Rediscovering the Delta a reassessment of the linkages between poverty, economic growth and public policy using geographically weighted regression analysis

Dominique Duval-Diop

Louisiana State University and Agricultural and Mechanical College

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REDISCOVERING THE DELTA
A REASSESSMENT OF THE LINKAGES BETWEEN POVERTY, ECONOMIC GROWTH
AND PUBLIC POLICY USING GEOGRAPHICALLY WEIGHTED REGRESSION
ANALYSIS

A Dissertation

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by
Dominique Duval-Diop
B.A., Northwestern University, 1993
M.P.A., Columbia University, 1997
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Abstract

The nineties have witnessed broad economic growth and prosperity throughout the nation, with improvements in all major indicators of economic well-being. Yet, many rural and urban regions continued to experience economic distress during this period. At the same time, investments in infrastructure, human capital and poverty relief continue to be targeted to these failing areas. This work examines trends in demographic indicators, economic growth and federal funding experienced between 1990 and 2000 in the federally designated Mississippi Delta region in order to answer the following questions. What impact does federal funding have on poverty in the Mississippi Delta region overall? What factors influence poverty levels, and is that influence exhibited throughout the region uniform or variable?

The methods used to answer these questions include traditional and spatial exploratory or descriptive analysis, and traditional regression analysis coupled with geographically weighted regression (GWR) modeling. Results revealed that reductions in poverty were not equally felt throughout the region. Moreover, metropolitan status also had a major impact on performance along certain indicators. Lastly, the causal factors of poverty were uneven across the entire region, with clear clusters of opposite effects evidenced in some cases.

A key finding was the positive impact of human resources spending on poverty in the Delta region and in the local models generated by GWR analysis. Programs important to rural areas such as agricultural supports also had a similar positive effect on poverty in most of the models. Again, the importance of local context and local institutions that are responsible for implementing federal policies is a major explanation of these results.

Local results that differ substantially from the averages represented by the global regression models strengthen the case for policies and programs that are more sensitive to local
differences. Of particular concern are the disparities in local and state capacity and willingness to implement programs that were previously the primary responsibility of federal institutions. For programs that remain largely the responsibility of the federal governments, the findings suggest that resources must be targeted and adapted to respond to the distinctiveness of certain local areas.
Chapter 1 – Background and Research Questions

1.1 INTRODUCTION

Rural America is a mosaic of differing cultures, economic patterns, opportunities and potentials. One cannot make a general statement describing rural areas and be entirely valid. The Mississippi Delta region is one part of rural America that often conjures up images of extreme income inequality, the legacy of its past exploitative agrarian social order, and rich cultural traditions (Cobb 1992, Woods 1998). Its poor African-American population must face oppressive poverty and staggering degrees of powerlessness (Woods 1998, Reid 1999). The conditions in this region mirror or are more akin to the less developed world than to industrially developed nations (Lord 1990).

In the 1980s, policymakers agreed that this part of rural America contains some of the most economically depressed regions in the United States (USDA 1998, Shaw 1992, Nicholas 1998). And so in 1989, Congress established the Lower Mississippi Delta Development Commission (LMDDC), with the promise to mobilize the region’s human and natural resources, allowing the Delta’s citizens to access the social and economic growth experienced by the rest of the nation (LMDDC 2000). The commission then embarked on a far-reaching, multi-agency effort to invest in the region’s economy, infrastructure and people to help it “become a full partner in America’s future” (LMDDC 2000, Page iv). The area was defined in the beginning to include 219 counties in Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee (see Figure 1). The region was later expanded to 240 counties located in the original seven states with the addition of 20 Alabama counties and one Louisiana county, and a new coordinating entity was established in 2000 called the Delta Regional Authority (DRA). To allow
for future research on current conditions in the entire region, this study will focus on the 
expanded county designation. Creation of the area under the responsibility of the LMDDC and 
the DRA—heretofore referred to as the “Delta region”— is a lesson in the application of the 
optimistic belief in government’s ability to reverse poverty by redistributing wealth.

Figure 1.1: Map of the Delta Region
While the Delta region contains several large metropolitan areas, it is largely rural and disproportionately poorer when compared to other areas in the United States. For example, regional unemployment and poverty levels are higher than the national average and the figures are even worse when the subset of rural counties is considered (Reeder and Calhoun 2002). Consequently, the level of federal funding per capita is higher than the national average. It is perhaps in part due to the additional support and the prosperity of the nineties that the Delta region did experience a decrease in poverty levels throughout the last decade. A more complete description of the region’s socioeconomic conditions can be found in Chapter 4.

Although progress has occurred in the decade of investment that followed this commitment, then President Clinton acknowledged that the Delta has not “fully participated in the unprecedented prosperity of the 1990s” (LMDDC 2000, page iv). The co-chairman of the DRA also acknowledged in 2002 that people in the area still suffer appalling levels of poverty (U.S. Government Printing Office 2002, Reeder and Calhoun 2002). Public policies are established at local and national scales to address society’s many problems. Often these policies require the commitment of substantial government resources, yet they are rarely fully evaluated for effectiveness. A key question focuses on what impact federal investment in the Mississippi Delta region has on regional and local patterns of economic growth (so often linked to poverty reduction). Another question is whether demographic factors have a greater influence than federal investment on poverty in 2000. Furthermore, the Beyond 2000 report (LMDDC 2000) mentioned that racial tensions continue to plague the region and hinder development efforts. Understanding whether the local context, that can be proxied by racial composition, in which funds are distributed affects overall outcomes can help shed some light on the actual impact of federal funding on targeted groups. Through this examination of local conditions, one is forced
to acknowledge the “series of political compromises, social alliances and hegemonic processes of domination”, caused by the overlap of civil society, capital interests and the government, that serve to support and secure a particular path of economic development (Amin 2000, page 8).

This brief introduction highlights the potential impact of federal policy aimed at addressing poverty within the context of state and economic restructuring. Given the original objectives and goals of the former commission, however, even a cursory assessment of the data shows that the outcomes of federal investment are mixed. Attempting to determine how poverty is distributed in the region, and the impact of demographics, economic growth and federal funding on these patterns, necessitates a step back to investigate the nature of persistent poverty in the U.S. and in rural America in general.

1.2 PROBLEM DEFINITION, HYPOTHESES AND RESEARCH OBJECTIVES

While the nineties were a time of widespread economic prosperity in the United States, not everyone benefited, weakening the traditional link between economic growth and poverty declines, at least at the local levels (Levernier et al. 2000). At the same time as the market was producing so much benefit for many people, the federal state began to use more market-based solutions to the intractable problem of persistent poverty. This provoked a proliferation of welfare policies aimed at addressing poverty based on this faith in market forces to adequately distribute the benefits of growth to the poor by providing an adequate supply jobs. This shift in public policy ignored the enduring inability of the job market to effectively redistribute the fruits of economic growth. Placing increased responsibility for the poor in the invisible hands of the market puts the responsibility for the condition of economic deprivation squarely on the shoulders of the poor. Alternatively it removed more and more responsibility from federal
institutions. Trends in state restructuring further complicate the effects of economic restructuring and must be included in any analysis of changes in poverty.

In summary, the formal research questions are the following. What impact does federal funding have on poverty in the Mississippi Delta region overall? Secondly, are the factors that influence poverty levels throughout the region uniform or variable? Which set of factors has the most influence on poverty trends in the region: demographic or economic factors?

This research attempts to answer these questions by conducting a systematic study of poverty in the federally designated Delta region. The following hypotheses will be tested in this study and attempt to describe the impact of federal policies on poverty in the Delta region.

1. Although poverty decreased nationwide between 1990 and 2000, when examining poverty trends at a disaggregated level one will find that reductions in poverty were not shared throughout all areas, particularly throughout areas in the Delta region.

2. Differences in year 2000 poverty trends will be observed between urban versus rural settings.

3. The underlying causes for observed poverty trends, including the impact of economic growth, will not be similar across counties due to the differences in place/geography and how these differences affect the implementation of federal programs aimed at relieving poverty.

The proposed objectives will guide the testing of these hypotheses and thus uncover the nature of the relationship between the causes of poverty and the causes of poverty reduction.

The specific objectives are to:
1. Develop a descriptive profile of demographic and economic trends in the 240-county Delta region in order to show rural and urban differences;

2. Explore the complex geographic patterns of variables that fall within three main areas of interest—poverty, economic growth and federal funding;

3. Examine the causal relationships between poverty, economic growth and federal funding;

4. Examine causal relationships between poverty, economic growth and federal funding within the context of a spatial model;

5. Demonstrate the usefulness of this approach in highlighting specific local areas that show particularly interesting patterns in order to shed light on the underlying causes of these patterns.

To accomplish these objectives, the following methods are proposed. The descriptive analysis associated with Objective 1 will be conducted using secondary data from a number of federal and state governmental sources, including the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the U.S. Bureau of Economic Analysis. Data trends will be mapped (using different quantitative thematic map types) as well as analyzed using typical univariate statistical techniques for descriptive analysis. This analysis is in itself valuable since it will add to the research on the Delta region by profiling regional that have occurred since the region’s creation.

With respect to Objective 2, exploratory data analysis will be conducted on the variables. Exploratory spatial analysis, including the calculation of spatial autocorrelation on the overall region and within local areas, will hint at how relationships among variables appear to cluster within certain areas in the study region. By including the spatial dimension, one can better understand the extent to which context matters.
Understanding how patterns are expressed in a descriptive sense is just a precursor to understanding how the variables are related, that is their causal linkages, which is the focus of Objective 3. The application of the typical global regression model will attempt to relate economic growth and federal funding, as well as other demographic variables, to the poverty rate. For Objective 4, a spatial regression model from the geographically weighted regression family will be applied. Using this technique acknowledges the existence of geographic variation in the data set and attempts to discover the nature of the variation. Results will be contrasted with those from the typical global regression model to show how economic growth sustains long-term spatial variation and the persistence of regional differences in poverty levels. With this technique one can more adequately respond to the following question. How does regional heterogeneity in the economic landscape connect with broader patterns of economic and governmental restructuring, to impact patterns of poverty in the region?

The last objective will involve analyzing the results of the spatial regression model and the exploratory analysis in order to exhibit differences in the relationships between variables that exist at the local level. A brief case study will be presented to illustrate divergence between the regional analysis and what happens at the local level. By alternating scales, one can ascertain the locally peculiar circumstances that engender such results.

1.3 JUSTIFICATION AND SIGNIFICANCE OF THE STUDY

This research is important and timely for several reasons. First, the limited amount of federal resources prompts policymakers to inquire whether taxpayer dollars went to good use. It is also important to ensure that those who were targeted by the development programs actually benefited. Concern with the effectiveness of public policies encourages a look at whether the LMDDC and the DRA, by leveraging a wide array of federal assistance programs, succeeded in
increasing economic growth and thus reducing poverty in the Delta. On the surface the preliminary assessment would be “not really”. Why has the Delta region as a whole failed to prosper, as have other parts of the nation, in spite of the years of concentrated federal investment and why have certain areas in the Delta region benefited more than others? Answering this question is imperative if one is attempting to evaluate the impact of the decision to create this special development region.

Second, this research falls in line with the research agenda for the 2000’s proposed by the Rural Poverty Research Center whose scholars acknowledge the need for more accurate, multi-level analysis. They point to the need for a greater understanding of the link between policy interventions and the local institutions that affect their intended impact, and lastly, the need for multi-site studies that use diverse methodologies (Weber and Jensen 2004). Much of the response to the demand for more research on modern poverty has occurred in disciplines other than geography. For example, the work of geographers in connecting political economies with space is being extended by sociologists to examine spatial inequality in both rural and urban settings. Economists have also sought to bring space into their analyses of regional growth (Plane 2003). While the inclusion of space to investigate poverty in other disciplines is gratifying, geographers must maintain interest in this important research agenda that is so relevant to public policy.

By addressing these questions, this research can elucidate the continuing debate on how economic growth affects economic well-being. Contradicting views confuse policymakers who are trying to deal with reducing the poverty that affects so many in such a prosperous nation. Bringing in the spatial or geographic perspective, can yield a more enlightened and complete analysis of the issues presented above. Additionally, this will help place geography at the
forefront of public debate, something that the chair of the American Association of Geographers sees as imperative (Murphy 2003).

Moreover, according to Smutny (2002) and Stimson et al. (2002), the local impact of economic restructuring on urban metropolitan areas has received a lot of attention but the non-metropolitan areas have been neglected. This research will provide more balance by adding to the scholarly work on rural areas. Furthermore, trends in state restructuring are so recent that their impact has been more theorized than empirically investigated. An additional benefit of this research is that it will study the impact of contradicting forces of state restructuring in the region. This is extremely important as activists, policy experts and decision makers hold up the Delta and Appalachia regions as a justification for creating similar political structures throughout the nation (U.S. Government Printing Office 2002).

Additional benefit can be drawn from bringing the past poverty studies to the present. A significant amount of research on poverty was conducted in the 1970s. However, the pace has slowed down and is now relatively quiet; perhaps due to Patterson’s (2000, page 81) astute observation that “prosperity made it easy to ignore the poor”. This research also offers the opportunity to counteract the underlying assumption of so many public policies of the lazy, problem poor whose basis can be found in the Reagan-era (Kodras 1997a, Goode and Maskovsky 2001, O’Connor 2001). Such policies, and the poverty research that supports and informs those policies, seek to portray the causes of poverty in purely individualistic terms (people are cause) (O’Connor 2001), when economic structures have an equal if not greater weight (Kodras 1997a). Lastly, this research will add to the body of work on the Delta region, which is not as extensive as that on the Appalachia.
1.4 ORGANIZATION OF THE STUDY

This dissertation is organized into six chapters. The introduction, research problem and objectives, and the justification and significance of the study are included in Chapter one. The second chapter is essentially a literature review that commences with a discussion of poverty and ways to measure it. It is followed by a treatment of economic growth. A discussion of a series of perspectives on poverty and what causes this phenomenon comes next. For example, poverty can be characterized as a result of market imperfections, or its geographically contingent nature may be emphasized, or its social construction and how that construction reveals power relations can be studied. Next, an examination of the role of the state in poverty reduction closes the chapter. Chapter three describes the data used in this research and includes a description of the conceptual model that will be estimated and the methodologies that will be employed to accomplish the research objectives. Chapter four consists of a descriptive analysis of the study region and the challenges the residents of this region continue to face. Techniques used include traditional descriptive statistics, thematic maps and exploratory spatial data analysis. Chapter five presents the results of the global and spatial regression models that were estimated. The dissertation concludes with Chapter six.
Chapter 2 – Literature Review

Throughout this literature review, the concepts of poverty, inequality and economic growth are introduced. No consensus exists on the definitions of these terms nor for how to derive or measure them as argued below.

2.1 POVERTY

Poverty as a concept can be likened to a multi-faceted prism (Figure 2), which alternatively illuminates and distorts the welfare policies of governments at all levels and spatial hierarchies. It is an idea that deeply divides policy makers, sociologists, economists, politicians and activists. Consider the following quotes as an example of the differing perspectives on how poverty can be defined. Research quoted in National Research Council (1995) argued that “economic poverty should be defined as the lack of sufficient income for people to ‘play roles, participate in the relationships, and follow the customary behavior which is expected of them by virtue of their membership of society’” (page 22). Others such as the United Nations Development Program (UNDP) point to poverty as describing an individual’s inability to “live a long and healthy life, to be educated, and to have access to the resources needed for a decent standard of living” (Hanham et al. 2000, page 2).

While economist Amartya Sen (1985) recognizes that relative differences in incomes are important; he sides with the UNDP perspective by placing a greater importance on a person’s capability to obtain some basic level of opportunity or minimum standard of well-being. This approach allows analysts to concentrate on what such an individual “can or cannot do, can or cannot be” (Sen 1985, page 670). Geographer Yapa (1996) also challenges the economic view that seeks to address poverty from the perspective of insufficient income. He argues that a focus
on income “is based on the connection that more affluent people have adequate food, shelter, and health care, hence the belief that problems of poverty will disappear with economic growth.

Figure 2.1: The Poverty Prism—Pathways to reducing poverty
and the consequent growth in household income” (Yapa 1996, page 717). In contrast, the National Research Council (NRC) emphasizes the need to place a narrow focus on “economic deprivation as the core notion of poverty” (NRC 1995, page 21). The council justifies this focus because “[t]he poverty measure influences policy making more broadly as an indicator of economic well-being (NRC 1995, page 18). Indeed temporal trends in poverty rates, as well as its disproportionate impact on certain societal groups, are often used to buttress or justify certain public policies such as the creation of the LMDDC and the DRA.

Irrespective of the measure selected to detect a lack of *something*, Osmani (2001) contends that the true question lies in what we are trying to equalize. He argues follows that equality for a group or region might necessarily lead to inequality for another group or region as income and resources are redistributed to those with less. His main conclusion is that if policy makers’ continue to pursue efforts to maximize the total utility of society, placing the distribution of resources as secondary, then society will fail to eradicate poverty.

2.1.1. Measuring Poverty

Many studies of economic well-being, including those of Shaw (1992), Nicholas (1998), and O’Connor (2001), use the official U.S. Census data on poverty thresholds or some modification thereof to measure poverty. However, if this data is not available, other data such as the mean per capita income, which is collected more frequently, is used to investigate the incidence and concentration of poverty. These standard measures of economic status have formed the foundation for the definition of the “poverty threshold” determined by the U.S. Bureau of the Census (Shaw 1992, O’Connor 2001, Nicholas 1998, NRC 1995). This approach is, however, being criticized because the poverty measure neither accounts for changes in consumption (it is merely adjusted for inflation), nor for geographical variation in prices.
Additionally, it does not include variables such as taxes or in-kind transfers (NRC 1995). It essentially assesses the amount of poverty generated by the market before being mitigated by state interventions (Brady 2003).

In fact, many researchers argue that these measures—or more importantly, how they are used to depict poverty—inadequately represent the true depth of poverty and its spatial concentration. Scholars, such as Strait (2001), have devised measures that provide insight on the concentration of poverty at a neighborhood level. In his article, Strait (2001) employs U.S. Census decennial data on metropolitan statistical areas for 1970, 1980, and 1990 to examine growth in extreme neighborhood poverty using two specific measures: neighborhood poverty rate (NPR) and the concentration of the poor (CPR). Extreme poverty neighborhoods are defined as census tracts having poverty rates equal to or exceeding 40 percent. The NPR, measured by taking the change in the percentage of the metropolitan population that resides in extreme poverty neighborhoods, indicates the proportion of people who have to deal with poverty around them even if they are not actually poor. The CPR, measured by taking the percentage of the metropolitan poor who reside in extreme poverty neighborhoods, shows those who not only must cope with their own poverty but also the poverty of those around them and the conditions that such poverty produces.

Examining measures of inequality or income gaps as opposed to absolute measures of poverty is often useful (O’Loughlin 1997). Yet, the level of inequality is much more difficult to measure, and different techniques abound. One of the most common methods used to determine the extent of inequality in an income distribution is to plot a Lorenz curve shown in Figure 3 (Shaw and Wheeler 1997, Levy and Faria 2002). This curve is essentially a cumulative frequency distribution that compares the distribution of a specific variable to that of perfect
equality. The Lorenz curve has chiefly been used to compare income distributions, but it has also been applied to assessing spatial patterns of inequality, the distribution of ethnic groups, and regional differences in health (Castillo-Salgado et al. 2001, Shaw and Wheeler 1997, Levy and Faria 2002). The cumulative share of the population is represented on the X-axis while the cumulative share of income is shown on the Y-axis. A diagonal line of perfect equality, represented by the 45-degree line, is compared to the Lorenz curve. The greater the deviation from this line, the greater the inequality (Castillo-Salgado et al. 2001).

Figure 2.2: Lorenz Curve

Several measures have been developed to calculate the extent of inequality associated with the Lorenz curve. One such measure, termed the index of dissimilarity, sums the vertical deviations between the curve and the diagonal line of perfect equality. As the index approaches 1, the distribution approaches perfect inequality. A score closer to zero would mean the distribution is close to perfectly equal.

This index is given by:

$$ ID = 0.5 \sum_{i=1}^{n} \left| (X_i - Y_j) \right| $$
where \( X \) is the cumulative percentage of the population by group, \( Y \) is the cumulative percentage of income shares per group, and \( n \) is the number of groups (Shaw and Wheeler 1997).

Another technique measuring inequality is the Gini coefficient which calculates the area between the equality diagonal and the Lorenz curve (Levy and Faria 2002). It is one of the principal measures of inequality in the economic discipline as well as in others (Xu 2004).

At the risk of perpetuating the narrow views that often constrain the discourse and poverty alleviation policies, this study uses the last approach to measuring poverty precisely because of its tie to public programs and policies, and because formulating a “new and improved” poverty measure is beyond the scope of this study. The conceptual model presented in chapter three describes more fully what measures will be used to complement this measure.

From this discussion, it is evident that the way poverty is defined governs the set of measures used to study it, which in turn influences the types of policies established to tackle it. However, it is important to acknowledge the way poverty manifests itself in all aspects of life. This can be accomplished by including other measures in the analysis, such as the infant mortality rate, that are closely related to the poverty rate and shed light on poverty’s impact on well-being.

2.2 ECONOMIC GROWTH AND POVERTY

2.2.1 Measuring Economic Growth

To add to the complexity of the number of measures available for poverty are those indicators of economic growth, which, in some cases, mirror poverty measures. Gross National Product (GNP) or Gross Domestic Product (GDP) growth rates, population changes, the change in the number of business establishments, wage or job growth, growth in particular sectors such as high-tech industries, unemployment rates as well as per capita or median measures of income all come to mind as “appropriate” measures of economic growth and change (Barro and Sala-I-
Martin 1995, Partridge and Rickman 2003, Levy and Faria 2002, Blank and Card 1993, Smutny 2002). Each measure provides insight on a different aspect of economic activity and its ensuing effects on poverty. For instance, research conducted by Blank and Card (1993) found that changes in poverty occurred largely due to fluctuations in three labor market variables—wage levels (a good proxy for productivity, measures the way productivity growth drives changes in the family income distribution), dispersion of wages and unemployment. “At any point in the business cycle, unemployment is unequally distributed across the population, with higher unemployment rates among lower-wage workers. Likewise, cyclical increases in unemployment fall disproportionately on less skilled workers” (Blank and Card 1993, 298).

Yet, because of geographic variations in prices, preferences and societies, it is often difficult to make meaningful comparisons using these individual indicators at the national scale. Researchers are also often baffled by which measure is the most appropriate to convey economic conditions and by how to determine the appropriate geographic scale. This is often due to the ambiguity in assessing growth when one measure may be favorable while another measure for the same region shows the opposite condition (Partridge and Rickman 2003). What one can conclude from this brief discussion is that economic growth is akin to improvements in the economic well-being of a population, however that is measured.

### 2.2.2 Relationship between Economic Growth and Poverty

Turning to the connection between growth and poverty, much work has been done examining the reciprocal relationship between economic growth and inequality. Since the 1950s, theorists have been influenced by the Kuznets curve hypothesis which appeared to show inequality, at least in the early stages of growth, as a prerequisite for sustained future growth. This belief was based on the assumption that capital accumulation directly linked to savings
behavior was essential to growth and that “poorer regions should grow more rapidly than richer regions because diminishing returns to capital would cause more advanced regions to grow more slowly than less advanced ones” (Rupasingha and Goetz 2003, p. 3). Thus by concentrating wealth in the hands of the wealthy, one would guarantee greater savings and therefore greater investment. Osmani (2001) blames the persistent rationale, which combines savings with the accumulation of capital to bring about growth as the chief source for the continuing conflict between equality and growth.

Further, policymakers and researchers often assert that without economic growth, poverty cannot be reduced (Blank and Card 1993). Chaudhuri (1989, page 3) maintains that traditionally the capacity to improve life circumstances, health, education and the quality of life has rested on the bedrock of economic growth. The World Development Report (World Bank 2001) echoes this sentiment but admits that similar rates of growth do not bring about comparable decreases in poverty. This anomaly contemplates the existence of a “…complex set of interactions among the policies, institutions, history, and geography of countries” (World Bank 2001, p. 45) that effects the ultimate outcome of economic growth. This is probably the reason for contradictory findings in the body of research on the impact of economic growth on poverty. For example, the direction of the relationship between growth and measures of inequality or well-being is much disputed. While Forbes (2000) shows a positive relationship between growth and inequality in advanced countries, Osmani (2001) and Aghion et al. 1999 find that an opposite relationship holds true.

Scholars have found a close correlation between per capita income, a key economic growth measure, and industrial composition--such that, as the industrial structures of regions (as well as income levels) converge or diverge to that of a larger economy. This finding supports
the belief that the improvement of the economy must lead to improvements in economic well-being. Further the notion that convergence in industrial composition results from economic growth is widely accepted (Bernat and Repice 2000). A wide range of studies have explored national growth trends and the manner in which they diverge or converge over time. In an examination of the U.S. manufacturing industry, Kim (1998) investigates long-run changes in the economic structure of the U.S. and the forces that produced them. He argues that economic integration influences patterns and periods of income convergence and divergence. By estimating the Hoover coefficient of localization and a regional specialization index, the author finds that although differences in the regional industry mix do not account for all variations in regional per capita income, they played a significant part in causing U.S. regional incomes to diverge and converge during the 19th and 20th centuries.

As a way of organizing the numerous concepts used in recent convergence literature, Rey (2001) distinguishes between two types of convergence: \( \alpha \) (alpha) convergence and \( \beta \) (beta) convergence. Alpha convergence is based on the traditional notion of the reduction in disparities in per capita income in regions across time. It is usually measured as the standard deviation of the regional income distributions. Kuznets’ inverted-U curve is a classical example of \( \alpha \) convergence. A chief short-coming of measures of \( \alpha \) convergence is that they do not shed light on the processes that may be influencing the narrowing or widening of regional incomes, nor do they deal with the underlying geographical patterns. Beta convergence is based on the neoclassical theory of growth that has each region converging towards its own general equilibrium.

The main economic mechanism widely referred to as generating improvements in economic well-being is job creation. Employment growth positively impacts real per capita
income generally and for specific demographic groups, such as youth and African Americans (O’Sullivan 2003). Blank and Card (1993), however, reject this blanket conclusion that more jobs lead to less poverty, in light of the important effect of wage inequality. Hence, the jury is still out on whether market growth is truly able to sustain increased incomes without government intervention (Ferreira 1999).

Mude et al. (2003) in their review of the literature note a well established positive relationship between educational attainment and future income. Also noted in their study is the reversal of this relationship in poor communities “generating a perpetual poverty trap whereby the poor attain low levels of education due to financial constraints and consequently can expect meager future earnings due to educational deficiencies” (Mude et al. 2003, page 2).

Lastly, the impact of economic changes related to the restructuring of many industrial economies should not be ignored. Changes in the industrial structure of rural America over the last decade have deeply affected the lot of the rural poor (Smutny 2003, MDC 2002, Kodras 1997a, and Levernier et al. 2000). Whereas the 1970s and 1980s brought high-paying manufacturing jobs to the South aiding in the transition from a failing agricultural region, the opposite was true in the late 1980s and 1990s (MDC 2002). It was at this time that many manufacturing firms abandoned the South to head for more profitable locations overseas. The retraction of manufacturing jobs and their replacement with more service-oriented industries was a painful process that many communities continue to confront.

2.3 SUMMARY OF POVERTY AND ECONOMIC GROWTH LITERATURE

This research does not attempt to resolve the outstanding issues with the manner in which to best depict and study changes in poverty and its determinants. Instead, it will employ the measures described in Chapter 3 (Methodology) based on the availability of data, the extent of
usage by both policy makers and researchers, and relevance to the research. Equally varied are the hypothetical relationships between economic growth and its impact on poverty. Economic growth is seen as poverty’s panacea but how it cures is deeply contested. In keeping with the contention that geographic variation prevents blanket generalizations, this research will allow the results of the empirical analysis to establish the causal relationships between poverty, economic growth and state intervention that will be found to exist in the Delta region. Lastly, this research does not add to the already extensive literature regarding the factors that determine economic growth. Instead it will draw from that literature to inform and explain the results of the empirical analysis.

Particular views of poverty and its causal factors will be used to interpret the results. For example, this study will employ the economic view of poverty as a notion of scarcity or market imperfection, and how this scarcity creates uneven opportunity in rural areas to interpret some of the results (Higgins 1995, Toner 1999, Chaudhuri 1989, Yapa 1996, Cloke 1995, Peet 1975 and Myrdal 1957). A necessary perspective to incorporate in this study is the idea of poverty as geographically contingent (Kodras 1997a, Kodras 1997b, Morrill 1993, Mehretu et. al.2000, Brunn and Wheeler 1971, Morrill and Wohlenberg 1971; Tickamyer and Duncan 1990; Peet 1999, Myrdal 1957). Economic structures and conditions or changes in these conditions are often connected to spatial fluctuations in poverty, creating isolation and marginalization. Therefore, this research is in line with a newer trend in poverty research that seeks to understand the “political, economic and ideological production of poverty” and its connection to marginality that occurs at different geographic scales (Goode and Maskovsky 2001, page16). Globally one cannot separate the local, place specific context from the wider regional or national restructuring of economic relationships. In fact, this is precisely what rearranges the relationships between
places and alters their relative advantage or disadvantage (Kodras 1997a). When examining demographic conditions often associated with poverty, infant mortality or female-headed households, geographical variability is also present. Lastly, one cannot ignore the glaring disparity between rural and urban places (Tickamyer and Duncan 1990). Causes of poverty, and consequently their “solutions or remedies” must be situated, therefore, in a spatial context.

To conclude, regardless of the determinants poverty, one cannot ignore its construction through a series of social networks of production (technology, academic, social, cultural, and political) (Yapa 1996). Borrowing from Kodras (1997a), this social construction makes each locality a unique blend of “economic, social, political and cultural traditions-a historically accumulated social order” (page 67). Massey’s (2004) description of this construction in her conceptualization of the spatial divisions of labor within the context of uneven development is useful when thinking about the Delta’s relationship to other regions on the national and global scale. Massey (2004) uses the lens of economic actors to examine the “relations of power and control, of dominance and subordination” in a region (page, 112). The relations of production govern how the labor is distributed across space. Functions are differentiated which leads to differentiation of jobs, labor forces and the skills that are present in different labor pools. Where white collar, high paying jobs exist and where low paying, less skilled manual work is located has far reaching implications for the prosperity of regions. The financial and policy implications of the relationship between one region that has large concentrations of high paying jobs and another region with all the low status jobs are substantial. Moreover, who decides which groups in society perform which functions is something that is determined by another set of causal factors. Massey (2004) contends that understanding the geography of social relations of
production that underpin any form of uneven development will lead to an understanding of the
geography of class and inequality.

Contrasting amalgams of these social forces in turn mold the market and state responses
to poverty and ultimately the impact these responses have on poverty. Therefore context matters
and empirical analysis of the problem presented in this research must remain cognizant of that
fact.

2.4 STATE THEORY

Throughout this research, attention is given to the “state” since it wields control over the
Delta region and over certain programs aimed at improving the welfare of the poor, and
improving the performance of the regional economy. A distinction is made between the state,
which will refer to the ensemble of socio-political institutions in place to administer government
programs at all geographic scales, and the welfare state, which is charged with maintaining those
resources specifically targeted to the poor. The two are equally important in this study since
poverty in the Delta region is being addressed from many angles.

Early in the development of the welfare state, investigations of “social contingencies”
linked the condition of poverty with rapid industrialization, finding fault in society and not the
individual (Briggs 2000). The nineties have witnessed broad economic growth and prosperity
throughout the nation, with improvements in all major indicators of economic well-being. But
many small areas in both rural and urban communities continued to experience economic
distress, indicating an obvious inability of the market to evenly distribute the benefits of
economic growth, and justifying a certain level of state intervention. Yet today, the state is
increasingly unable to perform the distributive function. The difficulty of social institutions to
adapt to changes in economic growth paradigms (such as the move to flexible specialization) prevents “the widespread distribution of the benefits of innovation” (Amin 2000, page 13).

The difficulty is felt at all levels of government: federal, state and local. The devolution of federal programs that started during the Reagan years, particularly those that are block granted to the states is also cited as a factor in the continued distress of certain regions and localities like those in the Delta. Devolution, or decentralization as it is sometimes called, refers to the shift of certain responsibilities that were traditionally those of centralized governments to regional or local governments. The justification for this trend lay in the expectation that decentralization would enhance efficiency by increasing inter-governmental competition and democratic voice by allowing local populations to weigh in on resource allocation decisions. Devolution, however, is most effective when strong traditions of civic participation, accountability and competency exist in subnational government (Warner 2003). In situations where these traditions, due to regional inequalities, are absent decentralizing the redistributive function of central government may actually undercut efficiencies in redistribution. Not only should the inability of the market to redistribute be considered, but the capacity of state and local governments to assume greater redistributive responsibility should be considered too. Warner (2003) contends that because many rural governments lack an ample revenue base or adequate management capacity, the success of the important innovation of decentralization is hampered.

Differences in capacity and resources causes the devolution of responsibility from national to subnational governments to “create a more uneven and competitive landscape between states and localities” (Warner 2003, page 541). Warner (2003) warns that the implications of devolution on exacerbating the inequalities between areas are not adequately addressed in the literature. While Warner’s (2003) look at the local tax effort is beyond the
scope of this research, the author makes a valid point particularly related to the fact that the lack “of political voice for the poor, limited local fiscal capacity, and inter-local competition for growth prevent local governments from adequately providing redistributive services” (page 542). The results of Warner’s research show that state aid to local governments and the centralization of redistributive functions at the state level are inversely related. That is the greater the centralization, the less investment is made in direct aid to localities. Areas that have both low state aid levels and low state centralization face the greatest fiscal challenges. Boyne (1996) also finds an inverse relationship between central funding and competition among localities with increases in central funding leading to decreases in local competition.

The retraction of state intervention and assistance the poor in the United States have seen in spite of the continuing inability of the market to mitigate the uneven distribution of the benefits of growth is distressing in light of the revelations of researchers such as Warner. Several federal policies were enacted in the 1990s to constrict the availability of services targeted at the very poor—including the sweeping welfare reforms passed in 1996. Ironically, the new poverty reduction policies depend on the market to lessen the effects of economic deprivation. They are based on the implicit assumption that the economy or economic growth is sufficient enough to reduce poverty and thus eliminate the need for government intervention. State restructuring that has altered the allocation of federal resources by giving more control to state and local governments (decentralization or devolution) also rely on the assumption of unbiased social institutions (Goode and Maskovsky 2001). However, by focusing on an individual’s supposedly unrestricted ability to access market opportunities, they fail to account for the economic and social structures that help form and maintain pockets of extreme need. Kodras (1997a) makes it clear, however, that one cannot discount the weight that local economic
conditions and social structures may place on an individual’s capacity to find a job. “[T]he market has the greatest structural effect on inequality and poverty, as it contains the mechanisms (e.g. labor markets, capital markets, property markets) that distribute economic resources (wages, profits, dividends, capital gains)” (Kodras 1997a, page 68).

Layered on top of these changes brought about by state devolution and disengagement is the opposing trend that can be characterized as a reengagement of the federal government in poor areas such as the Delta region. The creation of the LMDDC and later the Delta Regional Authority (DRA) represents a renewed commitment of the federal government in certain areas, even as it withdraws its support in others. How do these two contrasting positions affect the relationships between poverty and economic growth that will be explored in this region?

The answer may be found in the overlapping nature of the relationship between civil society, the state and capital articulated by Staeheli et al. (1997). Staeheli et al. (1997, page xxi) define the state “as a set of institutions and agents that interact with institutions and agents outside the state. Thus the state is neither completely autonomous of, nor completely dependent on, the wider society of which it is a part”. This view is echoed by authors such as Goodwin and Painter (1996) and Tickell and Peck (1996), who emphasize the broader concept of “local governance” which acknowledges the influence of a wide range of agents on the economic character of a region.

The realms of state, capital and civil society interact and their relative importance and power vis-à-vis each other are in constant flux as shown in Figure 2.4. According to Staeheli et al. (1997), the state’s main role is twofold: to ensure economic growth and the continued accumulation of capital and to gain authority from civil society. “First, the state, capital, and civil society are complex and overlapping entities. The state is particularly complicated,
consisting of disparate agents and institutions, working at different levels of the federal hierarchy and in distinct places, pursuing different and often inconsistent objectives” (Staeheli et al. 1997, page xxii). In the same way, both capital and civil society exhibit diversity and moreover the boundaries among the three spheres are “porous and dynamic” (Staeheli et al. 1997, page xxiii).

Figure 2.3: Diagram of the Interaction between the Realms of Society

The development of the Delta and subsequent mobilization of federal funding streams throughout several federal departments is occurring simultaneously with the three forms of state restructuring (devolution, privatization, and dismantling of federal programs) described by Staeheli et al. (1997) and Kodras (1997c). As previously mentioned, the philosophy behind state restructuring that has occurred since the 1980s is based on the idea that society’s many ills are caused by the “withdrawal of the state from both capital and civil society” (Staeheli et al. 1997, page xxvii). And even as state restructuring is moving inexorably towards this withdrawal,
lines between the three spheres remain blurred, making the impact of devolution geographically unequal. Dealing with the contradicting natures of these restructuring forces, as well as the globalization of economic activity and the subsequent diminishing of the power of localities to compete, may curtail the federal government’s influence on poverty in the Delta region. The consequences may be more characterized by a step backward than a move to a more progressive way of addressing poverty.

Institutions themselves have an important role in translating the impact of the disengagement of the federal state from local and regional areas. Not a minor complicating factor is the tendency of local institutions and actors to be more often in competition than in cooperation when implementing programs targeted at the needy. Oftentimes, it is the struggle by different local political factions for the control of resources, turf battles between institutions that administer programs and deficiencies in the level of organizational capacity of neighborhood constituencies that determines the outcome of anti-poverty policies and not the policies themselves (Thomson 2003).

Understanding that the translation of this withdrawal and even the translation of the reengagement of the state in the Delta region can be contentious, is important. As Amin (2004) contends, the failure of various reforms and programs is due to the common assumption that policies can be instituted in a uniform manner across all types of regions and localities. The “institutional economics” paradigm acknowledges the social foundation of economic conduct. That is, the economy is not in the words of Adam Smith, governed by an “invisible hand” but instead it “emerges as a composition of collective influences which shape individual action and as a diversified and path-dependent entity molded by inherited cultural and socio-institutional influences. One of the common critiques of the “new economic geography” espoused by
proponents of endogenous growth theory such as Krugman (1995) and Porter (1994) is that while clustering and specialization of economic activity provides a good explanation of the advancement of some regions vis-à-vis others, it ignores the basis of the advantages experienced by these areas. That basis lies “in the character of local social, cultural, and institutional arrangements” (Amin 2004, page 52). How these arrangements are affected by the restructuring of the state and how they respond to the changes in the economy that occur simultaneously is a testament to the existing power relations and capacity of the various actors such as poor African Americans in the state, civil social and capital realms.

The importance of how information is exchanged in the success of a region is also a consideration. New economic geography proponents emphasize network-based exchange of information across industries that forms the building blocks of an innovative knowledge base that ultimately drives the development of regions. This belief has led to the institution of state development policies that focused on the enhancement of specific industry clusters. Yet, these strategies often have failed to consider the interaction between the three realms. Amin (2004) puts it best when he state that “very few regions have attempted to develop unique industrial strategies based on deep assessment of local institutional and cultural specificities. To a degree, this failing stems from the inability of the policy community to recognize the centrality of ‘softer’ influences…” such as adaptive learning, broadening the local institutional base and mobilizing the social economy (page 53).
Chapter 3 – Data and Methodology

3.1 DATA

The variables used in this study and listed in Table 1 are divided into five broad categories: educational attainment data; county designations; demographic indicators; employment and income statistics; and federal policy variables. Educational attainment statistics were calculated using data from the U.S. Census Bureau. A focus was maintained on examining the attainment of a high school diploma or its equivalent. County designations, developed by the Economic Research Service of the U.S. Department of Agriculture (U.S.D.A.) describe the industry upon which each county is most dependent on for its earnings and jobs. Additional designations focus on the poor performing counties. For example, the HOUSE indicator denotes counties where over 30 percent of households lived in poor structures or paid a higher proportion of their wages for housing. PERPOV indicates the counties for which the poverty rate was 20 percent or more over the last four censuses. More complete descriptions of these variables can be found in Appendix A. Demographic statistics used in this study are either obtained from the U.S. Census Bureau or calculated using data from this source. These statistics depict the racial composition of the population, the amount of elderly and young that depend on the working age population, poverty levels for the overall population, infant mortality and migration. The sources for the employment and income statistics are the U.S. Census Bureau, the U.S. Bureau of Economic Analysis and the U.S. Bureau of Labor Statistics. They include the percent of the working aged population that is actually employed, change in per capita income data and the labor force participation rate. Federal policy variables were derived using U.S. Census population data and Consolidated Federal Funding Report data to arrive at figures that account for population differences.
Table 3.1: Variable List

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED1</td>
<td>Percent With No HS Diploma In 2000 (calculated)</td>
</tr>
<tr>
<td>ED5</td>
<td>Percent With No HS Diploma In 1990 (calculated)</td>
</tr>
<tr>
<td>ECONDEP</td>
<td>Economic Dependence</td>
</tr>
<tr>
<td>HOUSE</td>
<td>Housing Stress County</td>
</tr>
<tr>
<td>METRO</td>
<td>Metro/Nonmetro Status In 2003</td>
</tr>
<tr>
<td>BLACK00</td>
<td>Percent Black In 2000 (calculated)</td>
</tr>
<tr>
<td>DEPEND00</td>
<td>2000 Ratio of children and elderly over working aged population (calculated)</td>
</tr>
<tr>
<td>DEPEND90</td>
<td>1990 Ratio of children and elderly over working aged population (calculated)</td>
</tr>
<tr>
<td>IMR</td>
<td>2000 Infant Mortality Rate</td>
</tr>
<tr>
<td>NETMIG</td>
<td>Domestic 5-year net migration (1995 to 2000)</td>
</tr>
<tr>
<td>POP2000</td>
<td>2000 Total County Population</td>
</tr>
<tr>
<td>POP1990</td>
<td>1990 Total County Population</td>
</tr>
<tr>
<td>POV1990</td>
<td>1990 Poverty Rate</td>
</tr>
<tr>
<td>POV2000</td>
<td>2000 Poverty Rate</td>
</tr>
<tr>
<td>POVCHEG</td>
<td>Change In Poverty 1990 To 2000 (calculated)</td>
</tr>
<tr>
<td>EMRATE00</td>
<td>Employment Rate For 2000 (calculated number employed divided by working aged population)</td>
</tr>
<tr>
<td>EMRATE90</td>
<td>Employment Rate For 1990 (calculated number employed divided by working aged population)</td>
</tr>
<tr>
<td>ISCCHEG</td>
<td>Change In Per Capita Income 1990-2000 (calculated)</td>
</tr>
<tr>
<td>ISC3</td>
<td>Industrial Structural Change 1990-2000 (calculated)</td>
</tr>
<tr>
<td>LFPR00</td>
<td>2000 Labor Force Participation Rate</td>
</tr>
<tr>
<td>LFPR90</td>
<td>1990 Labor Force Participation Rate</td>
</tr>
<tr>
<td>PCANR94/PCANR00</td>
<td>Per Capita Ag. Funding</td>
</tr>
<tr>
<td>PCCMR94/PCCMR00</td>
<td>Per Capita Community Res. Funding</td>
</tr>
<tr>
<td>PCSPD94/PCSPD00</td>
<td>Per Capita Defense Spending</td>
</tr>
<tr>
<td>PCHMR94/PCHMR00</td>
<td>Per Capita Human Resources Spending</td>
</tr>
<tr>
<td>PCINS94/PCINS00</td>
<td>Per Capita Income Security Spending</td>
</tr>
<tr>
<td>PCNAT94/PCNAT00</td>
<td>Per Capita National Function Spending</td>
</tr>
<tr>
<td>PCTOT94/PCTOT00</td>
<td>Per Capita Total Federal Spending</td>
</tr>
<tr>
<td>PCCHG</td>
<td>Change in Fed. Funding btw 1990-2000</td>
</tr>
</tbody>
</table>

3.2 METHODOLOGY

Several techniques will be employed to investigate the research questions and hypotheses, and to explore the data and the spatial arrangement of the variables as well as their
relationships with each other. The parametric statistical methods that will be employed in this research all assume that linearity exists in the data. That is, the data must exhibit a normal distribution, and the nature of the relationships between variables is linear, such that changes in an independent variable bring about consistent changes in the dependent variable (Shaw and Wheeler 1997). Necessary data transformations are performed to make the data more useful to visualize and analyze. For example, one measure that is used is the Gini coefficient to show the extent of inequality in county level income distributions (Levy and Faria 2002).

3.2.1 Conceptual Model

In this research, the impact of three separate trends is probed: economic growth rates; demographics, and federal funding. The following model will be estimated first by using the year 1990 and in some cases 1994 figures and rates of change between 1990 and 2000 on certain variables. The model with then be estimated again using year 2000 statistics along with certain change variable. Examining changes as well as existing or past levels on variables gives insight into current circumstances and how those conditions compare to past conditions. The following equation describes generally the structure of the models that will be estimated.

\[
POV = f(EG, DEM, FED)
\]

where POV consists of the overall 2000 poverty rate, EG is a vector of economic growth measures affecting poverty, DEM represents demographic factors, and FED stands for federal funding levels and the policies that those funding streams represent.

**Poverty [POV]**

Different aspects of the U.S. Census poverty rate have been used including the family poverty rate (Rupasingha and Goetz 2003; Levernier et al. 2000), the individual poverty rate (Allen et al. 2000), and the child poverty rate (Friedman and Lichter 1998). Additionally, much
of the research on poverty has focused on inequality and so include the Gini coefficient, which is one of the most common measures of the inequality of income distributions (Forbes 2000; Levy and Faria 2002; and Xu 2004). As mentioned above, for the purpose of this research two models will be estimated using the overall poverty rate as the dependent variable and different year statistics. Using the Census derived poverty rate is justified because it is the most widely used measure among both scholars and policymakers, and so better lends itself to comparative studies. Additionally, it measures the poverty generated by market forces (before being mitigated by state actions) (Brady 2003). On the other hand, being able to detect how policies and economic growth affect the distribution of income is equally valuable.

**Economic Growth [EG]**

Economic growth in the traditional sense has often been measured with the gross domestic or national product indicators. For county level analyses, data on productivity are not easily available and several other measures have been commonly used to depict economic growth. This work will follow Partridge and Rickman (2003), Barrio and Sala-I-Martin (1995), and Bernat and Repice (2000) who include changes in per capita income as a key indicator in their assessments of growth and how that growth compares to other regions.

However, the economic growth indicators incorporated in the model should move beyond income measures in keeping with Bartik et al’s. (2003) finding that shifts in poverty levels were more closely related to employment factors rather than to changes in measures of income, which are imperfect indicators of economic development. One common employment measure, unemployment, is a less than complete measure since it does not account for the discouraged workers who no longer participate in the labor force (Partridge and Rickman 2003). Therefore, the employment rate (percent of the working aged population that is employed) will be included.
to provide a clearer picture. Labor force participation rates fall within this vector, also following Levernier et al. (2000).

Bringing in economic restructuring reflected in changing industrial composition is an important but often neglected part of many growth models (Wilson 1987). Often, the cost of adjustments to the changing importance of various industrial sectors can result in long-term unemployment and income loss for those with industry-specific skills. McLaughlin (2002), Rupasingha and Goetz (2003), and Levernier et al. (2000) all account for sectoral change in their analyses of growth and poverty. This research will examine the impact of the change in the industrial dissimilarity index on poverty, as modeled by Levernier et al. (2000).

In an effort to show the dynamics of the economic restructuring, some of the data to be included in the analysis will represent changes in rates and figures. Changes in these indicators over the decade of investment will be examined along with current levels in order to show which counties experienced the greatest restructuring and amount of federal investment. The results are hypothesized to show that those counties that experienced major federal investment would show positive changes in economic indicators in the 1990s, and thus decreases in poverty levels.

**Demographics [DEM]**

Fitchen (1995), Nord et al. (1995), and Partridge and Rickman (2003) add population movement as an important component of the study of economic growth’s relationship to well-being. Many scholars associate racial fractionalization as a major impediment to the spread of the benefits of economic growth, citing poverty as intrinsically linked to race and class (Rupasingha and Goetz 2003, Wilson 1987). Massey (2004) shows that inequality is often linked to deeper social structures (often resulting from historical racial conflicts) that reflect a corresponding spatial pattern of inequality that disadvantages regions. Navarro (2002) also ties
health status directly to class and poverty, and uses the infant mortality rate as a more wholistic indicator of well-being. Therefore, population change, racial distribution as well as infant mortality will be included in the model. Lastly, educational attainment is added as a crucial demographic acting as a proxy for low-skilled workers (Levernier et al. 2000, Forbes 2000).

**Federal Funding [FED]**

Public policies have a significant impact on the market (Kodras 1997a) and on well-being (Osmani 2000) on par with the importance of economic growth. Aghion et al. (1999) proposes that “government transfers are the second largest source of household income, suggesting that even if growth matters in shaping the distribution of income, policy choices also place a crucial role” (p. 1632). Yet in studying the effect that the geographic distribution of federal funds and Congressional politics has on growth, Levitt and Poterba (1999) find that elevated district-specific federal spending does not appear to be directly related to state economic growth. That said, this study will follow Rupasingha and Goetz (2003) who use per capita federal grants which is hypothesized to have a negative effect on poverty. Specifically, variables on program-specific federal funding will be included in the analysis in order to extract the relative impact of different types of federal funding such as income transfer payments on poverty. These variables are organized into six broad categories that represent aggregates of specific programs as follows: (a) agriculture and natural resources that include agricultural assistance, research and services, forest and land management, and water and recreational resources programs; (b) community resources that includes business assistance, community facilities, community and regional development, environmental protection, housing, Native American programs, and transportation; (c) defense and space that includes aeronautics and space, defense contracts and administration; (d) human resources which includes elementary and
secondary education, food and nutrition, health services, social services, and training and employment; (e) income security that includes medical and hospital benefits, public assistance and unemployment compensation, retirement, disability, and survivors social security payments; and lastly national functions including criminal justice and law enforcement, energy, higher education and research, all other federal funds programs excluding insurance programs.

3.2.2 Exploratory Spatial Data Analysis – Descriptive Analysis

A number of methods will be used to visualize the geographic distribution of selected measures. Exploratory data analysis that touches on questions of clustering, dispersal or autocorrelation in the data is useful as a preliminary step before attempting to make generalizations about complex spatial patterns and relationships (Fotheringham et al. 2000). A combination of tools including various thematic maps and tables of descriptive statistics will be employed to describe the data set for the region as a whole. Unless otherwise noted, all thematic maps use the natural breaks classification scheme. This classification scheme uses a statistical the Jenk’s optimization algorithm that finds groupings that are inherent in the data. Because of its ability to more closely display actual patterns among the data when compared to other classification methods, the natural breaks classification scheme was used throughout most of this study.

One important statistic to investigate is the degree of spatial autocorrelation (SPAC)—which may include spatial dependency or spatial heterogeneity (Patton and McErlean 2003, Goodchild 1986). A textbook definition of SPAC is advanced by McGrew and Monroe (2000, page 172) who suggest that the “basic property of spatially autocorrelated data is that the values are nonrandomly related or interdependent over space”. Measures of SPAC assess the degree to which an attribute variable is similar (or different) from its neighbors. An analysis of SPAC
provides both descriptive information, showing the way phenomena are distributed across space; and reveals a causal process by measuring the degree of influence exerted by a phenomenon over its neighbors (Fotheringham et al. 2000). Moran’s $I$, developed by P. Moran (Moran 1950) is a widely used measure of spatial autocorrelation and can be calculated using the following formula (Goodchild 1986, Fotheringham et al. 2000, Fotheringham et al. 2002).

$$I = \left( \frac{n}{\sum_i \sum_j w_{ij}} \right) \left( \sum_j \sum_i w_{ij} (x_j - x) (x_i - x) \right) \left( \sum_i (x_i - x)^2 \right)$$

where: $i$ and $j$ symbolize the spatial units of interest, $x$ is the mean and $w_{ij}$ represents the degree of connection between zones $i$ and $j$. Goodchild (1986, page 4) notes that the “degree of spatial autocorrelation present in a pattern is very much dependent on scale”. Therefore, measures of SPAC must be linked with a specific scale and can change significantly as the scale is altered. In this research the county level has been chosen as the unit of analysis for regional analysis.

Until very recently, even this measure that acknowledges the existence of spatial dependency was measured globally. That is, a single statistic was calculated for the entire data set. Anselin (1995) and others have extended global statistics such as the Moran’s $I$, to depict local variations. Using this approach one can see whether or not spatial data are clustered (positive spatial autocorrelation) or dispersed (negative spatial autocorrelation). This is especially important when different degrees of autocorrelation are present in one data set. Since global measures would fail to pick up these patterns, they could indicate a lack of any spatial autocorrelation. “The development of a localized version of spatial autocorrelation allows spatial variations in the spatial arrangement of data to be examined (Fotheringham et al. 2002, page 15).” Therefore, LISA statistics will be used to conduct the spatial autocorrelation analysis.
The most common LISA is Moran’s $I$, which gives a score that usually ranges from –1 for negative spatial autocorrelation to +1 for positive correlation. A positive score means that a polygon with a high score is likely to have other polygons with high scores surrounding it. By the same token, a low score with low scoring polygons as neighbors would also show a positive score. The statistic takes a value close to 0 when no spatial autocorrelation exists in the data set. A negative score means that the scores of neighboring polygons will be the opposite of the central polygon – i.e. a polygon with a low score will have high scoring neighbors, and vice versa. Moran’s $I$ ranges from –1 to +1 for positive correlation.

In the calculation of the LISA statistics, to define the proximity of neighborhoods of interest a spatial weights matrix which imposes a structure on the extent of spatial interaction must be constructed. Weights can be either discrete such as the rook or queen binary contiguity matrices (either the area is a neighbor or not a neighbor) or have continuous values based on an inverse distance between points or a length of a shared border between polygons. In the continuous scheme, all areas are expected to have an influence on the area of interest, but the ones in closest proximity have the largest influence. According to Fotheringham et al. (2002), the selection of a weighting scheme is an arbitrary or subjective decision. The analyses in this work all employ the queen contiguity where both the border and the vertex of the polygons figure into the selection of a first order neighbors.

GeoDa 0.9.3, a recent addition to the suite of software that is available for use in exploratory spatial data analysis as well as spatial regression modeling, will be used in this research to conduct the preliminary description of spatial patterns in the Delta region. While other software programs and toolboxes such as SpaceStat exist, GeoDa stands out in that is it tailored to lattice data, data that do not represent a sample from a continuous data set nor point
locations of specific events (Anselin 2003). Moreover, the software calculates not only a global Moran’s I statistic for spatial autocorrelation in the areal data used in this research, it can also be used to generate local spatial autocorrelation indices.

SPAC analysis may also be conducted on the residuals generated from traditional least squared regression estimations. Scatter plots can be derived in order to show whether spatial outliers exist and where these outliers may be located. Actual values can be examined or standardized versions of these residuals could be studied to determine if the assumptions of constant variance and uncorrelated residuals, that must be fulfilled for a regression analysis to be unbiased, are violated (Dougherty 2002, Shaw and Wheeler 1997).

3.2.3 Regression Techniques

Global Regression Analysis and Multicollinearity

To justify the causality among factors that are explained in the theories presented in Chapter 2, one must be able to drawn inferences between various phenomena. One technique for detecting causal relationships among variables is the traditional regression analysis. This study will use the common ordinary least squares linear regression model which minimizes the difference between the actual and estimated dependent values (Gujarati 1999).

Researchers using this method frequently encounter the problem of multicollinearity, which arises when independent parameters included in a regression equation are strongly correlated. This problem is present if the R-square value (the proportion of variation in the dependent variable that is explained by the explanatory variables) is high and the overall F-statistic is significant while the influence of the independent variables is insignificant (Gujarati 1999). A formal method of detecting whether multicollinearity is present is to first examine the bivariate correlations between the independent variables to determine which variables are
strongly related. A better method, however, is to examine the *tolerances* (0.10 or less indicates multicollinearity) or the *variance inflation factor (VIF)* (values greater than 10 indicate multicollinearity). Gujarati (1999, page 322) warns that “multicollinearity is a question of degree and not of kind. The meaningful distinction is not between the presence and the absence of multicollinearity, but between its various degrees.”

**Geographically Weighted Regression Analysis**

Acknowledging the existence of spatial nonstationarity in the empirical estimation of the influence of economic, demographic and policy variables on poverty in the Delta is important in light of the fact that context matters and therefore “some relationships in various areas are inherently different” (Huang and Leung 2002, page 235). “The idea that human behaviour can vary intrinsically over space is consistent with post-modernist beliefs on the importance of place and locality as frames for understanding such behaviour” (Fotheringham *et al.* 2002, page 10).

Spatial nonstationarity may also result from sampling variation or model misspecification in which variables are omitted or are represented with an incorrect functional form (Fotheringham *et al.* 2002). For example, county designations or other areal groups are often used as proxies for an economic phenomena. Because there is a mismatch between these designations and that actual extent of economic transactions in markets such as housing or labor, traditional analyses can result in spatial measurement errors or spatial autocorrelation (Anselin and Bera 1998). Given this, applying a global regression model to study the factors affecting the reduction of poverty in the Delta region would be inappropriate and instead a technique that takes into account this spatial variation should be used.

Geographically weighted regression (GWR) analysis is a relatively new technique that extends the least squares regression estimation process by recognizing the influence of
neighboring data values on the point of interest, say point \( i \). That is, data points are more impacted by data points that are closer in proximity than by those that are further away (Fotheringham \textit{et al.} 2000, Fotheringham \textit{et al.} 2002, LeSage 2001). “The technique allows detailed spatial variations in relationships to be examined. In doing so, the problem with global parameter estimates is highlighted: global values are nothing more than spatial averages that can hide a great deal of information about the process being studied” (Fotheringham \textit{et al.} 2002, page 51). To arrive at a parameter estimate that is unbiased by spatial autocorrelation, data from observations closer to the point of interest \( i \), must be geographically weighted more than data from observations farther away. This is accomplished by placing a spatial kernel over each data point and weighting the surrounding observations using a distance-decay function (Fotheringham \textit{et al.} 2002). Therefore, the weight of a data point is greatest when it corresponds to the regression point. The bandwidth is a measure of the amount of distance decay in the weighting scheme with small bandwidths corresponding to a spatial kernel that has a steeper distance weighting function which produces a rougher surface than those with larger bandwidths. Essentially, the bandwidth yields an estimate of the number of nearest neighbors and indicates the size of the local sample used to estimate the model for a particular location. So for a sample size of \( N = 160 \), a convergence at 155 nearest neighbors would indicate that the GWR results could be close to the global regression results. “For each location, the data will be weighted differently so that the results of any one calibration are unique to a particular location” (Fotheringham \textit{et al.} 2002, page 44). By allowing varying relationships to exist across space, a set of local parameters may be obtained rather than global parameters that are biased by the presence of spatial-nonstationarity (Bivand and Brunstad 2002, Huang and Leung 2002, Fotheringham \textit{et al.} 2002).
Generally, the results produced by GWR are insensitive to the selection of the distance weighted function, however the results are affected by the bandwidth (a measure of the distance-decay in the weighting function) chosen to define a certain weighting scheme (Fotheringham et al. 2002). Fotheringham et al. (2002, page 59) note that “as the bandwidth becomes smaller, the parameter estimates will increasingly depend on observations in close proximity to \( i \) and hence will have increased variance.” Taken from Fotheringham et al. (2002), Figure 3.1 illustrates the relationship between the spatial kernel and the bandwidth. When estimating a GWR, caution must be given to bandwidth selection.

Finding the optimal bandwidth is determined by calculating an important statistic, the Akaike Information Criterion (AIC) at various bandwidths and selecting the bandwidth that minimizes the AIC. Adjusting the bandwidth affects the number of degrees of freedom in the model. Minimizing the AIC “takes into account the different number of degrees of freedom in

\[
X = \text{Regression pt} \quad W_{ij} = \text{weight of data point } j \text{ at regression pt } i \\
\bullet \text{ data point } \quad d_{ij} = \text{distance between data point } j \text{ at regression pt } i
\]
different models so that their relative performances can be compared more accurately. A model with a lower AIC is held to be a ‘better’ model”. Rule of thumb holds that to be significant, the difference in the AICs of differing models must be greater than 3 (Fotheringham et al. 2002, page 212). Model calibrations can be accomplished using fixed (size of kernel does not change) or adaptive (size of kernel varies) spatial kernels. The adaptive kernel allows the use of a variable bandwidth so that where the regression points are farther apart, the bandwidth is larger than for areas where those points are more dense. Adaptive kernels address the estimation of parameters with large standard errors where data points are sparse leading to an under smoothed surface.

This study will use a software called GWR 3.0 that takes these considerations into account while conducting spatial regression analysis and compares the GWR results to those of a global regression analysis. In addition to several statistics, the software also outputs a shapefile containing local parameter estimates, significance values and R-square values enabling the construction of local regression equations. While still relatively new, research on economic growth, property values, crime and other spatial phenomena have increasingly applied the GWR framework (Arthold 2004, Bivand and Brunstad 2002, Brundson et al. 1998, Fotheringham et al. 2002, Huang and Leung 2002, Kyratso and Yiorgos 2004, LeSage 2001, Yu 2004). Huang and Leung (2002), for example, applied GWR to the analysis of regional industrialization in China and found that the GWR model performed better than the global regression estimate in predicting the factors responsible for the level of industrialization in different areas. Bivand and Brunstad (2002) used GWR to assess the spatial non-stationarity in estimating the rate of convergence in regional economic growth rates in Western Europe. The authors established evidence that agricultural subsidies negatively affected economic growth convergence.
Chapter 4 – Descriptive Analysis

The arrangements of which Amin (2004) speaks are enduring and based in historical events and norms that serve to structure the actions of individuals and actor networks as they attempt to adjust the economic course of their communities. Taking an institutional approach not only recognizes the intangible yet real influences constraining the success of state actions addressed at reducing poverty, but it also has implications for the possibility of undertaking certain types actions. For example, the Delta Regional Authority (DRA) was developed from a core of 219 counties identified by the LMDDC. These counties have varying degrees of poverty and the original efforts to mobilize action in the region were concentrated on tapping into existing structures of power. An extensive amount of work was conducted to assess the current status of the region. Today the Delta economy is still structured around the colonial model where raw inputs such as cotton are produced but then are developed elsewhere into valued added goods. Profits of wealthy farmers continue to leave the region as they are invested elsewhere, while at the same time they continue to advocate for maintaining low property taxes. In the past, the characteristics of nature served to isolate certain areas in the region. Mr. Hawkins, the Executive Director of the Lower Mississippi Delta Development Commission hoped to move away from economic and social isolation by making “the region think of itself as a region, by harmonizing state and local regulations and taxes throughout the delta, by recommending better roads, and bridges to link the two sides of the river and by starting a ‘buy delta’ campaign” (The Economist 1989, page 33).

The types of recommendations emanating from the work of the original Delta commission did not lead to a coherent and focused strategy to really empower the most disadvantaged. Instead the initial focus was placed on increasing the amount of federal funds
that were allocated to the region. Lawmakers, such as Representative Mike Espy and Senator Thad Cochran, amended bills in an attempt to get a fairer distribution of funds to the Delta counties in the areas of housing, education, transportation and others. Senator Bumpers acknowledged that a huge federal infusion of funds in the Delta was highly unlikely, but felt that modifying the allocation methodology of formula grant programs would be an easier way to redirect funds. This strategy very likely engendered competition between states and institutions and those representing the Delta, but analyzing the efficacy of this strategy requires research that is beyond the scope of this work. However, it is no secret that the Delta region did not receive a sustained high level of federal investment specifically targeted to an entity whose mission was the development of the region itself. The efforts to redirect funds were successful in some cases, but a separate source of funds such as those that are allocated to the Appalachian Regional Commission (ARC) was conspicuously absent or minimal. This is especially true when compared with the Appalachian Regional Commission’s success in its initial years.

The ARC was created five years after an initial coalition that was formed in 1960 to solve the problems of poverty that were confronting that region. Following the release of that report, then President Kennedy formed a federal-state committee in 1963 that came to be known as the President's Appalachian Regional Commission. This commission produced a strategic development plan for the region that eventually led to the passage of the Appalachian Regional Development Act (ARDA) 1965. In its first years of existence the Appalachian region, Congress authorized appropriations exceeding $250 million. In contrast, the LMDDC, after its 18-month, $3 million regional assessment had to wait several years for any significant direct allocation of funds to conduct regional development. It was only after the creation of the Delta Regional Authority that it received approximately $27 million in Federal Fiscal Year (FFY) 2002 followed
by $7.2 million in FFY 2003, $3.6 million in FFY 2004 and $6 million in FFY 2005. The
disadvantage Delta counties confronted when trying to garner more federal support was also
exacerbated by the required state or local match necessary to receive certain federal grants. The
impact of this lack of success can be clearly seen in the statistics presented below.

4.1 DESCRIPTIVE ANALYSIS OF THE 240-COUNTY DELTA REGION

History can provide insight on the current conditions that the poor in the Delta are
attempting so desperately to escape. Always a major player in the global economy, the Delta and
the South participated in the expansion of capitalism in the late nineteenth and early twentieth
centuries as a source for new markets and raw materials in the colonial world (Woodruff 2003).
In later years, the region operated as today’s third World countries do by luring manufacturing
establishments from the northern part of the United States and transforming itself into a “branch
plant economy” (MDC 2002, Woods 1998). This dependence made many communities who
chased after manufacturing establishments vulnerable during the waves of plant closures that
occurred in the 1980s. Increasingly these southern places find themselves continuing to lose out
to the Third World as the recession of the first few years of the 21st century “hastened the
collapse of low-wage, low-skill manufacturing upon which so many Southern communities
depended” (MDC 2002, page 1).

This is just one instance in which the choices of economic actors in the regions from the
time of its initial colonization have shaped the economic and demographic patterns that are
revealed in this chapter. The fact that counties with poverty rates below the national average
coincide with those that are specialized in manufacturing or have diverse economies may not be
a matter of chance. Furthermore, it is also no accident that for example educational non-
attainment are highest in areas with large populations of African Americans.
Neither, the impact of race on all aspects of Delta society, culture and economy nor the region’s deep-rooted history in the economic structure of slavery which was set up to exploit its rich natural resources can be ignored. Although the Lower Mississippi Delta Development Commission (LMDDC) 2000 report acknowledges that race relations significantly affect the fortunes of poor African Americans in the region, it does not explore how these relationships impact the administration of the programs targeted at alleviating poverty. In subsequent chapters, the argument will be made that the patterns of deprivation exhibited have occurred not only due to historical truths but also to a social structure of power that channels the benefits of public sector programs intended to level the playing field away from the neediest. These same structures also redirect the benefits of private sector investments and act as the artifacts of colonialism that still have a profound ability to limit the choices of the region’s poor. One good example is the rampant discrimination perpetuated on African American farmers by U.S. Department of Agriculture (USDA) staff. In a report published in 1998, the USDA states that historical discrimination regarding “services extended to traditionally underserved farmers, ranchers, and small farmers, and to small forestry owners and operators, is well documented” (USDA 1998, page 26). This discrimination culminated in a lawsuit against this federal institution. Another author, Woodruff (2003, page 3) states that in “the alluvial empire, planters controlled all levels of government: federal, state and local” and Woods (1997) talks about the “resilience of plantation relations.” Both authors recognize the need to examine the blurred borders between state, capital and civil society in the Delta region, and thus hope to shed the spotlight on how the continuing white monopoly over economic and social structures potentially hinders poverty reduction efforts. In the study region, anti-poverty advocates and historians hold the view that whites control capital, and, even as African Americans gain political power and
participate more fully in the civil society, they are unable to eradicate the sharp economic and social fracture between the rich and the poor. “African Americans have the positions, he [Leonard Morris] said, but their power is limited by lack of capital, which remains primarily in the hands of the business community, which remains primarily white” (John 1999, page 3).

Because of the legacy of the plantation systems, tensions also exist in the rural labor markets which have historically been “underwritten by segregation, and disenfranchisement that kept black people poor and stripped of basic civil and human rights” (Woodruff 2003, page 2). What follows in the rest of the chapter is a comprehensive study of the large set of demographic and economic indicators of the region at the beginning of the 21st century. This snapshot will lend credence to and confirm the above statements and also point to potential causal relationships between key variables.

In 2000, the federally designated Delta region under the Delta Regional Authority comprised 240 counties in 8 states. To allow the ability to make recommendations for the future, the 240-county designation is used in this study in lieu of the 219-county region that existed prior to 2000. According to the U.S. Census Bureau, there were 9.4 million people living in the Delta region in 2000. While the trend exhibited over the last decade (1990 to 2000) is toward greater urbanization, the Delta region is still predominantly rural. According to the county topology classification system established by the Economic Research Service of the U.S.D.A., in 2003 there were 54 (or 22.5% compared to 34.7% nationally) metropolitan counties versus 186 (or 77.5% compared to 65.3% nationally) nonmetropolitan counties (see Figure 4.1). This contrasts with the number of metropolitan counties in 1993 that were classified as metropolitan (32). To
Figure 4.1: Distribution of Metropolitan versus Nonmetropolitan Counties

permit future comparison and analyses, this study will employ the 2003 classification system (as opposed to the 1993 system) to represent the counties over the ten-year period spanning 1990 to 2000.
As shown in Table 4.1, the 2003 county topology codes detailing the industry upon which each county depended yields interesting patterns as well (see Figure 4.2). For the entire region, counties most frequently fell into one of two categories: manufacturing (with 86 counties or 35.8%) and nonspecialized, which are counties where no one industry dominates (with 90 counties or 37.5%). Those counties that are largely natural resource dependent (farming and mining dependent counties) comprise just 13% of the total number of counties. When examining the industrial dependence of subsets of counties, differences arise, particularly between metropolitan and nonmetropolitan counties. The majority of metropolitan counties are dependent on manufacturing (40.74%) while the majority of nonmetropolitan counties are nonspecialized (41.94%). Differences between rural and urban counties are exhibited across other variables such as poverty rates as shown in the following discussion.

Table 4.1: County Economic Dependence By Metropolitan Status

<table>
<thead>
<tr>
<th>Code</th>
<th>County Type</th>
<th>Region Number</th>
<th>Region Percent</th>
<th>Metropolitan Number</th>
<th>Metropolitan Percent</th>
<th>Nonmetropolitan Number</th>
<th>Nonmetropolitan Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farming</td>
<td>21</td>
<td>8.75</td>
<td>6</td>
<td>11.11</td>
<td>15</td>
<td>8.06</td>
</tr>
<tr>
<td>2</td>
<td>Mining</td>
<td>10</td>
<td>4.17</td>
<td>1</td>
<td>1.85</td>
<td>9</td>
<td>4.84</td>
</tr>
<tr>
<td>3</td>
<td>Manufacturing</td>
<td>86</td>
<td>35.83</td>
<td>22</td>
<td>40.74</td>
<td>64</td>
<td>34.41</td>
</tr>
<tr>
<td>4</td>
<td>Fed/State Gov.</td>
<td>25</td>
<td>10.42</td>
<td>8</td>
<td>14.81</td>
<td>17</td>
<td>9.14</td>
</tr>
<tr>
<td>5</td>
<td>Services</td>
<td>8</td>
<td>3.33</td>
<td>5</td>
<td>9.26</td>
<td>3</td>
<td>1.61</td>
</tr>
<tr>
<td>6</td>
<td>Nonspecialized</td>
<td>90</td>
<td>37.5</td>
<td>12</td>
<td>22.22</td>
<td>78</td>
<td>41.94</td>
</tr>
</tbody>
</table>

Source: Data from the Economic Research Service, 2004, County Topology Codes

A selected set of important demographic and economic variables illustrates diversity in both demographic and economic trends as they relate to the metropolitan status and economic dependency status of each county. Striking patterns also materialize when the policy variables represented by different categories of federal funding are examined. Table 4.2 compares the
Figure 4.2: County Economic Dependency Status
regional averages exhibited for the metropolitan versus nonmetropolitan counties on the following variables which are for the year 2000 except unless otherwise noted: poverty rate (POV2000), educational attainment (ED1), per capita income (P2000), infant mortality rate (IMR), employment rate (EMRATE00), percent African-American (BLACK00), 1995-2000 net migration (NETMIG), dependency ratio (DEPEND00), industrial structural change (ISC3), labor force participation rate (LFPR00), gini coefficient (G), and per capita agricultural, community resources, defense, human resources, income security, national function, and total federal funding, and per capita change in federal funding between 1994 and 2000.

The distributions of these variables are also illustrated in Figures 4.3 through 4.8. For example, it is clear that the dominance of rural counties which have the tendency to be poorer skews the regional poverty rate upward to 21.1%. Figure 4.3 shows how those counties with poverty rates exceeding the regional average, which is almost double the national average, are clustered along the river and in the southern portions of the region. Metropolitan counties also tended to perform better than nonmetropolitan counties with lower poverty and higher per capita income and employment rates. Nonmetropolitan counties tended to have lower educational attainment (again located close to the river as shown in Figure 4.4) with greater percentages of the population with no high school diploma when compared with the more urbanized counties. They also had lower labor force participation rates that subsequently led to lower employment rates, which has implications for the number of workers that are able to support the elderly and the young. Metropolitan counties had greater levels of out-migration between 1995 and 2000 than rural counties but had a dependency ratio (calculated by dividing the total number of children and elderly by the total number of individuals aged 18 to 64 years) that fell below the
Table 4.2: Averages of Selected Variables for Delta Regions in 2000

<table>
<thead>
<tr>
<th></th>
<th>Region</th>
<th>Metropolitan</th>
<th>Nonmetropolitan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>21.1%</td>
<td>18.3%</td>
<td>21.9%</td>
</tr>
<tr>
<td>Percent w/o HS Diploma</td>
<td>31.1%</td>
<td>27.7%</td>
<td>32.1%</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$19,381</td>
<td>$21,641</td>
<td>$18,725</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>7.98</td>
<td>8.08</td>
<td>7.96</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>77.0%</td>
<td>81.4%</td>
<td>75.7%</td>
</tr>
<tr>
<td>Percent African-American</td>
<td>27.1%</td>
<td>31.3%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Net Migration</td>
<td>-258</td>
<td>-966</td>
<td>-53</td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>1.5</td>
<td>1.45</td>
<td>1.52</td>
</tr>
<tr>
<td>Industry Structural Change</td>
<td>0.117</td>
<td>0.106</td>
<td>0.121</td>
</tr>
<tr>
<td>Labor Force Participation</td>
<td>72.3%</td>
<td>73.8%</td>
<td>71.9%</td>
</tr>
<tr>
<td>Gini Coefficient</td>
<td>0.4113</td>
<td>0.4013</td>
<td>0.4141</td>
</tr>
<tr>
<td>Per Capita Agricultural Spending</td>
<td>$729</td>
<td>$337</td>
<td>$843</td>
</tr>
<tr>
<td>Per Capita Community Resources Spending</td>
<td>$491</td>
<td>$577</td>
<td>$467</td>
</tr>
<tr>
<td>Per Capita Defense Spending</td>
<td>$286</td>
<td>$535</td>
<td>$213</td>
</tr>
<tr>
<td>Per Capita Human Resources Spending</td>
<td>$197</td>
<td>$181</td>
<td>$201</td>
</tr>
<tr>
<td>Per Capita Income Security Spending</td>
<td>$4,180</td>
<td>$3,313</td>
<td>$4,432</td>
</tr>
<tr>
<td>Per Capita National Function Spending</td>
<td>$422</td>
<td>$379</td>
<td>$434</td>
</tr>
<tr>
<td>Per Capita Total Federal Funding</td>
<td>$6,303</td>
<td>$5,323</td>
<td>$6,588</td>
</tr>
<tr>
<td>Percent Change in Federal Funding, 1994-2000</td>
<td>29.6%</td>
<td>25.3%</td>
<td>30.9%</td>
</tr>
</tbody>
</table>

Regional average of 1.5. Both population gain and loss counties exhibit high dependency ratios possibly due to the migration of retirees to certain areas and the flight of working aged individuals in others. African Americans also tended to be more concentrated in urban areas than in the rural counties. However, due to the large number of rural counties, this trend disguises the fact that the highest concentrations of African-American populations are clustered around the center of the region along the banks of the Mississippi River (see Figure 4.5). Though the regional net migration was negative, Figure 4.6 shows significant variation across counties, with certain areas experiencing net population gains. In particular, many of the counties in the northern part of the region showed positive changes in population and the counties along the central part of the region, often those bordering the Mississippi River exhibited population losses.
Figure 4.7 depicts the industrial structural change at the county level, and compares that
distribution with the change in poverty rate between 1990 and 2000. Following Levernier
(2000), this index was calculated based on the sum of the absolute changes in the share of one-
digit industry employment between 1990 and 2000. It measures the share of the work force that
would have to move to a different sector such that the industrial composition would be the same
in both periods. “A positive coefficient suggests adjustment costs in the reallocation of labor
across sectors that worsens the economic outcomes at the lower end through some combination
of increased unemployment and lower wage rates (Levernier 2000, page 480).” Workers in
metropolitan counties are less vulnerable to the instability caused by sectoral changes than are
the rural counties based on this indicator. This measure also has a dispersed spatial pattern with
high and low values lying adjacent to one another. When compared with the poverty changes, the
patterns require further study. For instance, the three counties that had the highest amount of
sectoral reallocations had dissimilar poverty change rates. Both Baxter, AR and Avoyelles, LA
experienced decreases in poverty accompanied with high sectoral reallocations while the
opposite was true for Calhoun, AR which experienced a 6.3% increase in poverty.

Lastly, Figure 4.8 shows the Gini Coefficient, a measure of the inequality of an area’s
income distribution. It dramatically portrays the extent to which rural, Delta counties that are
predominantly African-American (as shown in other maps) suffer from greater levels of income
inequality. The Northern part of the region is remarkably uniform in its comparatively lower
levels of inequality.

Given these disparities that clearly demonstrate greater need across the board in
nonmetropolitan counties, it is not surprising that the total federal funding per capita is
significantly higher, over $6,500 or more than $1,200 difference. The only federal funding
functions that were more generous in the metropolitan areas are community resources at $577 per capita versus $467. The community resources function includes investment in businesses and regional development, community facilities, environmental services, housing and transportation while defense spending is comprised of payroll, contracts, administration, aeronautics and space. Although greater education levels have been proven to be a powerful indicator of reduced poverty, the lowest amount of federal investment falls in the category of human resources (includes elementary and secondary education, nutrition, social services and training). Income security funding includes assistance payments such as medical and hospital benefits, public assistance and unemployment compensation, retirement, social security and disability. It is by far the largest category of federal investment in the Delta ranging between $3,300 and $4,400 per capita depending on urban status. Spending on other programs that fall under the national function classification such as criminal justice, higher education and research, and energy received on average $420 per capita.

When averaged according to the type of industry that dominates each county, the patterns compared to those exhibited between nonmetropolitan and metropolitan counties are even more revealing (see Table 4.3). The counties with the highest per capita income in 2000 were those that were most dependent on the services industry, which also happened to be one type of county that has the highest concentration of African Americans and one of the highest infant mortality rates. These areas also exhibited a huge employment rate (130% of the population is employed) indicating significant commuting from surrounding parishes. This figure is probably driven by Tunica County, MS which experienced an explosive growth in the casino industry during the 1990 to 2000 period, thus highlighting the peculiarity of place and the need for more geographic research to explain the patterns hinted at in mean statistics.
Figure 4.3: 2000 Poverty Rate Compared to U.S. and Regional Averages

Note: Map is based on the U.S. 2000 poverty rate of 12.4% and the Delta regional poverty rate of 21.1%
Figure 4.4: Percent with No High School Diploma in 2000
Figure 4.5: Percent African American in 2000
Figure 4.6: Net Migration and Metropolitan Status
Figure 4.7: Industrial Structural Change Between 1990 and 2000 and Change in Poverty Rate between 1990 and 2000
Figure 4.8: 2000 Gini Coefficient and Metropolitan Status
Table 4.3: 2000 Average of Selected Demographic and Economic Variables Counties by Economic Dependency

<table>
<thead>
<tr>
<th></th>
<th>Farming</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Fed/State Gov.</th>
<th>Services</th>
<th>Non-specialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>25.7%</td>
<td>17.5%</td>
<td>18.9%</td>
<td>20.7%</td>
<td>20.3%</td>
<td>22.6%</td>
</tr>
<tr>
<td>Percent w/o HS Diploma</td>
<td>35.7%</td>
<td>29.0%</td>
<td>30.6%</td>
<td>27.4%</td>
<td>25.3%</td>
<td>32.2%</td>
</tr>
<tr>
<td>Percapita Income</td>
<td>$18,423</td>
<td>$20,417</td>
<td>$20,022</td>
<td>$19,870</td>
<td>$24,584</td>
<td>$18,279</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>11.5</td>
<td>1.7</td>
<td>8.5</td>
<td>7.4</td>
<td>11.2</td>
<td>7.3</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>63.7%</td>
<td>82.6%</td>
<td>78.6%</td>
<td>81.7%</td>
<td>130.0%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Percent African-American</td>
<td>37.3%</td>
<td>7.6%</td>
<td>26.0%</td>
<td>32.5%</td>
<td>37.3%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Net Migration</td>
<td>7</td>
<td>-523</td>
<td>344</td>
<td>-2,294</td>
<td>-4,963</td>
<td>118</td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>1.53</td>
<td>1.5</td>
<td>1.49</td>
<td>1.39</td>
<td>1.45</td>
<td>1.53</td>
</tr>
<tr>
<td>Industrial Structural Change</td>
<td>0.149</td>
<td>0.103</td>
<td>0.119</td>
<td>0.117</td>
<td>0.129</td>
<td>0.109</td>
</tr>
<tr>
<td>Labor Force Participation</td>
<td>0.726</td>
<td>0.747</td>
<td>0.73</td>
<td>0.694</td>
<td>0.769</td>
<td>0.718</td>
</tr>
<tr>
<td>Gini Coefficient</td>
<td>0.411</td>
<td>0.399</td>
<td>0.4087</td>
<td>0.4244</td>
<td>0.3988</td>
<td>0.4126</td>
</tr>
<tr>
<td>Per Capita Agricultural Spending</td>
<td>$2,163</td>
<td>$485</td>
<td>$629</td>
<td>$241</td>
<td>$577</td>
<td>$667</td>
</tr>
<tr>
<td>Per Capita Community Resources Spending</td>
<td>$411</td>
<td>$261</td>
<td>$479</td>
<td>$455</td>
<td>$1,001</td>
<td>$513</td>
</tr>
<tr>
<td>Per Capita Defense Spending</td>
<td>$217</td>
<td>$267</td>
<td>$204</td>
<td>$972</td>
<td>$443</td>
<td>$117</td>
</tr>
<tr>
<td>Per Capita Human Resources Spending</td>
<td>$235</td>
<td>$152</td>
<td>$172</td>
<td>$185</td>
<td>$174</td>
<td>$221</td>
</tr>
<tr>
<td>Per Capita Income Security Spending</td>
<td>$4,253</td>
<td>$4,360</td>
<td>$4,125</td>
<td>$3,517</td>
<td>$3,158</td>
<td>$4,470</td>
</tr>
<tr>
<td>Per Capita National Function Spending</td>
<td>$200</td>
<td>$2,015</td>
<td>$287</td>
<td>$834</td>
<td>$356</td>
<td>$316</td>
</tr>
<tr>
<td>Per Capita Total Federal Funding</td>
<td>$7,478</td>
<td>$7,541</td>
<td>$5,894</td>
<td>$6,204</td>
<td>$5,710</td>
<td>$6,364</td>
</tr>
<tr>
<td>Percent Change in Federal Funding, 1990-2000</td>
<td>24.7%</td>
<td>25.5%</td>
<td>30.5%</td>
<td>19.3%</td>
<td>24.7%</td>
<td>33.6%</td>
</tr>
</tbody>
</table>

Although they had identical concentrations of African Americans and similar elevated infant mortality rates as the services dependent counties, counties that were dominated by farming performed the worst on most measures. For instance, the highest average poverty and infant mortality rates are found in these counties.

These counties also had a high concentration of African Americans and one of the lowest per capita income levels, as well as low educational attainment rates. Educational attainment
was the poorest in the farming dominated and nonspecialized counties with an average of one-third of those 25 years and older with no high-school diploma. Three types of counties—mining, government and services—experienced out-migration compared to counties dominated by other industries. However, government and services counties did not have a correspondingly high number of dependents per working aged person. This indicates a higher presence of workers as evident in the high employment rates.

The counties with the highest level of federal investment in income security were those counties that are classified as non-specialized and were also counties with the highest percentage change in federal funding between 1990 and 2000. Two county types with comparatively high total federal investment per capita were the natural resource dependent counties of farming and mining. Community resources spending was the highest in the 8 services dependent counties, counties which also experienced the highest per capita income, employment rates, and the lowest educational non-attainment rates. At the same time, those counties had the lowest inequality level and had the highest labor force participation rates.

The next largest funding level occurred in mining dependent areas which received the highest per capita national function spending. Combined low populations and high investment in specific programs in the areas of agriculture in the farming counties and national functions in the mining counties seems to be driving the large per capita total federal funding allocations in those two county categories. Yet patterns of the impact of these investments are difficult to discern. For example, the services counties have similar infant mortality rates, and equal distributions of African Americans, however, they have very different total levels of per capita spending ($5,710) when compared to the farming counties level of $7,478. The performance on economic
indicators also favors services dependent counties in spite of these demographic risks coupled with lower federal investment.

Table 4.4 shows that whether a county is classified as one that experienced population loss, persistent poverty or housing stress affected its performance on the selected demographics. Patterns emerge at first glance at these statistics such as the counties that fall under these designations all have a comparatively higher percentage of African American residents. Except for the persistently poor areas, the employment rate does not seem to vary according to its designation. However, across the board, counties that are persistently poor, experienced population losses and housing stress all had higher dependency ratios (thus fewer working aged individuals) and higher migration. Detected differences in these classifications also occurred across programmatic funding. Per capita funding levels were all significantly higher in counties classified as population loss, persistently poor or having housing stress. Defense and national function spending was higher, however, for the areas not classified as persistently poor and for those categorized as housing stress counties.

Although these tables hint at differences across various categories of counties, one still cannot determine whether these differences are statistically significant without conducting statistical tests. A $t$-test was conducted using the SAS statistical software package. This test investigates the probability that the difference between two different sample means is caused by chance. Table 4.5 illustrates the $t$-test results, which show whether or not the differences observed among these various classifications are statistically significant along the selected variables. The results reveal that for all the variables excluding 2000 per capita income (P2000), 2000 employment rate (EMRATE00), and infant mortality rate (IMR), being designated as a population loss county produced statistically poorer performance at the 0.05 significance level.
Table 4.4: 2000 Averages of Selected Variables for Counties by Selected Designation

<table>
<thead>
<tr>
<th></th>
<th>Pop. Gain N= 182</th>
<th>Pop. Loss N = 58</th>
<th>Not Persistent Poverty N = 129</th>
<th>Persistent Poverty N = 111</th>
<th>Not Housing Stress N = 186</th>
<th>Housing Stress N = 54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>19.5%</td>
<td>25.9%</td>
<td>15.8%</td>
<td>27.1%</td>
<td>18.5%</td>
<td>29.7%</td>
</tr>
<tr>
<td>Percent w/o HS Diploma</td>
<td>30.3%</td>
<td>33.6%</td>
<td>28.1%</td>
<td>34.5%</td>
<td>30.0%</td>
<td>34.7%</td>
</tr>
<tr>
<td>Percapita Income</td>
<td>$19,522</td>
<td>$18,941</td>
<td>$21,055</td>
<td>$17,436</td>
<td>$19,909</td>
<td>$17,564</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>7.51</td>
<td>9.48</td>
<td>6.50</td>
<td>9.71</td>
<td>6.58</td>
<td>12.8</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>6.4%</td>
<td>8.1%</td>
<td>5.6%</td>
<td>8.2%</td>
<td>6.3%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>76.9%</td>
<td>77.4%</td>
<td>80.7%</td>
<td>72.7%</td>
<td>77.3%</td>
<td>75.9%</td>
</tr>
<tr>
<td>Percent African-American</td>
<td>23.2%</td>
<td>39.1%</td>
<td>14.5%</td>
<td>41.7%</td>
<td>18.7%</td>
<td>56.1%</td>
</tr>
<tr>
<td>Net Migration</td>
<td>168</td>
<td>-1,596</td>
<td>180</td>
<td>-767</td>
<td>147</td>
<td>-1,653</td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>1.48</td>
<td>1.55</td>
<td>1.47</td>
<td>1.53</td>
<td>1.49</td>
<td>1.52</td>
</tr>
<tr>
<td>Per Capita Agricultural Spending</td>
<td>$453</td>
<td>$1,595</td>
<td>$575</td>
<td>$908</td>
<td>$619</td>
<td>$1,110</td>
</tr>
<tr>
<td>Per Capita Community Resources Spending</td>
<td>$481</td>
<td>$526</td>
<td>$471</td>
<td>$515</td>
<td>$457</td>
<td>$612</td>
</tr>
<tr>
<td>Per Capita Defense Spending</td>
<td>$247</td>
<td>$408</td>
<td>$331</td>
<td>$233</td>
<td>$315</td>
<td>$184</td>
</tr>
<tr>
<td>Per Capita Human Resources Spending</td>
<td>$165</td>
<td>$297</td>
<td>$132</td>
<td>$272</td>
<td>$165</td>
<td>$306</td>
</tr>
<tr>
<td>Per Capita Income Security Spending</td>
<td>$4,003</td>
<td>$4,735</td>
<td>$3,907</td>
<td>$4,496</td>
<td>$4,166</td>
<td>$4,227</td>
</tr>
<tr>
<td>Per Capita National Function Spending</td>
<td>$368</td>
<td>$589</td>
<td>$505</td>
<td>$325</td>
<td>$433</td>
<td>$384</td>
</tr>
<tr>
<td>Per Capita Total Federal Funding</td>
<td>$5,717</td>
<td>$8,144</td>
<td>$5,922</td>
<td>$6,747</td>
<td>$6,153</td>
<td>$6,823</td>
</tr>
<tr>
<td>Percent Change in Federal Funding, 1990-2000</td>
<td>29.1%</td>
<td>-52.6%</td>
<td>32.0%</td>
<td>26.8%</td>
<td>31.8%</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

That is these counties were poorer, had a less educated workforce, higher unemployment and more dependents per working aged individual. Similar differences occurred across persistent poverty counties with only net migration (NETMIG) lacking significance. For the housing stress designation like the population loss counties, the EMRATE00 and industrial structural change (ISC3) variables were insignificant but unlike the other designations dependency ratio (DEPEND00) was also insignificant. Lastly, whether or not a county is rural...
was a statistically significant indicator of difference along the selected variables excluding IMR, EMRATE00, percent black in 2000 (BLACK00), NETMIG, 2000 labor force participation rate (LFPR00) and ISC3. Overall, these four designations are good predictors of performance along demographic and economic variables. Table 4.5 also confirms the contention that real differences in the conditions of poverty and economic stress occur based on metropolitan status. Being rural means being poorer, with lower educational attainment and significantly higher unemployment as well as dependency ratios. Total federal funding per capita was significant at the 0.01 level for all categories except for housing stress. The significance results for federal funding per capita in the broad functional areas was more variable. Both human resource and income security spending was highly significant for both the population loss and persistent poverty counties, while the other variables had more variable levels of significant different.

**Table 4.5: Results of T-Tests for Significant Difference**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Population Loss</th>
<th>Sig.</th>
<th>Persistent Poverty</th>
<th>Sig.</th>
<th>Metro</th>
<th>Sig.</th>
<th>Housing Stress</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Percent No HS Diploma</td>
<td>0.0004 **</td>
<td>&lt;.0001 ***</td>
<td>&lt;.0001 ***</td>
<td>&lt;.0001 ***</td>
<td>&lt;.0001 ***</td>
<td>&lt;.0001 ***</td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>0.2482</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>0.1571</td>
<td></td>
<td>0.0027 **</td>
<td></td>
<td>0.8984</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Employment Rate</td>
<td>0.8466</td>
<td></td>
<td>0.0182 *</td>
<td></td>
<td>0.3735</td>
<td></td>
<td>0.8041</td>
<td></td>
</tr>
<tr>
<td>Percent Black</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.132</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Net Migration</td>
<td>0.0212 *</td>
<td>0.0707</td>
<td>0.4206</td>
<td>0.0531</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.1383</td>
<td></td>
</tr>
<tr>
<td>Labor Force Participation</td>
<td>0.9747</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.2321</td>
<td></td>
<td>0.0003 **</td>
<td></td>
</tr>
<tr>
<td>Industrial Structural Change</td>
<td>0.9525</td>
<td></td>
<td>0.689</td>
<td></td>
<td>0.2084</td>
<td></td>
<td>0.3515</td>
<td></td>
</tr>
<tr>
<td>Gini Coefficient</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
</tbody>
</table>

**Policy Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Population Loss</th>
<th>Sig.</th>
<th>Persistent Poverty</th>
<th>Sig.</th>
<th>Metro</th>
<th>Sig.</th>
<th>Housing Stress</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Capita Ag. Funding</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.0803</td>
<td></td>
<td>0.0258</td>
<td></td>
<td>0.0304 *</td>
<td></td>
</tr>
<tr>
<td>Per Capita Community Res. Funding</td>
<td>0.5088</td>
<td></td>
<td>0.4508</td>
<td></td>
<td>0.1128</td>
<td></td>
<td>0.0259 *</td>
<td></td>
</tr>
<tr>
<td>Per Capita Defense Spending</td>
<td>0.3648</td>
<td></td>
<td>0.5192</td>
<td></td>
<td>0.0761</td>
<td></td>
<td>0.4702</td>
<td></td>
</tr>
<tr>
<td>Per Capita Human Resources Spending</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.26</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
</tr>
<tr>
<td>Per Capita Income Security Spending</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.6652</td>
<td></td>
</tr>
<tr>
<td>Per Capita National Func. Spending</td>
<td>0.0939</td>
<td></td>
<td>0.1126</td>
<td></td>
<td>0.6889</td>
<td></td>
<td>0.7179</td>
<td></td>
</tr>
<tr>
<td>Per Capita Total Federal Spending</td>
<td>&lt;.0001 ***</td>
<td></td>
<td>0.007 **</td>
<td></td>
<td>0.0005</td>
<td></td>
<td>0.0678</td>
<td></td>
</tr>
<tr>
<td>Change in Fed. Funding btw 1990-2000</td>
<td>0.6167</td>
<td></td>
<td>0.1173</td>
<td></td>
<td>0.5331</td>
<td></td>
<td>0.0153</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: All variables are for the year 2000 unless otherwise noted. *** = significant at the 0.0001 level; ** = significant at the 0.01 level; * = significant at the 0.05
4.2 EXPLORATORY SPATIAL ANALYSIS

While dividing counties by various designations accounts for some of the geographic variation, it is important to know whether these areas are located in isolated pockets and dispersed as spatial anomalies or whether they are clustered across certain variables. The pattern that is in evidence will influence the nature of the policy intervention. Moreover, comparing the performance between different types of counties still depends on comparing averages, masking potential variation within these groups. Are there some farming dependent counties that are performing well? If so, where are they located and what factors contribute to their performance? The following tool will be used to investigate these questions.

As introduced in Chapter 3, a simple tool to visualize the extent of spatial dependence or heterogeneity is exploratory spatial data analysis or ESDA. Tobler’s Law of Geography is at odds with the traditional statistical assumption of independent observations and holds instead that observations will be spatially clustered. ESDA is more data driven as opposed to theory driven and therefore cannot answer questions related to the factors that may cause a particular distribution to arise. However it does provide useful insight into the spatial patterns and outliers present in a data set that can better direct theory-driven investigations.

ESDA was run using the GeoDa 0.9.3 software and the local Moran statistics and maps were generated to depict spatial clustering and patterns of spatial heterogeneity. The LISA (local indicators of spatial association) statistics and graphics are generated using an algorithm that randomizes the data using a permutation approach. The following maps are related to the Moran scatterplot that accompany them. The high-high category shown in the map corresponds to the upper right quadrant in the scatterplot and the low-low category describes the lower left quadrant. Since the scatterplot depicts the relationship between the variable value at a specific location
with its spatial lag (Anselin and Bera 1998), then these two categories show where like values are clustered, in other words spatially autocorrelated. A strong positive Moran’s I of 0.5544 for 1990 poverty and 0.5315 for 2000 poverty (which is the interpretation of the slope of the regression line shown in the scatterplot) coupled with the two maps reveal that two distinct spatial regimes of poverty exist in the Delta (see Figures 4.9 and 4.10). In the northeastern part of the region exists a large and significant cluster of low poverty rates in both time periods. The opposite is true for the areas centered around the Mississippi River and for counties in Alabama. The two remaining counties are low-high and high-low indicate areas of spatial association of dissimilar values: “low values surrounded by high neighboring values for the former, and high values surrounded by low values for the latter.” (Anselin 1995, page 106).

The results for the analysis of the POVCHG variable (tested for sensitivity) show a low global Moran’s I of 0.0831 masks several local regimes of spatial association and significant clustering of high and low poverty change rates. Several isolated areas of significance indicate spatial heterogeneity exists in the data set as well (see Figure 4.11). According to Anselin (1994 p. 117), the presence of a large number of observations that are positively correlated with their neighbors combined with a similar number that are negatively correlated “may indicate the presence of different spatial regimes or local-nonstationarity.” Those regimes are resistant to political boundaries and therefore cross state lines.

When the change in poverty between 1990 and 2000 is layered over the 2000 poverty rate, interesting patterns emerge (see Figure 4.12). The most striking pattern is that most of the high poverty counties experienced no significant changes in the economic conditions of its poor residents.
This illustrates what the theory of cumulative causation suggests, that initial conditions are difficult to overcome. A subset, however, of these high poverty areas did show significant decreases in poverty. When a map of persistently poor is overlaid, one can see that almost all of the significant clusters of high poverty areas are labeled persistently poor (Figure 4.13), while the opposite is true for the clusters of low poverty areas. Significant areas of clustered high poverty rates in 2000 also overlap with significant clusters of educational non-attainment (Figure 4.14), but on average do not overlap with significant clusters found in the poverty change LISA map. Also the LISA maps for poverty and infant mortality all exhibit a greater degree of spatial dependence and therefore have correspondingly higher and positive Moran’s I. It is telling that the incidence of high poverty rates, low educational attainment and high infant mortality also coincides with significant clusters of African American populations.
Figure 4.9: LISA Analysis for 1990 Poverty Rate (a) Cluster Map; (b) Box Plot; (c) Significance Map; (d) Moran Scatter Plot
Figure 4.10: LISA Analysis for 2000 Poverty Rate (a) Cluster Map; (b) Box Plot; (c) Significance Map; (d) Moran Scatter Plot
Figure 4.11: LISA Analysis for Change in Poverty Between 1990 and 2000 (a) Cluster Map; (b) Box Plot; (c) Significance Map; (d) Moran Scatter Plot
Figure 4.12: LISA Map of 2000 Poverty Rate and Poverty Change Between 1990 and 2000
Figure 4.13: LISA Map of 2000 Poverty Rate and Persistent Poverty Counties
Figure 4.14: LISA Map of 2000 Poverty Rate and 2000 Percent with No Highschool Diploma
Chapter 5 - Regression Analysis and GWR Results

This chapter examines and compares the results of traditional global regression and geographically weighted regression (GWR) models. Prior to the application of these models, a test for multicollinearity was run to determine the appropriate set of variables to be included. Each model regresses the 2000 poverty rate against a suite of exogenous parameters and assesses its suitability based on the Akaike Information Criteria (AIC) statistic (Fotheringham et al. 2002). Increases in the coefficient of determination with the GWR models are partly due to increases in the degrees of freedom. However, if combined with the decrease in the AIC, one can conclude that the GWR model more closely approximates reality. Significant F-statistics associated with analysis of variance tests that compare the global and local regression models would also support this conclusion. These statistics are examined for each model that is discussed below. The models presented below go beyond studies such as Goetz et al. (2003) or Swaminathan and Findeis (2004) in that they attempt to assess the impact of aggregate federal funding instead of focusing on specific programs.

5.1 MODEL 1 RESULTS

The descriptive analysis in Chapter 4 raises questions regarding the underlying causes of the exhibited pattern that can be answered with GWR. One question that is particularly interesting is the extent to which the change in poverty and the current poverty rate are affected by preexisting conditions and changes in socio-economic conditions in the Delta region. Analyzing these patterns could help researchers determine whether the poverty
level depends on initial conditions and if so whether the results can be explained more by the theory of cumulative causation or by convergence theory.

Several models were run to arrive at Model 1. First a model was run that included poverty change as the dependent variable and variables that indicated preexisting conditions (the poverty rate, population, educational attainment, employment rate, income, labor force participation rate and dependency ratio for 1990 and the per capita total federal funding for 1994 as the dependent variables. This model had a lower explanatory power than the next model which substituted income change and net migration for income and population and included industrial structural change. The third model run had an even greater explanatory power when specific federal funding categories were added to the analysis instead of the total federal spending per capita. However, when these same exogenous variables are used to model the 2000 poverty rate instead of change in poverty between 1990 and 2000 the results improved dramatically producing a model with a much higher explanatory power.

The final model to which the tests for multicollinearity were applied included the 2000 poverty rate as the dependent variable and the following variables as the exogenous factors: 1990 poverty rate; 1990 percent with no high school diploma; 1990 employment rate; income change; metropolitan status; net migration; 1990 dependency ratio; 1990 labor force participation rate; industrial structural change; and the six per capita federal funding variables.

Recall that a first step in detecting the presence of multicollinearity is to examine the Pearson’s correlation coefficient. Two variables had comparatively high correlations with several other variables—1990 poverty rate and the 1990 dependency ratio. For example, both were strongly and positively related to each other and to the educational attainment and
human resources policy variable. These same two variables had relatively higher variance inflation factors (VIFs) and low tolerances as well. In this global regression, only four variables were significant in spite of the extremely high F-statistic of 152.64. Moreover, the signs of several coefficients were inconsistent with the literature and theory. For example, the lack of educational attainment in 1990 had a negative impact on poverty in 2000. Another example is the 1990 employment rate, which was found to increase the 2000 poverty rate. All of these results point to the presence of multicollinearity. While correcting for this problem is not as straightforward, one common method is to drop the variable that is strongly related to several of the exogenous factors. In this case, the 1990 poverty rate was removed from the analysis and a model was run using largely economic factors from the previous decade. Both of the variables mentioned above that had inconsistent signs changed signs when this variable was removed. In the new model, none of the tolerance statistics went below 0.35 and the VIFs did not exceed 2.81, in keeping with Gujarati’s (1999) assertion that multicollinearity is a question of degree. Thus while this model still exhibits multicollinearity, the degree or severity to which it is present was diminished when the 1990 poverty rate is eliminated.

Another issue that should be considered when running the GWR model is the actual shape of the study region. The Mississippi Delta region includes twenty counties in Alabama that are not contiguous to the rest of the region which is centered around the Mississippi River. Including a noncontiguous area into the spatial analysis could overly smooth the results. To ensure that this does not occur, and because these counties were made a part of the region at the end of the delineated study period (1990 to 2000), these counties were removed prior to the estimation of both the global and GWR models. To determine the
sensitivity of including these counties, models were run that did include them. The results did not change substantially with only slight increases in bandwidth and the coefficient of determination.

Many of the coefficient signs in the Model 1 that finally corrected for multicollinearity signaled relationships that are compatible with conventional theories about the effect of certain variables on poverty (see Table 5.1). For example, the global results show that the income change variable is significant and negatively related to the 2000 poverty rate as expected. That is, for every unit increase in income, poverty decreases by 3.6%. Two other highly significant variables are the 1990 lack of educational attainment and the 1990 dependency ratio, both of which had a strong positive impact on the 2000 poverty rate.

For every percentage increase in the percent with no high school diploma, the 2000 poverty rate increases by 0.139. The dependency ratio in 1990 caused the poverty rate to increase by almost a fourth of a percentage point. These findings support the theory of cumulative causation which purports that previous conditions significantly constrain improvements on future conditions. However, one variable that exhibits an unexpected relationship to the 2000 poverty rate is the 1994 human resources federal policy variable. This variable had a highly significant and positive effect in the global regression model. Recall that human resources funding includes spending on education, training and social support programs that help spur development along with spending on community resources. Reeder and Calhoun (2002) assert the importance of human resources programs on areas with large populations of the poor and undereducated. These programs help enhance human capital therefore bringing growth in high quality jobs.
Table 5.1: Presentation of Global and GWR Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependent Variable: 2000 Poverty Rate</td>
<td>Dependent Variable: 2000 Poverty Rate</td>
</tr>
<tr>
<td></td>
<td>Global</td>
<td>GWR (County ranges)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.2062**</td>
<td>-0.013 to 0.342</td>
</tr>
<tr>
<td>Percent w/o HS diploma</td>
<td>0.198**</td>
<td>0.114 to 0.382</td>
</tr>
<tr>
<td>Percent Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Pov.</td>
<td>0.042**</td>
<td>0.018 to 0.098</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>- 0.0036</td>
<td>-0.022 to 0.0195</td>
</tr>
<tr>
<td>Infant Mortality</td>
<td>-8.4 E-05</td>
<td>-9.8 E-04 to 2.47 E-04</td>
</tr>
<tr>
<td>Income Change</td>
<td>- 0.036**</td>
<td>-0.125 to 0.073**</td>
</tr>
<tr>
<td>Net Migration</td>
<td>- 1.834 E-06**</td>
<td>-7.0 E-06 to 2.0 E-06</td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>- 0.015</td>
<td>-0.132 to 0.133</td>
</tr>
<tr>
<td>Labor Force Part.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indus Structural Change</td>
<td>-0.017</td>
<td>-0.132 to 0.133</td>
</tr>
<tr>
<td>'90 Pov. Rate</td>
<td>0.139**</td>
<td>-0.025 to 0.397</td>
</tr>
<tr>
<td>'90 Per. w/o HS diploma</td>
<td>-0.023**</td>
<td>-0.102 to 0.100</td>
</tr>
<tr>
<td>'90 Dependency Ratio</td>
<td>0.173**</td>
<td>-0.210 to 0.428**</td>
</tr>
<tr>
<td>'90 Labor Force Part.</td>
<td>-0.259**</td>
<td>-0.046 to 0.029**</td>
</tr>
<tr>
<td>'94 PC Ag. Resources</td>
<td>1.44 E-05**</td>
<td>-2.1 E-05 to 1.9 E-05</td>
</tr>
<tr>
<td>'94 PC Comm. Resources</td>
<td>-3.97 E-06</td>
<td>-2.0 E-05 to 6.3 E-05</td>
</tr>
<tr>
<td>'94 PC Space &amp; Defense</td>
<td>-2.53 E-06</td>
<td>-1.3 E-05 to 4.0 E-05</td>
</tr>
<tr>
<td>'94 PC Human Resources</td>
<td>3.125 E-04**</td>
<td>1.28 E-04 to 4.57 E-04</td>
</tr>
<tr>
<td>'94 PC Income Security</td>
<td>-2.762 E-07</td>
<td>-1.9 E-05 to 4.6 E-05**</td>
</tr>
<tr>
<td>'94 PC National Function</td>
<td>9.86 E-06</td>
<td>-1.8 E-05 to 2.6 E-05</td>
</tr>
<tr>
<td>'00 PC Ag. Resources</td>
<td>1.12 E-06</td>
<td>1.0 E-06 to 3.0 E-06</td>
</tr>
<tr>
<td>'00 PC Comm. Resources</td>
<td>2.3 E-06</td>
<td>-3.0 E-06 to 1.4 E-05</td>
</tr>
<tr>
<td>'00 PC Space &amp; Defense</td>
<td>3.97 E-07</td>
<td>-8.0 E-06 to 5.0 E-06</td>
</tr>
<tr>
<td>'00 PC Human Resources</td>
<td>9.35 E-05**</td>
<td>1.3 E-05 to 1.43 E-04</td>
</tr>
<tr>
<td>'00 PC Income Security</td>
<td>1.79 E-06</td>
<td>1.0 E-06 to 8.0 E-06</td>
</tr>
<tr>
<td>'00 PC National Function</td>
<td>1.71 E-06</td>
<td>6.0 E-06 to 1.8 E-05</td>
</tr>
<tr>
<td>G</td>
<td>1.36**</td>
<td>0.986 to 1.59**</td>
</tr>
<tr>
<td>Bandwidth</td>
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<td>94</td>
</tr>
<tr>
<td>AIC</td>
<td>-786</td>
<td>-803</td>
</tr>
<tr>
<td>Coefficient of</td>
<td>0.695</td>
<td>0.866</td>
</tr>
<tr>
<td>Determination</td>
<td>3.746</td>
<td>2.91</td>
</tr>
</tbody>
</table>

NOTES: Shaded cells indicate those variables that were included in the model.  
** Indicate those variables that were significant in the global regression model or were significantly geographically structured in the geographically weighted regression model.
Since many of these programs are administered at the state level, they are not captured in this county-level analysis in the data set used. However key programs such as the Title 1 assistance to schools with at risk populations are covered. Other programs that are a part of this vector include special employment training programs targeted at youth, seniors, homeless populations and veterans, numerous nutrition programs and educational programs. The model results show that for every unit increase in spending on this particular set of programs, 2000 poverty worsens by 0.03%. Another federal policy variable, agricultural resources is noteworthy. Like the human resources variable, 1994 spending levels are associated with a significant and positive increase in the 2000 poverty rate, 0.001% to be exact. Contradictory patterns such as these hint at the deeper relationships that exist and that should be examined at a more local level.

Part of the unexplained variance exhibited in this model (R-squared value equals 0.695) could result from the assumption at the foundation of all global regression models, the assumption that relationships between variables are constant across space. The fact that non-stationarity may exist in the data set is not taken into account in this traditional model. For the GWR model, one should scrutinize the bandwidth and the point at which the model converges to determine the local sample size of the nearest neighbors. The closer the bandwidth is to the size of the entire sample, the closer the GWR model is to the global regression model. In Model 1 the bandwidth converges at a sample size of 94 which is far less than the total sample size of 220. If one follows Fotheringham et al (2002), the next figure that one should examine is the AIC that is used to determine which model presents the best fit or is more appropriate for the data. As previously discussed, the model with the smallest AIC is deemed to most closely approximate reality. Using this criterion, one can see
in Table 5.1 that the GWR model is the best especially when it is coupled with the higher coefficient of determination or R-square value of 0.866. The high F-statistic of 3.75 also indicates that the GWR model represents an improvement over the global regression model.

The Monte Carlo test conducted in the analysis investigates the significance of the amount of spatial variability for each of the local parameter estimates. Note again the difference in meaning behind this significance test versus the traditional significance tests for the global regression. The results of these tests are shown in Table 5.1, and suggest that income change, labor force participation, the dependency ratio and the income security federal policy variable all exhibit significant spatial patterns that did not randomly occur. Figure 5.1 presents the spatial distribution of the localized R-square values while Figures 5.2, 5.3 and 5.4 present maps of selected variables.

Recall that in global regression modeling the R-square statistic measures the proportion of variance in the observed data that the model explains. Thus local versions of this statistic can be computed to get a sense of how well a local model “can replicate the data recorded in the vicinity of the regression point” (Fotheringham et al 2002, page 215). While these statistics cannot be interpreted with as much confidence as the global value because of the potential nonstationarity of the local models, it is still useful to examine the geographic distribution of this measure. One notices that the pseudo localized R-square values in Figure 5.1 range from 60.4% in the northeast to 91.7% in the central part of the region compared to a global R-square value of 86.6%. This suggests that the local models in the central subregion, where concentrations of African Americans and poor conditions are prevalent as shown in Figures 4.3 to 4.8, have a better fit than the global model while the northeastern region performs just as well as the global model.
Figure 5.1: Model 1 – Localized Pseudo R-square Values
Immediately, one can see interesting patterns emerge in Figure 5.2 (a). While in the global model the impact of increases in income on the 2000 poverty rate is small—poverty decreases substantially in the central region for every percentage increase in per capita income with poverty decreasing by over twelve percent in certain areas. The coefficients associated with the central subregion are also highly significant as shown in Figure 5.2 (b) compared to the northern subregion where the effect of income change on poverty was insignificant. This confirms the long held assumption that policies that increased income levels such as a higher minimum wage would go a long way to reducing the pervasiveness of poverty, particularly in areas where low wage labor predominates.

Another noteworthy pattern is revealed in Figure 5.3(a) and (b) which shows that the ratio of elderly and children for every working aged individual in 1990 (termed the dependency ratio) has a highly significant and positive effect on 2000 poverty levels in the central part of the Delta region and an significant but negative impact on poverty in the north. The significant and positive effect of this parameter is what dominates the global regression, thus masking the opposite local relationships found in the northern part of the Delta region. Figures 5.4 (a) and (b) show that the distribution of the spatially clustered 1990 labor force participation rate variable has its largest negative impact on the 2000 poverty rate in, again, the central region of the Delta area. The emergence of a distinct spatial regime at the heart of the 220 county area based on the maps presented in this section is evident. This region corresponds to the Yazoo Delta area that has particularly deep ties to the institution of slavery and the plantation economy (Cobb 1992).
Figure 5.2: Selected Variables and T-Values for GWR Model 1: (a) coefficient for income change, (b) t-value for income change
Figure 5.3: Selected Variables and T-Values for GWR Model 1: (a) coefficient for dependency ratio, (b) t-value for dependency ratio
Figure 5.4: Selected Variables and T-Values for GWR Model 1: (a) coefficient for 1990 labor force participation rate, (b) t-value for 1990 labor force participation rate
Although the Monte Carlo test for spatial variability failed for the per capita human resources spending, this variable and its significance values are mapped because it proved to have a significant effect on the 2000 poverty rate in the global regression equation. Those maps are presented in Figure 5.5 (a) and (b). Across the Delta region, increased per capita spending on programs aimed at improving the human capital of the regional population had a marginal but significant positive influence on the 2000 poverty rate. This is in contradiction to human capital theorists who have long argued “that modern state education systems contribute to economic development, first, by socializing students to modern values and attitudes and, second, by teaching job-related competencies and skills (Gough 2000, page 242). Other variables related to federal policies and programs were insignificant in the global regression. This finding challenges the assertion that greater federal investment in education and other programs in a poor region will generally lead to an improvement in the economic well-being of the population. Thomson (2003) and Blank (2004) both point to the manner in which programs are targeted as well as the state of the institutions that are charged with program implementation as key determinants of whether program goals are achieved.

Figure B.3 in Appendix B does show that there has been an overall increase in the human resources funding category between 1994 and 2000 although not as large as the increases in the northern part of the Delta region. Other maps showing the change in the federal policy variables also appear in this appendix.

Factors that underpin the effectiveness of local institutions as they administer programs particularly those aimed at reducing poverty include the extent to which these institutions are governed by special interests, the extent to which they are also connected
Figure 5.5: Selected Variables and T-Values for GWR Model 1: (a) coefficient for 1994 per capita human resources spending, (b) t-value for 1994 per capita human resources spending
with non-local institutions, the uniqueness of a particular local community, and the openness of these institutions as they relate to class patterns and social norms. Blank (2004) wisely states that the

“design and implementation of effective anti-poverty policies – whether job programs or cash assistance programs – requires an effectively functioning public sector. Legislation that mandates subsidies or services to the poor is only as effective as the local government’s ability and willingness to implement it. In isolated rural regions where government has little presence, people may be unaware of available services or unable to access them. In areas where government serves the interests of only a limited group of people, parts of the population may be excluded from assistance” (page 15).

How programs are targeted, to individuals or to places can also impact their effectiveness at eradicating poverty according to Thomson (2003). Considerations for targeting resources include: (1) scope – project or area wide; (2) scale – volume of the resources targeted; (3) goal – what the program is intended to achieve such as community revitalization or improving educational attainment; and (4) strategic – resources are essential to and increase the probability of the achievement of the program goals as opposed to defacto or convenience targeting. So a number of factors such as inadequate targeting or the ability or willingness of local institutions to implement human resources programs effective could explain the fact that this variable is associated with increases in poverty.

Table 5.2 presents the local results of two selected counties, the rural East Carroll parish and the urban Orleans parish. These two parishes were selected because they are in the same state. In addition, the difference in each area’s metropolitan status has an impact on the types of funding they receive (Orleans receives almost no agricultural funding while East Carroll receives a substantial amount per capita), which could cause dissimilar results on the estimated models. Based on the models shown in this table, it is clear that a fair amount of divergence from the global regression occurs at the local level. For example, the influence of
Table 5.2: Model 1 GWR Results for Selected Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>East Carroll Regression coefficients &amp; sign. values</th>
<th>East Carroll Variable Values</th>
<th>Orleans Regression coefficients &amp; sign. values</th>
<th>Orleans Variable Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.1538</td>
<td></td>
<td>0.0161</td>
<td>0.32</td>
</tr>
<tr>
<td>1990 Ed. Attainment</td>
<td>0.2041</td>
<td>0.51</td>
<td>0.3181</td>
<td>1.09</td>
</tr>
<tr>
<td>1990 Emp. Rate</td>
<td>0.0047</td>
<td>0.65</td>
<td>0.0217</td>
<td>0.45</td>
</tr>
<tr>
<td>Income Change</td>
<td>-0.1058</td>
<td>0.47</td>
<td>-0.0405</td>
<td></td>
</tr>
<tr>
<td>Metropolitan Status</td>
<td>0.0013</td>
<td></td>
<td>-0.0055</td>
<td></td>
</tr>
<tr>
<td>Net Migration</td>
<td>-0.000001</td>
<td>-239.00</td>
<td>-0.000001</td>
<td>-40825</td>
</tr>
<tr>
<td>1990 Dependency Ratio</td>
<td>0.3211</td>
<td>0.99</td>
<td>0.1987</td>
<td>0.68</td>
</tr>
<tr>
<td>1990 Labor Force Part. Rate</td>
<td>-0.2946</td>
<td>0.64</td>
<td>-0.1835</td>
<td>0.70</td>
</tr>
<tr>
<td>Industrial Structural Change</td>
<td>0.0328</td>
<td>0.12</td>
<td>-0.0074</td>
<td>0.05</td>
</tr>
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<td>1994 PC Ag. Resources</td>
<td>0.0000005</td>
<td>$ 3,344</td>
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<td>$ 10</td>
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<td>1994 PC Community Resources</td>
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<td>0.000037</td>
<td>$ 812</td>
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<tr>
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<td>$ 94</td>
<td>-0.000001</td>
<td>$ 1</td>
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<tr>
<td>1994 PC Human Resources</td>
<td>0.000275</td>
<td>$ 267</td>
<td>0.000234</td>
<td>$ 161</td>
</tr>
<tr>
<td>1994 PC Income Security</td>
<td>-0.000009</td>
<td>$ 4,911</td>
<td>0.000012</td>
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</tr>
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<td>1994 PC National Function</td>
<td>0.000008</td>
<td>$ 173</td>
<td>-0.000003</td>
<td>$ 2,047</td>
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<table>
<thead>
<tr>
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<td></td>
<td>-0.9863</td>
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<tr>
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<td>Labor Force Part. Rate</td>
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</tr>
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<td>Industrial Structural Change</td>
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<td></td>
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<td></td>
<td>2.0541</td>
<td></td>
</tr>
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<td>-0.1894</td>
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<td></td>
<td>1.5430</td>
<td></td>
</tr>
<tr>
<td>1994 PC National Function</td>
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<td>-0.2040</td>
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</tr>
<tr>
<td>Observed 2000 Poverty Rate</td>
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<td></td>
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</tr>
<tr>
<td>Predicted 2000 Poverty Rate</td>
<td>0.4056</td>
<td></td>
<td>0.2744</td>
<td></td>
</tr>
<tr>
<td>Standardized Residuals</td>
<td>-0.0142</td>
<td></td>
<td>0.1270</td>
<td></td>
</tr>
<tr>
<td>Local Pseudo R-square</td>
<td>0.8883</td>
<td></td>
<td>0.8657</td>
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</tbody>
</table>

the educational attainment parameter on the 2000 poverty rate was substantially more positive than the average. That is as the percent of those without a high school diploma
increases in 1990, the level of poverty increases between 20.4% and 31.8% compared to an average increase of 13.9%.

The income change parameter was significant in only one of the selected counties, East Carroll parish. The effect of this parameter is also magnified at the local level producing larger decreases in the 2000 poverty rate, with coefficients ranging from -0.1058 to -0.0405 versus -0.036 in the global regression. However, in Orleans parish, increases in income is not statistically significant. The fact that inequality exists in the parish could account for the fact that income benefits are not sufficiently shared by all people. Thus wealth generating policies and programs that directly affect income have long lasting effects at the local level over the past decade on 2000 poverty rates, but these effects are not equally shared between metropolitan and rural areas.

Lastly, trends observed on the per capita federal policy variables are noteworthy, particularly the significant and positive impact of per capita human resource spending in the selected counties. This agrees with the result found in the global regression where spending on the same programs is positive and significant. In the two selected counties, the agricultural resources variable for 1994, community resources spending (only significant in East Carroll parish) as well as the human resources spending in 1994 both served to worsen the conditions of the poor. A large body of literature exists on the role of means-tested programs in determining the behavior of recipients and its effect on poverty (Axinn and Stern 1988; Goodin et al. 2000, Cason 2001; Goode and Maskovsky 2001; Lobao and Hooks 2003; Mead 2000; O’Connor 2001; and Wilson 1987). For example, in his comparison of the U.S. welfare regime with two European countries (Germany and the Netherlands), Goodin et al. (2000) find that the U.S. system not only starts with a high amount of inequality, but it
actually worsens the levels of inequality. “Governmental transfers in the U.S. are less than half as effective at erasing pre-government income inequality” (Goodin et al. 2000, page 179). Other theorists such as Mrydal (1969) and Barr (1987) believe that government sponsored redistribution is compatible with economic efficiency and increased competitiveness of welfare states. Instead, this redistribution ultimately increases poverty by reducing the competitiveness of welfare states. While research on the effect of welfare programs on poverty is extensive, often it is not combined with an assessment of the impact of other programs such as agricultural support programs. Moreover, given the fact that each locality has its own peculiar set of demographic characteristics, it would be premature to make a definitive statement on the potential causes of this pattern without doing more research on the ground. Suffice it to say that conducting a regression analysis that takes into account the geographic dimension reveals these local variations and guides policy makers towards places that stand out from the norm and that may therefore require a different approach.

5.2 MODEL 2 RESULTS

The next question raised by the descriptive analysis in Chapter 4 touches on the relationship that exists between current conditions and socio-economic change coupled with overall federal spending on the 2000 poverty rate. To discern these relationships, the 1990 and 1994 variables are replaced with variables from the year 2000. The change variables such as income change and net migration remain in the model. Additional variables include industrial structural change, 2000 infant mortality rate, and poverty change between 1990 and 2000. Unlike Model 1, the dependency ratio for 2000 was removed due to multicollinearity. The percent of African Americans, while contemplated for inclusion also was highly
correlated with other variables such as the infant mortality rate and the per capita spending on human resources. The final model included the following exogenous variables: poverty change between 1990 and 2000; 2000 percent with no high school diploma; 2000 employment rate; 2000 infant mortality; income change between 1990 and 2000; metropolitan status; net migration; 2000 labor force participation rate; industrial structural change; and the six per capita federal funding variables. The results of Model 2 are presented in Table 5.1 and show while less variables are significant predictors of the dependent variable when compared to Model 1, the global model had a higher explanatory power with some changes in the types of influence exerted by certain variables.

For example, although net migration caused poverty to decrease in Model 1, the opposite is true for the second model. Instead, net migration was significant and caused poverty to increase marginally instead of the negative pressure it exerted in Model 1. This supports Fitchen’s (1995) finding that the heightened migration of the poor into rural areas further boosts the poverty rates. The urban poor are often attracted to these areas by the lower cost of living. In Fitchen’s study, migration across adjacent counties was also found to be significant. Based on these conclusions, the demographic composition of migrants in the region and the nature of the economies of surrounding counties should be examined to understand the reason that increases in population tend to cause poverty to increase in this model. The demographic variable infant mortality, although not significant in Model 2 and had a negative sign.

On the other hand, the same counterintuitive pattern that was found in Model 1 also emerged with the human resources federal policy variable which was significant and positively correlated with poverty. The reason this relationship exists in the Delta could be a
result of conditions at the granular level of the individual school and the quality of teachers or administrators, and the level of parental and volunteer investment in the schools. Exploring this rationale could lead to the realization that different strategies or a different combination of strategies may be necessary to negatively influence the poverty levels with spending on human capital programs.

Expected relationships held with labor force participation and educational attainment. Lastly, a new variable, the gini coefficient proved to be the strongest influence on the poverty rate. For every unit increase in the gini coefficient, poverty more than doubles.

An evaluation of the efficacy of the GWR model in comparison to the global model reveals that while it is still the better model, the difference between the two models is less pronounced than the difference found in Model 1. Since the bandwidth converges at a sample size of 146, the GWR can be said to more closely approach the global regression than Model 1 and the F-statistic of 2.91 also hints at a GWR that distinguishes itself less from the global regression. Having made that statement, the GWR still meets the criteria of being more robust with the increase in the coefficient of determination of 0.043 coupled with a decrease of 6 in the AIC. Figure 5.6 presents the spatial distribution of the Local pseudo R-square values which is important to indicate how well the local models fit as explained earlier in this chapter. It shows that the most robust GWR models are located in the central part of the region.

Three variables are highlighted in thematic maps for various reasons. The percent of those aged 25 years and older that did not have a high school diploma in the region in 2000 is mapped because aside from the gini coefficient, it exerts the largest positive influence on poverty. The per capita investment in human resources in 2000 is mapped because it
represents the only federal policy variable that is significant in the global model. Lastly, the gini coefficient, which is calculated on family income for the year 2000 is mapped simply for its strong influence on the dependent variable.

Figure 5.7 shows a substantial variation in the amount of influence that educational attainment exerts on poverty. Figure 4.4 in Chapter 4 shows that in the northeastern part of the region, the percent without a high school diploma does not exceed a quarter of the population aged 25 years and older. In the central part of the region, however, this percent is at least one-third and in some parts approaches one half of persons aged 25 years and older.
It is not surprising that towards the central part of the region, poverty increases by almost 0.40 for each unit increase in the percent of individuals without a high school diploma, while in the northeastern end of the Delta this influence is reduced by half. Perhaps one of the reasons that the human resources federal policy variable shown in Figure 5.8 has a positive impact on poverty, particularly in the North where it is highly significant, lies in the types of educational investments that are made in the region. Possibly the fact that these investments do not focus on supporting the development of the knowledge networks that new economic
geography experts identify as the key to regional success is a major reason for this pattern, as mentioned in Chapter 2. In fact, local institutions may actively work to prevent the flow of information and innovation to African Americans and the poor. Therefore policymakers should inquire about how racism impedes this information flow and non-traditional forms of learning, thus preventing African Americans and the poor from harnessing education to lift themselves out of poverty. Future research that is beyond the scope of this study should include an analysis of a region outside of the Delta to draw comparisons that will allow this point to be validated.

This model does not look at the effect that spatially lagged poverty rates exert on the poverty levels of a given county. Instead it substitutes the closely correlated inequality statistic, the gini coefficient which was calculated for the year 2000 and shown in Figure 5.9.

Figure 5.8: Selected Variables and T-Values for GWR Model 2: (a) coefficient for 2000 per capita human resources spending, (b) t-value for 2000 per capita human resources spending
While the weight of this variable on poverty was profound it was relatively lighter in the northern part of the region. These counties also happened to have a cluster of below average 2000 poverty rates with many of those counties experiencing poverty rates that did not exceed the regional average of 21.1%.

Figure 5.9: Selected Variables and T-Values for GWR Model 2: (a) 2000 gini coefficient, and (b) t-value for 2000 gini coefficient
Table 5.3 shows the Model 2 results for the same two counties that were selected for the reasons described earlier in the chapter. Income change exerted a smaller and insignificant influence on poverty in this model than in the previous model. Unlike the global regression model and the GWR county results for the previous model, neither human resources nor income security spending in 2000 significantly affected the poverty rate. Although both parishes had a similar set of significant variables, East Carroll parish is distinguished by its higher levels of significance along each of those variables. In addition, certain factors influenced poverty differently across the two models. For instance, in Model 1, educational attainment had a significant negative effect on poverty in East Carroll but an insignificant negative effect in Orleans. However, the opposite was true in Model 2, the lack of educational achievement placed a significant upward pressure on the 2000 poverty rate in both parishes. Another example is the net migration which was an insignificant and negative influence in Model 1 but a significant and positive influence on the dependent variable in Model 2.

Understanding why these patterns exist and why they differ in crucial ways from the global regression models necessitates a more in depth look at local conditions, i.e. a case study. Case studies help illustrate how socioeconomic conditions at the local level relate to policy conditions across space in one community. They also provide examples of how the results of a complex, regional analysis are manifested at a different scale. Blank (2004) cites five attributes that are important influences on a particular region or locality. These attributes include the natural environment, the economic structure of a region, the status of public and community institutions, existing social norms and cultural environment, and lastly the demographic characteristics of its population.
Table 5.3: Model 2 GWR Results for Selected Counties

<table>
<thead>
<tr>
<th>Variables</th>
<th>East Carroll Regression coefficients &amp; sign. values</th>
<th>Orleans Regression coefficients &amp; sign. values</th>
<th>Orleans Variable Values</th>
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<td></td>
<td>Intercept -0.450148 --- -0.410555 ---</td>
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</tr>
<tr>
<td>Percent Change in Poverty, 1990-00</td>
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<td>2000 Ed. Attainment</td>
<td>0.261847 0.42 0.194984 0.25</td>
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<td></td>
</tr>
<tr>
<td>2000 Emp. Rate</td>
<td>-0.002382 0.63 -0.014726 1.09</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>2000 Infant Mortality Rate</td>
<td>0.000167 24.7 0.000195 7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Income Change, 1990-00</td>
<td>-0.051938 0.47 -0.041878 0.45</td>
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<td></td>
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<tr>
<td>Metropolitan Status</td>
<td>0.011295 0 0.003499 1</td>
<td>-40825</td>
<td></td>
</tr>
<tr>
<td>Net Migration</td>
<td>0.000002 -239.00 0.000001</td>
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<td></td>
</tr>
<tr>
<td>2000 Labor Force Part. Rate</td>
<td>-0.046410 0.58 -0.035514 0.67</td>
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<td>Industrial Structural Change</td>
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<td>2000 PC Ag. Resources</td>
<td>0.000001 $ 3,473 0.000002 $ 4</td>
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<td>2000 PC Community Resources</td>
<td>0.000008 $ 336 0.000014 $ 790</td>
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<td>2000 PC Human Resources</td>
<td>0.000043 $ 876 0.000043 $ 459</td>
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<td>2000 PC Income Security</td>
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<tr>
<td>2000 PC National Function</td>
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<tr>
<td>2000 PC Space &amp; Defense</td>
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<tr>
<td>2000 Gini Coefficient</td>
<td>1.466380 0.47 1.421390 0.50</td>
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T-Values

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<th>T-Values</th>
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<tr>
<td>2000 Emp. Rate</td>
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<tr>
<td>2000 Infant Mortality Rate</td>
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</tr>
<tr>
<td>Percent Income Change, 1990-00</td>
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<td>Metropolitan Status</td>
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<td>Net Migration</td>
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<td>2000 Labor Force Part. Rate</td>
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<td>Industrial Structural Change</td>
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<td>2000 PC Ag. Resources</td>
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<td>Predicted 2000 Poverty Rate</td>
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<td>Local Pseudo R-square</td>
<td>0.908949 0.917966</td>
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</tbody>
</table>

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According to Blank (2004), these features are fixed in the short run, but are subject to change in the long run. The interconnected nature of these factors, the fact that changes in these factors happen concurrently, and the need to situation what happens at a local level within a larger region context create modeling challenges. However, the modeling work conducted in Chapter 5 provide a method for examining the complexity of these dimensions that Blank (2004) references. Attempts at such modeling serve a good purpose by signaling to policymakers at all levels the areas and issues that require their attention. Such an “alert” system that is formally grounded in data and sound theory that describes the interaction of poverty with socioeconomic conditions and policies is a useful guide that can inform more in depth, localized analyses.
Chapter 6 - Conclusions

6.1 Conclusion

At the beginning of this research, several hypotheses were made regarding the poverty trends one would find in this region, the causes of those trends, and the manner with which those trends varied at different scales throughout the Delta region. The impact of geography and place-specific differences were hypothesized to influence observed poverty trends, including the impact of economic growth, and were assumed to lead to differences the implementation of federal programs aimed at relieving poverty. Creation of the Delta Regional Authority and its predecessor, the LMDDC, were thought to have an impact on the outcomes related to poverty in this region, as were trends in state restructuring.

Descriptive and exploratory spatial analyses revealed both clustered and dispersed spatial patterns in the variables used in the analysis. Differences in demographic and economic conditions as well as in the amount of federal funding were exhibited particularly along urban and rural dichotomies. Overall, all three hypotheses were proven by the results of the various analyses conducted in this study. Reductions in poverty were not equally felt throughout the region, with certain areas experiencing drastic decreases while other areas remained stagnant or had increases in poverty. Along many variables, whether or not a county was categorized as rural or urban had a major impact on performance along certain indicators. Lastly, the causal factors of poverty were uneven across the entire region, with clear clusters of opposite effects evidenced in some cases. However, the impact of federal funding on economic growth, and economic growth’s impact on poverty is less clear. Results were mixed and point to the potential influence of dominant industries, migration patterns, clusters of economic activities, and most importantly the historical and cultural
characteristics of specific parts of the Delta. The key finding was the positive impact of human resources spending on poverty in the Delta region and in the local models generated by geographically weighted regression analysis. Programs important to rural areas such as agricultural supports also had a similar positive effect on poverty in most of the models. Again, the importance of local context and local institutions that are responsible for implementing federal policies (that are even more important in light of state restructuring and the retraction of federal influence) is a major explanation of these results. For example, the black farmer lawsuit brought against the USDA is a perfect example of how a federal institution operating in the local context can hamper the positive benefits of redistributive policies (USDA 1998).

Local results that differ substantially from the averages represented by the global regression models strengthen the case for policies and programs that are more sensitive to local differences. Of particular concern are the disparities in local and state capacity to implement programs that were previously the primary responsibility of federal institutions. For programs that remain largely the responsibility of the federal governments, the findings suggest that resources must be targeted and adapted to respond to the distinctiveness of certain local areas.

The permeability of the borders across the three realms (state, capital and civil society) purported by Staeheli *et al.* (1997) exacerbates the negative effects of devolution and ineffective local implementation of programs meant to enhance local economies. Those agents that are able to travel across these boundaries are successful in negotiating in order to solve problems that directly impact their own economic interest. However, others who are powerless are not as successful. Therefore, the withdrawal of the state is often accompanied
by a withdrawal of capital and key powerful elements in civil society from certain parts or aspects of local communities, leaving behind those who are traditionally excluded because they cannot traverse these boundaries. This illustrates the need for addressing the myriad layers through which poverty and its consequences are formed and maintained.

The four lenses that are shown in the “Poverty Prism” presented in Figure 2.1 on page 18 are a useful tool. Many of the policies and programs addressed at enhancing economic growth and reducing poverty address only one side of the problem. A better tactic to reduce poverty would entail approaching it from these different lenses—power relation, market imperfection, geographic contingency, and social construction. Such a comprehensive method is more promising because it allows policy makers to fully address the many barriers to redistributing the benefits of economic growth. The nature of the state institutions that influences most strongly what occurs in this region is also a good lens through which to interpret the results. Since there is such a huge investment in welfare programs in the region, one can argue that the welfare state dominates which has implications for the relative power of this region given the lack of power this state holds vis-à-vis other “states.” Moreover, the impact of the disengagement of the state seems to far outweigh the impact of the reengagement of the state in the creation of the DRA. The types of investment required for this region to lift itself from the quagmire of poverty must combine both infrastructural investment as well as the human capital investment.

The ineffectiveness of regional institutions such as the DRA in shaping this targeting however, may be more a function of the imbalanced political landscape that Warner (2003) mentions and uneven economic landscape of the Delta region in relation to the rest of the nation as Massey (2004) describes in her study of uneven development. While in many
ways, the Delta seems to be a world of its own, it cannot be considered in isolation from its place in the nation and in the world. How the Delta relates to other regions especially as it relates to the spatial division of labor that Massey (2004) cites as so critical could also enlighten the causes of the results that are exhibited in this work.

Federal and state intervention is going to require that policymakers not only think differently about space, but that they develop programs using an adaptive management or administrative approach that can change with the dynamics of the region. Those static conditions such as race and power relations that are very difficult to alter and that may hinder progress regardless of the amount of programmatic investment must also be identified and addressed directly. This would entail an approach that combines empowerment strategies with human and physical capital investment.

Communicating with local individuals and obtaining their input on the impacts of programs will not only empower them but help structure programs so that they have the maximum impact. In addition, effective but fair targeting of resources within the region may permit local residents and the states in which they reside to gain the most benefit overall. This approach could yield better results because of the spillover effects that accompany most federal programs. Regardless of what the solutions that are applied to increase the positive benefits of federal investments, they must be “context-specific and sensitive to local path-dependencies” (Amin 2004, page 51).

Thus any poverty reduction strategy should have at its core strategies to create or strengthen what Amin (2004) calls “networks of association”. By strengthening or creating these networks, traditionally excluded societal actors will gain voice and the ability to negotiate the terms of community investments and will become embedded in both the policy-
making and implementation processes that serve to define the protocols for future discourse and action at the community level around anti-poverty programs. This cannot be done effectively without the engagement and mobilization of multiple independent organizations within civil society. The staff of the DRA showed an understanding of this need when they created the Leadership Development program in 2005. However, continued attempts to eliminate institutions such as the Delta Regional Authority such as those made by the Congressional Budget Office (2005) coupled with lack of investment in such institutions undermine any potential economic gains in this region. Strategies that provide tools to permit the easy flow of information to local areas are also necessary to enhance collaboration across the civil society, capital and the state.

One can conclude from this discussion that the positive impact of state engagement in communities necessitates a mobilization of excluded actors, or an empowerment strategy. Further research would perhaps attempt to model changes in social capital that would signal such empowerment by using a proxy measure similar to one used by Rupasingha and Goetz (2003). Linkages between certain sub regions (defined by specialized clusters of counties that are similar along certain socioeconomic variables) with other areas in the Delta or outside of the Delta could also be explored to better understand how Massey’s (2004) concept of the division of labor can be harnessed to explain the results revealed in this research. Industry specific effects may also be investigated in the context of uneven development within the region. Lastly, additional research should be conducted on the impact that local revenues and policy differences that exist across state regimes have on the trends shown in this region.
References


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Appendix A – County Topology Codes

Economic Type—Codes and definitions of the categories are as follows:

**Farming-dependent** (440 total, 403 nonmetro) counties—either 15 percent or more of average annual labor and proprietors' earnings derived from farming during 1998-2000 or 15 percent or more of employed residents worked in farm occupations in 2000. Note that a few counties have changed farm dependency status from the preliminary group posted in May 2004. See methods, data sources, and documentation for an explanation of these changes.

**Mining-dependent** (128 total, 113 nonmetro) counties—15 percent or more of average annual labor and proprietors' earnings derived from mining during 1998-2000.

**Manufacturing-dependent** (905 total, 585 nonmetro) counties—25 percent or more of average annual labor and proprietors' earnings derived from manufacturing during 1998-2000.

**Federal/State government-dependent** (381 total, 222 nonmetro) counties—15 percent or more of average annual labor and proprietors' earnings derived from Federal and State government during 1998-2000.

**Services-dependent** (340 total, 114 nonmetro) counties—45 percent or more of average annual labor and proprietors' earnings derived from services (SIC categories of retail trade; finance, insurance, and real estate; and services) during 1998-2000.

**Nonspecialized** (948 total, 615 nonmetro) counties—did not meet the dependence threshold for any one of the above industries.

Policy Types—These indicators are not mutually exclusive; definitions of the types are as follows:

**Housing stress** (537 total, 302 nonmetro) counties—30 percent or more of households had one or more of these housing conditions in 2000: lacked complete plumbing, lacked complete kitchen, paid 30 percent or more of income for owner costs or rent, or had more than 1 person per room. See methods for more details.

**Persistent poverty** (386 total, 340 nonmetro) counties—20 percent or more of residents were poor as measured by each of the last 4 censuses, 1970, 1980, 1990, and 2000.

**Population loss** (601 total, 532 nonmetro) counties—number of residents declined both between the 1980 and 1990 censuses and between the 1990 and 2000 censuses.

Source: U.S. Department of Agriculture, Economic Research Service
Appendix B – Maps of Changes in Federal Funding

Figure B.1: Change in Agriculture and Natural Resources 1994 to 2000 and Poverty Change 1990 to 2000

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Figure B.2: Change in Community Resources 1994 to 2000 and Poverty Change 1990 to 2000
Figure B.3: Change in Human Resources 1994 to 2000 and Poverty Change 1990 to 2000
Figure B.4: Change in Income Security 1994 to 2000 and Poverty Change 1990 to 2000
Figure B.5: Change in National Function Funding 1994 to 2000 and Poverty Change 1990 to 2000
Figure B.6: Change in Space and Defense Funding 1994 to 2000 and Poverty Change 1990 to 2000
Figure B.7: Change in Total Funding 1994 to 2000 and Poverty Change 1990 to 2000
Vita

Dominique Duval-Diop has an extensive background and expertise in community development, hurricane rebuilding policies, budget and fiscal analysis, geography and planning, social services and labor policy. Mrs. Duval-Diop obtained this expertise not only at several prestigious universities but also in state government and through teaching. She was employed for four years as a budget analyst in the Louisiana House of Representatives, during which time she worked on issues including the Temporary Assistance to Needy Families block grant unobligated balance and implementation of the Federal welfare reform law, the reorganization of the Department of Economic Development and various labor issues. While completing work towards her doctoral degree in economic geography, Mrs. Duval-Diop also acquired expertise in the spatial modeling of economic and demographic phenomena and adds the geographical aspect to her research. During her tenure at Louisiana State University, she developed an in depth knowledge of the issues and trends exhibited in the Mississippi Delta Region particularly regarding poverty trends and poverty reduction strategies.

From 2004 to 2005, Mrs. Duval-Diop worked in the Commissioner’s Office of the Louisiana Division of Administration first as a Research Analyst. Following the Hurricanes of 2005, she worked to assist in the start-up of the Louisiana Recovery Authority by acting as its Director of Long-Term Planning. Currently she is the Policy and Reporting Manager in the Disaster Recovery Unit of the Office of Community Development in the Louisiana Division of Administration. In this capacity she is responsible for developing policies and for the strategic planning and performance measurement of $10.4 billion worth of rebuilding programs.
The career path that Mrs. Duval-Diop has followed was grounded in her experience as a Teach For America volunteer in East Baton Rouge parish, an experience that drove home the fact that success in school was intricately linked with the economic and social conditions of the communities in which children live. Poverty and the burden that it places on children must be dealt with in order for school reforms and educational innovations to be successful. Working to eradicate poverty through the implementation of public policies and programs has been Mrs. Duval-Diop’s mission since participating in Teach for America.

Dominique Duval-Diop has received a number of awards and externally-funded training opportunities in the areas of budget analysis, policy and leadership. Some examples include serving as a National Conference of State Legislatures (NCSL) Technical Advisor in Madagascar and the Ivory Coast, and membership in the Leadership/Greater Baton Rouge Class of 2005.

Mrs. Duval-Diop holds a Bachelors of Arts in Economics from Northwestern University, a Masters of Public Administration from Columbia University, and will graduate in December 2006 with a doctoral degree in Economic Geography from Louisiana State University. She is the chair of the Louisiana Geographic Information System Council Strategic Planning Subcommittee and is on the Executive Steering Committees of the Louisiana Rebuilds Electronic Portal and the Solutions to Poverty (STOP) Network.