easy to repeat the rules at the beginning of quasi-judicial hearings and to reprint the rules in the packet of materials they receive before each meeting.

Arguably, there is no good excuse for board members not being educated as to the basic rules of the quasi-judicial process. The better question is whether board members can be educated sufficiently that it is redundant or unnecessary to educate members of the public.

D. *The Model – Could it be Changed Altogether?*

Yet another approach to protecting due process is to allow information to come in from all sides prior to the hearing but with a formal emphasis on 1) document and information disclosures and 2) reminders to board members of their duties to keep open minds. Such an open channel process is arguably a more honest means of adapting to contacts that will occur anyway, even with the best checks and balances in place.

If such a system were adopted, board members should receive at least a synopsis of the application at the time of its submittal so that it could not be mischaracterized by opponents. Board members should be prohibited from giving strategic advice to either side and continually cautioned against promising anything more than that they will keep an open mind until all evidence is presented at the hearing. Letters, faxes, emails and other documents could be characterized as public documents available for scrutiny by any interested party upon request. The formal mechanism for disclosures would have to be worked out so that board members were not be subjected to copy costs and so that their time is not abused. If inaccurate or biased information is gleaned from opponents' statements or literature, quick responses and corrections could follow.

Board members probably should be reminded in each hearing cycle what their duties are and how evidence is to be received and perceived. For example, it would help to educate Board members regarding reliability of types of evidence and how to distinguish between opinion testimony and facts.

E. *A Hybrid Solution*

Changing the entire model would be the steepest of the mountains to climb, and if a county or municipality were to adopt such an open system it would likely lead eventually to litigation to determine whether parties' due process rights are sufficiently protected. The answer to that question would lie in the manner of its structure and execution, but a quasi-judicial process where communication is allowed with decision makers throughout period leading up to the hearing could be devised.

The easier solution – and probably the most effective – would be to keep the system we have where contacts are prohibited prior to the hearing, but focus energies on educating *both* board members and advocates as described in the sections above. *Ex parte* contacts are still going to occur, but the egregiousness of violations should dissipate.

## Carolina Planning Book Review

# Redesigning Cities: the cure-all to what ails your built environment

**Jennifer Lewis**

*Redesigning Cities: Principles, Practice, Implementation*, by Jonathan Barnett, FAICP, is intended as a cure-all to what ails today's built environment. Barnett explains that the problem with today's built environment is not due to substandard conditions such as inadequate plumbing or poor insulating materials. Instead, "the problem is in the public environment, in the way our homes and lives fit together" (27). The book provides solutions and historical context to a gamut of today's planning issues, from the decline of-public space to urban sprawl to the concentration of poverty. The book also provides effective tools for building community and creating healthier, more vibrant cities.

As the title suggests, Barnett's book is divided into three major sections: Principles, Practice, and Implementation. *Section I: Principles* is structured around five basic design issues: community, livability, mobility, equity, and sustainability. In this section, Barnett enlightens the reader on the importance of the public space in building a community, how highways and parking lots fragment development, and the roots of concentrated poverty in deed restrictions and redlining. The chapter on sustainability covers the recent concepts of sprawl, smart growth, and new urbanism. Although this section contains some recommendations for rectifying the problems that Barnett describes, it mostly serves to provide the reader with a fundamental understanding of the issues that the subsequent sections attempt to address.

In the opening lines of Section II: Practice, Barnett writes: "People can make a neighborhood out of different kinds of places, but the design and physical condition of the community have a big effect on whether people create neighborhoods or not" (95). This concept of neighborhood sets the stage for the section, which goes on to focus on the methods to improve various aspects of a location: new and old neighborhoods, suburbs, commercial corridors, downtowns, and even edge cities. For each of these categories of urban spaces, Barnett devotes a chapter of examples of methods to improve conditions, ranging from simple and cheap to elaborate and expensive. Here, Barnett also discusses such concepts as gentrification and neighborhood self-help, approaches to improving commercial strip zoning, and retrofitting edge cities. In the chapter titled "Reinventing Inner-City Neighborhoods," Barnett educates the reader about efforts to create successful public housing towers through renovations and a careful mixing of tenants. Using large, black and white photo montages, he highlights Hope VI projects in Washington, DC, Cleveland, and Boston, and the scattered site public housing efforts of Mayor Joseph Riley in Charleston, South Carolina. Recommended solutions and carefully selected examples of success receive the same treatment in other

chapters. His recommended methods for improving neighborhoods often tend toward the traditional. Examples include his suggestion to create a historic district to preserve neighborhoods and prevent failing downtowns, and the idea to reclaim natural systems to provide an improved setting for inner-ring suburbs.

In *Section III: Implementation*, Barnett narrows his discussion from broad policy concepts to improve a location to specific design-related suggestions. In "Designing the Public Environment," he summarizes principles for the design of public spaces from planning theorists such as Richard Whyte, Jan Gehl and others into nine statements that include everything from planning for a pleasant microclimate, to providing food, and designing for walkable distances. In the next chapter, he suggests particular changes in development regulations, especially modernist zoning codes, and emphasizes the need to incorporate environmental factors. Leaning heavily on New Urbanist ideas, he recommends various special types of new zoning, including mixed lot-size residential districts that will replace traditional residential zones. In his closing chapter, Barnett outlines ways in which his recommendations can be implemented.

In his efforts to encompass all of the major issues in planning today, Barnett may initially seem to be tackling an overwhelming amount of information. Yet amidst the seemingly overload of issues, there are several recurrent themes that provide a helpful framework: (1) the importance of pedestrian-friendly places and a human-scale environment to build community, (2) the need to change policies and regulations to be more in tune with people's social, not just functional, needs, and (3) the necessity to preserve downtowns, historic buildings, and public spaces. As may be evident, the underlying influence for many of Barnett's solutions is New Urbanism (NU). From beginning to end, we see the major themes of NU: walkability, community-building, historic preservation, and environmental sensitivity. Indeed, Barnett leans heavily on the ideas of others, including architects Jan Gehl and William H. Whyte, the Congress of the New Urbanism, and even Jane Jacobs and Ian McHarg. In his book, Barnett synthesizes the leading ideas in planning and helps the reader to understand how each idea relates to the other.

From the opening story about the creation of Wildwood, Missouri, to the closing chapter entitled "Making the Designed City a Reality,", Jonathan Barnett's Redesigning *Cities: Principles, Practice, Implementation* is an educational guide to modern-day planning and its history. Written in straightforward language that is as easily understood by the layperson as by an experienced planner, *Redesigning Cities* attempts to bridge the gap between planning and design. Ideal for amateurs and experts alike, *Redesigning Cities* will equip anyone interested in planning with the preliminary background knowledge and technical solutions to take action to improve the condition of today's urban form.

**References**

Barnett, Jonathan. *Redesigning Cities: Principles, Practice, Implementation.* American Planning Association, Planners Press. Chicago: 2003.

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