Federal Spending and Economic Growth in Southeastern Nonmetropolitan Counties

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The 1997 Balanced Budget Act requires a balanced federal budget by year 2002. In order to meet this goal, significant cuts in existing spending programs may be necessary. The impact of such cuts for local economies depends upon to what extent local economic growth and stability are tied to federal programs. There is a volume of literature which suggests that budget cuts in the 1980s (particularly the elimination of General Revenue Sharing Program) were detrimental to nonmetropolitan economies (Falk and Lyson 1993). In this analysis I explore the economic impact of federal spending with an integrated sociological model of regional processes that examines the effects of federal spending on local economic growth in southeastern nonmetropolitan counties during recent business cycles.

The human ecology and new urban/rural sociology continue to be the dominant paradigms of regional processes in sociological theory. The new urban/rural sociology assumes that the state plays a powerful role in generating regional differences in economic growth, while the human ecology perspective downplays the role of the state in economic development (Hooks 1994). A rich tradition of research shows that ecological processes are important determinants of social system change and economic growth. However, lagging economic regions, such as nonmetropolitan economies during the 1980s and early 1990s (Mencken and Singelmann 1998; Lichter and McLaughlin 1995; USDA 1993), make for a context in which the effects of state involvement and federal spending can impact local economic processes, net of ecological constructs (Mencken, forthcoming).

In addition to the general debate about the role of the state in the economy, much of the theory and research regarding the economic impacts of federal spending focus on the spatial consequences of geographical differences in levels of funding. However, some scholars point out that there was an emergence of a New Federalism during the 1980s—a fundamental shift in philosophy concerning the role of government in economic development (Falk and Lyson 1993). Therefore, the economic impact of federal spending during the 1980s, particularly in nonmetropolitan economies, must be also addressed in terms of net changes in federal funding during the New Federalism of the 1980s and early 1990s. I explore these issues with descriptive and multivariate regression analysis during recent business cycles (1983-88; 1989-92) for nonmetropolitan counties in the following southeastern states: Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee.

Literature Review

Human ecology is a market-oriented perspective that focuses on the natural aspects of local development. According to ecological theory, social system growth is, in part, a function of spatial dominance of primary sustenance functions (particularly natural resources) and diversity of sustenance activities (Hooks 1994; Poston 1984; Hawley 1986; Irwin and Kasarda 1991; Murdock *et al.* 1993). Spatially dominant systems receive greater resource inputs from external social systems, thus increasing the complexity of the system and the demand for integrative and coordinative functions (i.e. jobs—Murdock *et al.* 1993). Human ecology also emphasizes the impact of the built environment (roads/water systems, communication/transportation systems, spatial integration and economies of scale) on regional processes and development/retention of spatially dominant sustenance functions. However, the connection between the state and the built environment is largely ignored in ecological models (Hooks 1994; Kasarda and Irwin 1991; Frisbie and Kasarda 1988; Zukin 1980). Hooks (1994: 767) claims that ecological theory views state investments in the built environment as either a by-product of private enterprise, or as short-term phenomena with little impact. Ecologists concede that the subject of state involvement has received limited attention in ecological research (see Frisbie and Kasarda 1988).

Other regional science studies from a neoclassical perspective also question the economic effectiveness of federal spending. Many federal spending studies are criticized for being conducted on the wrong level of aggregation and for failure to control adequately for a variety of other place factors which may affect local economic growth (Morgan

and LaPlant 1996; Munnell 1990; 1992). Furthermore, other studies from economics imply that the effects of federal spending are endogenous to private sector enterprises, since many federal programs require local matching funds, which are difficult for places that are doing poorly to raise (Benton 1992; Walzer and Deller 1993). Many economists predict a negative impact of federal spending on economic growth (see recently Cronovich 1997; Kim 1998).

Where human ecology views regional growth resulting from technological innovations and functional imperatives of market adaptations, the new urban/rural sociology is based on several key assumptions. One of these assumptions is that growth coalitions of state, local, and national government leaders and local business elites attempt to forge a 'pro business climate' that keeps profits high, taxes and wages low, and makes locales relatively attractive for business location (Smith 1995; Gottdiener and Feagin 1988; Falk and Lyson 1988). Places with pro-business climates experience greater capital accumulation and economic growth, although this economic growth typically benefits the elite members that comprise the growth coalitions. Another assumption of the new urban/rural sociology is the state disparity hypothesis: regional differences in federal spending create regional differences in economic growth (Smith 1995; Mollenkopf 1983). A review of the new urban/rural sociology identifies at least three major ways in which federal spending can impact local economic growth: public investment spending; defense and defense contracts; federal employment.

Federal Public Investment Spending

According to O'Connor (1973), private capital accumulation and economic growth is dependent upon both physical and human capital (see also Castells 1988; Feagin 1988; 1984; Jaffee 1990; Block 1995). The accumulation of private capital requires public investments in physical infrastructure—including roads, railways, ports, bridges, water/sewer systems, hospitals, etc. A well maintained highway system reduces transportation costs, which allows companies to produce goods at lower costs, increase

profits, expand business, hire more workers and generate more income/employment growth in the local economy (Rephann and Isserman 1995). Munnell (1990; 1992) argues that a 1% increase in public spending on infrastructure increases the output of the national economy by 0.34%. Moreover, Aschauer (1989a; 1989b) shows that public sector spending increases GNP 2 to 5 times more than private sector spending. At the local level, public sector infrastructure spending can improve the business climate of places—attracting jobs and in-migrants—which occupy about half of all new jobs (Munnell 1992; Walzer and Deller 1993; Mehay and Solnick 1990). Mehay and Solnick (1990: 479) argue that each new in-migrant, in turn, generates 1.259 new jobs through multiplier effects.

In addition, O'Connor (1973) argues that private capital accumulation depends upon mastery of new production processes, educated/skilled workers, cutting edge materials/products, and advanced technologies. State investment in physical and human capital is necessary because the costs of both are too high for private capital to meet adequately the physical and human capital needs of capital accumulation. Entrepreneurs will not risk capital to invest in repairing or building roads, highways and bridges. Private corporations cannot assume all of the costs of educating workers and the financial risks of developing new technologies (Feagin 1984; O'Connor 1973; Hoenack 1993; Jaffee 1990). Therefore, the state (particularly the federal government) makes these investments and subsidizes the accumulation of private capital (Feagin 1988; 1984; see also Block 1995 for review).

This approach to regional growth and development is part of the public goods perspective in economics and has its foundations in Adam Smith's *Wealth of Nations*. This model, however, has been applied primarily to national economies with a focus on the impact of public investment on GNP (Kim 1998; Munnell 1992; Aschauer 1989a). New urban/rural sociology research suggests that these investments are not distributed equally among places in the U.S. economy, and that places which receive more federal public investment spending also experience greater economic growth. Disparities in federal spending are often cited as reasons why nonmetropolitan counties lag behind metropolitan counties (Feagin 1988; Lyson 1989; Falk and Lyson 1993; Mencken and Singelmann 1998). This type of spending is important for rural economies because it is necessary to create the built environment and to develop technologies and enhance skills necessary for

economic growth. It is the assumption upon which federal investment programs, such as the Appalachian Regional Commission and the Tennessee Valley Authority are predicated. Elsewhere, I show that public investment spending was important for income and employment growth in Appalachian counties during the 1980s and early 1990s (Mencken, forthcoming).

Federal Defense and Procurement Spending

Across disciplines much attention has been given to the impact of defense spending and the socioeconomic impact of the emergence of the 20th century military-industrial complex (Gottdiener 1994; Markusen 1987; Markusen *et al*. 1991; Glickman and Glasmeier 1989). Many studies contend that a shift in federal funds to defense spending created regional variation in economic well-being (Markusen *et al*. 1991; Falk and Lyson 1993; Johnson *et al*. 1995). There is a volume of research which shows that military planning and spending has had an important impact on regional and local economic growth during and since World War II, particularly for the emergence of high tech engineering and science based industries in high tech corridors such as Route 128 in Massachusetts, Silicon Valley and Orange County, CA (Hooks 1994; Hooks and Bloomquist 1992; Markusen *et al*. 1991; Nash 1985). Moreover, Crump (1993; see also Crump and Archer 1993) shows that Department of Defense R&D spending was a catalyst for the emergence of professional/ producer services which may serve as contractors or provide support services and expertise to defense contractors. This is an important link, given the key role that professional/producer services play in generating economic growth in a post-industrial economy (Sassen 1991; Goe 1994).

The effects of defense spending in southeastern rural economies raise an interesting question. Florida and Alabama are 'gunbelt' states, according to Markusen *et al*. (1991). In addition, there is a substantial military presence in North Carolina, South Carolina and Georgia (Crump and Archer 1993). Places in South Carolina and Tennessee have played an important role in the nuclear weapons program via the manufacture and procurement of nuclear materials through Department of Energy contracts. While Greenberg *et al*. (1998) suggest a net positive economic impact of these plants, Hooks and Getz (1998) suggest that these places do not generate employment growth. While according to Markusen *et al*. (1991) this region of the country is relatively defense-intensive, the impacts of this type of federal spending on nonmetropolitan economies in the region are relatively unknown. Hooks and Getz (1998) suggest that defense related federal spending impacts manufacturing employment growth in metropolitan areas. In this project, I explore the impact of defense-related employment and procurement spending in the region, with particular focus on the relative impact in southeastern nonmetropolitan counties.

Federal Employment

Isserman (1994) argues that federal facilities have become a cherished prize in the post-industrial economic development contest. Federal employment can give communities in certain regions a relative competitive advantage during national business cycles through higher wage jobs and greater employment stability. Mollenkopf (1983) argues that federal employment is important for two reasons. First, federal civilian layoffs are not as prominent during business cycle downturns as are private sector layoffs. Therefore, places with a greater proportion of federal employment may perform better than other places during downturns in the economy. Second, places with a significant federal employment presence have more stable employment bases. Singelmann *et al*. (1993) argue that this translates into consistent local consumption of local goods and services, employment multipliers, and a stable tax base. Local stability, bolstered by federal employment, creates a situation where long term local investment in place-competitive factors (infrastructure, schools) is more feasible, and this may give certain areas a competitive advantage in attracting new employment (Hoenack 1993). While Kasarda and Irwin (1991) found no support for this argument in a national study, Singelmann *et al*. (1993) found some support for this hypothesis for rural economies during the 1980-82 recession. Hooks and Getz (1998) show that MSAs that have a defense related R&D facility are more likely to experience manufacturing employment growth. The question of how such spending impacts nonmetropolitan counties, especially those economically disconnected from metropolitan areas, is left unexplored.

The review of literature shows three important ways in which federal spending can impact economic

growth in local economies: public investment spending, employment, and defense/ procurement spending. The literature also informs a general hypothesis that counties which receive greater volumes of these types of federal spending (public investment, defense/procurement, federal salaries/wages) should experience greater economic growth.

Hypothesis 1. Counties which receive greater levels of federal spending experience greater economic growth during the business cycles of the 1980s and early 1990s.

New Federalism and the 1980s

During the 1980s, there was a fundamental shift in ideas concerning the role and function of government. Under the New Federalism, the federal government's role shifted from a pro-active partner in economic development to a *laissez-faire* approach (Falk and Lyson 1993). Moreover, Falk and Lyson (1993) contend that the socioeconomic spatial disparities in the 1980s were created partly by the transfer of dollars from successful nonmetropolitan development programs to defense contracts (see also Castells 1988; Singelmann *et al.* 1993; Mencken and Singelmann 1998). During the 1980s, over $8 billion were cut from nonmetropolitan development programs, such as FMHA business loans, Economic Development Administration, Community Development block grants. These were federal public investment programs that aided local communities, particularly nonmetropolitan communities and local governments. In addition, other federal development programs were routinely the target of elimination, in particular the federal Appalachian Regional Commission, which was targeted for elimination in each of the federal budgets presented by the Reagan Administrations (see Isserman and Rephann 1995 for discussion). Lyson (1989) argues that these funding cuts also removed valuable federal leadership from these development programs.

Perhaps the most visible change in federal participation during the 1980s was the elimination of the General Revenue Sharing Program, and subsequently over $6 billion in federal funding (Falk and Lyson 1993, p. 268). This elimination is considered detrimental to rural communities and local governments in

nonmetropolitan counties that often utilized these dollars as required matching funds for federal infrastructure projects (Waller and Delzer 1993; Johnson *et al.* 1995). According to Falk and Lyson (1993; 1988), the funding cuts to these programs and the reallocation of these dollars to defense contractors negatively impacted nonmetropolitan economies while creating job growth in the suburbs of large cities (see also Lyson 1989; Singemann *et al.* 1993; Crump and Archer 1993). In nonmetropolitan economies, arguments from proponents of a New Federalism suggest that the net changes in federal funding are more important determinants of economic growth than are the relative levels of federal spending. This leads to a second hypothesis based on changes in federal spending.

Hypothesis 2. Counties with positive net changes in federal spending had higher economic growth rates during business cycles of the 1980s and early 1990s.

The hypothesis also implies that counties that experienced net negative changes in these programs during this period experienced lower levels of economic growth.

Data and Analysis

The analysis combines descriptive and multivariate regression analysis to test the two hypotheses, and to examine the trends and economic impacts of federal spending in nonmetropolitan Southeast counties. The analysis focuses on the trends and impacts of federal spending on local economic growth during the 1983-88 recovery and 1989-92 recession. This time period is chosen for both empirical and conceptual reasons. Empirically, the detailed spending data on federal spending are provided by the Department of Commerce beginning in 1983, making an analysis of years prior to this date not practical. Conceptually, the 1980s represent a period of decline for many nonmetropolitan economies, although there is some evidence to suggest that this effect was less severe in the South (Mencken and Singelmann 1998; Falk and Lyson 1993). In addition, proponents of the New Federalism maintain that there was a shift in federal spending priorities during this period (Falk and Lyson 1993; Mencken and Singelmann 1998). Therefore, the 1980s and early 1990s are interesting periods to examine the effects of federal spending in nonmetropolitan counties. The analysis is differentiated by the 1983-88 and 1989-92 business cycles because local economies respond differently

during national cycles of expansion and contraction (Kasarda and Irwin 1991; Singelmann *et al*. 1993).[i]

The analysis employs three **per capita** measures of federal spending (in different forms): procurement/defense (all federal procurement contracts, including defense; defense military installation spending, defense civilian salary spending); non-defense federal salaries/wages and public investment spending. This last category of spending includes: research (basic science/engineering, agricultural, forestry, economic/social science, environmental, policy, energy and university research), infrastructure investment (development grants, airport aid, roads, water systems, loans for infrastructure, rural communication systems, electrification, transportation and planning grants), and related public goods investments, such as school funds, vocational education support, community development block grants, job training grants, trade promotion grants, business assistance/small business loans, Tennessee Valley Authority payments, and Appalachian Regional Commission funding.[ii] Since the theoretical argument is that public investment spending is necessary for private capital accumulation, I do not include public assistance variables such as AFDC, SSI payments, black lung, and childhood immunization. However, I did include several agricultural related spending programs that could be considered assistance rather than investment (rural clean water, forestry research and assistance, farm operating loans). Data are from the Consolidated Federal Funds Report, United States Department of Commerce.

There are two hypotheses, each with different expectations for the impact of federal spending. To test these hypotheses, I employ two separate regression analyses. Each analysis requires unique measures of federal spending. Hypotheses 1 predicts that relative levels of federal spending will affect relative economic growth in nonmetropolitan counties. To test this hypothesis, I utilize the three per capita measures federal spending at the beginning of each business cycle (natural log transformations) in order to predict how different levels of federal funding at the beginning of the cycle affected differences in economic growth across the cycle. For example, public investment spending is measured in 1983 and used to predict economic growth rates between 1983 and 1988. This follows an analytic approach that I and others have used (Mencken, forthcoming; Kasarda and Irwin 1991).

Hypothesis 2 predicts that changes in federal spending affect local economic growth. To test this hypothesis, I utilize first difference growth rates of the three federal spending measures constructed as the logarithmic first difference growth rates for the 1983-1988 and 1989-1992 cycles (see Jackman 1980): $\ln(T_2) - \ln(T_1)$. These measures are used to assess how changes in federal spending affected changes in the dependent variables during each cycle.

Control Variables

I frame the analysis to focus on the economic impact of federal spending while controlling for other key determinants of regional processes from sociological theory. From the human ecology, I include logarithmic first difference growth rate measures of population change between 1970-80 and 1980-90. Previous models (Frisbie and Poston 1976; 1978; Murdock *et al*. 1993; Poston 1984) show that population change is a function of ecological structure and sustenance organization. I use population change as a proxy measure for the built environment. Ecological theory predicts (and research supports) that places with a built environment conducive to growth will experience population increases. The analysis controls for spatial effects (see below) which often indicate spatial diffusion (and economic integration) of economic processes across geographical units of analysis, an important construct in human ecology (Kasarda and Irwin 1991). I also control for population density (population per square mile) and for percent of total earnings in mining. Mining is a measure of sustenance organization. There is coal and other forms of mining in this region, and many mining counties did significantly worse during the 1980s (Maggard 1994; Nord and Luloff 1993).

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[i] Analyses of the post-1992 period are warranted, but not provided. One reason is that the nation is still in a growth cycle which began in 1993. Second, some key growth measures are not available for this time period.

[ii] The Consolidated Federal Funds Report provides data on both federal spending in a given year and on federal grant awards in a given year (although the money may be spent in different years). I also used average spending amounts per capita for each year and each category of federal spending. The results were similar.

From the new urban/rural sociology, I include percentage of adult population 25 years or older with some education beyond high school (natural log) as a proxy measure of labor force quality. Percent of county population black (natural log) is used as a measure of a politically disenfranchised population (Talley and Cotton 1993; Tomaskovic-Devey and Roscigno 1996). I also control for the proportion of the county population that is classified as farm population. Agriculture fell on hard times in the 1980s. While midwestern farmers absorbed the brunt of agricultural change, farm families in general had adjustments to make (Lobao and Meyer 1995). Demographically, I also control for the proportion of the population 65 and older (natural log measure). Glasgow (1995) shows that nonmetropolitan areas experienced significant in-migration of retired persons during the 1980s. The geographical distribution of retirement age persons needs to be controlled in this analysis.

Manufacturing Growth and Potential Interactions

Traditionally, nonmetropolitan economies have competed with urban economies on the basis of low cost labor (Mencken and Singelmann 1998; Glasmeier and Howland 1995; Summers 1982). The nonmetropolitan South experienced significant economic growth related to the rustbelt-to-sunbelt industrial transformation (Wheat 1986). During the late 1980s and early 1990s, however, some nonmetropolitan communities in the South and elsewhere began to lose these manufacturing jobs to overseas labor markets (Lichter and McLaughlin 1995; Gaventa *et al.* 1990). Given the impact of manufacturing in this region, it is important to incorporate manufacturing's presence into models of local economic growth. What complicates the role of manufacturing in the South is the impact of defense and defense procurement spending. Hooks and Getz (1998) show that manufacturing employment growth (and subsequent multipliers) is significantly tied to defense and other procurement contracts. Non-defense manufacturing in nonmetropolitan counties is more apt to be labor intensive and therefore more vulnerable to cheaper labor costs in foreign labor markets (see Gaventa *et al.* 1990; Mencken and

Singelmann 1998; Lichter and McLaughlin 1995). Therefore, defense/procurement related manufacturing should have economic impacts significantly different from manufacturing enterprises disconnected from the defense industry. This hypothesis implies an interaction effect between the effects of manufacturing and defense/procurement spending.

I include two measures of manufacturing and procurement/defense spending interactions in the analysis. For the regression models that test Hypothesis 1, I construct a measure which is the natural log transformation of the proportion of the labor force employed in private manufacturing in 1983 (for the 1983-88 model) and 1989 (for the 1989-92 model). I also create interaction terms with these manufacturing growth measures by the level of per capita procurement/defense spending for 1983 and 1989.

For the analysis that tests Hypothesis 2, I construct a logarithmic first difference change measure for employment in private manufacturing for the beginning and end points of the 1983-88 and 1989-92 business cycles. Second, I include an interaction term between defense/procurement change (1983-88; 1989-92) and the manufacturing change (1983-88 and 1989-92). The analysis assumes that these two interaction variables will measure manufacturing concentration and growth related to defense and procurement spending in a given county. Previous research implies that defense and procurement spending are strongly linked to manufacturing employment in a county (Hooks and Getz 1998; Hooks and Bloomquist 1992). However, without more detailed data on the types of manufacturing employment in each county there is no way to guarantee that the interaction variables measure the inter-dependency of defense and procurement spending and manufacturing in the Southeast.

Dependent Variables

Conceptually, the two hypotheses tested in this analysis predict that federal spending will have a net impact on economic growth in nonmetropolitan counties. I utilize four measures of economic growth as dependent variables in this analysis: per capita income growth, nonfarm earnings growth rates, private nonfarm employment growth, civilian employment growth (unemployed but looking for work adjusted out). First difference growth rate models require that the natural log of the measure at the beginning of the cycle (1983, 1989) be included as predictor variables to adjust the analysis for

regression toward the mean (Jackman 1980). These four measures are grounded conceptually in sociological theories of growth. Employment growth is a standard measure used in much regional science research. Theoretically, from the human ecology, employment growth is a good indicator of system change because places that experience social system expansion typically experience net employment growth (among other things). While human ecology focuses on net growth, other sociological perspectives focus on quality of growth or development (Lyson *et al* 1993; Tolbert *et al*. 1998; Fuller 1970—see also Rich 1994). Earnings and per capita income growth are good measures of quality growth. Both imply that the purchasing power of local citizens is increasing, and that overall quality of life is improving. Regional scientists have shown that nonmetropolitan places can experience employment growth, but limited income and earnings growth if the employment growth is in low-quality jobs (Glasmeier and Howland 1995; Bloomquist *et al*. 1993; Maggard 1994). Therefore it is important, theoretically, to assess the impact of federal spending on both income and employment growth during recent business cycles. Data for non-federal spending measures are from the 1996 USA Counties file.

When politically constructed units of analysis, such as counties, are used in research of economic and social processes there is potential for spatial autocorrelation among observations. There are a number of options available to correct for spatial autocorrelation (Land and Deane 1992), but many of these procedures introduce other statistical problems into the analysis (Anselin and Kelejian 1997). I use an MLE spatial lag regression model of the form:

$$y = a + \rho Wy + \beta X + \varepsilon$$

where ρWy is a spatially lagged dependent variable constructed from: $\Sigma_j w_{ij} x_j$. Anselin (1996) shows that this formula creates a spatial lag for variable x at location x_i, which is the sum of the product of each county with its corresponding weight from the **ith** row of the spatial weights matrix (w_{ij}). It is the weighted average of values for all locations. It allows the dependent variable value in county x to take into consideration the influence of nearby counties. The spatial weights matrix is a distance measure between each county in the analysis. I use a squared inverse distance matrix based on a gravity model. Each county's longitude and latitude coordinates are used as the distance point reference in the analysis; however, the gravity model puts greater emphasis on the values of locations nearby. While only nonmetropolitan counties are used in the analysis, the spatial lag variables are constructed for all metropolitan and nonmetropolitan counties in this six state region. Therefore, the spatial effects variable in the analysis takes into consideration the influence of metropolitan counties not included in the analysis. The analysis is performed using SpaceStat, a software package created by Luc Anselin (1995).

Descriptive Results

Table 1 presents the descriptive analysis of the federal spending and dependent variables. For comparative purposes, data are presented for nonmetropolitan Southeast counties, metropolitan Southeast counties, and totals for the United States. Table 1 also presents descriptive statistics for the income, earnings and employment growth rates used as dependent variables in the analysis.

Employment Growth

The statistics for the 1983-88 recovery show that nonmetropolitan Southeastern counties experienced significant nonfarm and civilian employment growth, and growth rates on par with the national nonfarm and civilian growth rates for that period. However, the nonmetropolitan growth rates were significantly lower than those for metropolitan Southeastern counties. During the 1989-92 recession, all employment growth rates are significantly less than in the 1983-88 recovery. However, nonfarm and civilian employment grew in Southeastern nonmetropolitan counties at the same rate as the national growth rate. Metropolitan counties in the Southeast experienced slightly higher rates.

Table 1. First Difference Growth Rates for Selected Variables, 1983-88 and 1989-92

	Mean Growth Rate Metro South	Mean Growth Rate Nonmetro. South	Mean Growth Rate United States
Private Nonfarm Employment 1983-88	0.305	0.21	0.19
Civilian Employment 1983-88*	0.199	0.09	0.08
Per Capita Income 1983-88	0.33	0.34	0.34
Nonfarm Earnings 1983-88	0.365	0.38	0.37
Private Nonfarm Employment 1989-92	0.052	0.02	0.02
Civilian Employment 1989-92*	0.057	0.01	0.01
Per Capita Income 1989-92	0.135	0.16	0.16
Nonfarm Earnings 1989-92	0.12	0.13	0.12
Salaries/Wages 1983-88	0.703	0.71	0.04
Defense/Procurement 1983-88	**-0.263**	0.53	**-0.15**
Public Investment 1983-88	**-0.146**	**-0.50**	-0.42
Salaries/Wages 1989-92	0.205	0.20	0.14
Defense/Procurement 1989-92	0.165	0.26	**-0.07**
Public Investment 1989-92	0.358	0.20	0.01

*Unemployed but looking for work adjusted

Income and Employment Growth

In addition, per capita income and nonfarm earnings grew at rates significantly higher than the rate of inflation for this period (which was approximately 18%) for Southeast metropolitan counties, Southeast nonmetropolitan counties, and the national growth rate. Moreover, while employment grew at a faster rate in the metropolitan Southeast, income and earnings grew at the same rates for Southeast metropolitan, Southeast nonmetropolitan counties and the national growth rates. During the 1989-92 recession, in nonmetropolitan Southeast counties per capita earnings grew slightly greater than inflation (16% vs 13%), while nonfarm earnings kept pace with inflation (13%).[iii] Per capita income growth was slightly lower for metropolitan Southeast counties during this period. Tables 2 and 3 present the top performing nonmetropolitan Southeast counties for each measure of economic growth.

[iii] Inflation rates based on the Consumer Price Index.

Table 2. Top Performing Nonmetropolitan Southeast Counties Economic Growth 1983-88

Nonfarm Empl. Growth		Civilian Emply. Growth		Per Capita Inc Growth		Nonfarm Earnings Growth	
County	**% Chg**	**County**	**% Chg**	**County**	**% Chg**	**County**	**% Chg**
Echols GA	126	Lafayette FL	94	Tyrrell NC	74	Tyrrell NC	100
Moore TN	112	Franklin FL	92	Hyde NC	65	Hyde NC	93
Washington NC	108	Stewart TN	89	Calhoun GA	58	Calhoun GA	86
Lafayette FL	100	Van Buren TN	79	Duplin NC	58	Haywood TN	75
Stewart TN	97	Yancey NC	77	Baker GA	55	Duplin NC	71
Hancock TN	80	Hancock TN	70	Dooly GA	54	Macon GA	70
Irwin GA	78	Glades FL	64	Haywood TN	53	Dooly GA	70
Dare NC	72	Dare NC	63	Clay GA	51	DeKalb TN	64
Yancey NC	70	Crawford GA	63	Miller GA	51	Miller GA	64
McIntosh GA	66	Monroe FL	61	White GA	51	Dare NC	62
Gordon GA	61	Wakulla FL	56	DeKalb TN	51	Crockett TN	62
Clay TN	59	Trousdale TN	53	Yancey NC	51	Yancey NC	61
Saluda SC	58	Pender NC	51	Washington NC	51	De Soto FL	61
Marion GA	57	Baker FL	50	Greene NC	50	Lake TN	59
White GA	56	Camden GA	49	Candler GA	50	Clay GA	59
Lanier GA	56	Union GA	46	Brooks GA	49	Greene NC	59
Gilchrist FL	56	Wayne TN	46	Webster GA	49	Hale AL	59
Swain NC	56	Jackson TN	45	Quitman GA	49	White GA	59
Citrus FL	56	Atkinson GA	44	Union GA	49	Randolph GA	58
Haralson GA	54	Monroe TN	44	Crockett TN	48	Pickett TN	57

Federal Spending Growth

The data for federal spending change for southeast nonmetropolitan counties show that salaries and defense/procurement spending grew, on average, between 1983 and 1988, while public investment spending had an average decrease in per capita spending of 50%. Falk and Lyson (1993) argue that the 1980s were a period in which these funds were cut, and these data show that there was a decrease in this type of spending for this period. However, during the same period the median public investment spending rate was 17%, suggesting that the negative mean value is created by negative outliers. Moreover, the analysis shows that per capita public investment spending growth rates were negative for metropolitan counties, nonmetropolitan counties, and the national rate of growth. Nonmetropolitan Southeast counties experienced an average increase in defense spending, while metropolitan Southeast counties experienced a reduction in defense spending.

During the 1989-92 period, nonmetropolitan Southeast counties, on average, experienced growth for all three measures of federal spending. For both salaries/wages and defense/procurement, these growth rates were substantially less than in the previous period, however. Metropolitan Southeast

counties also experienced increases in all three measures of federal spending. The data also show that the Southeast region experienced greater public investment spending growth than did the nation as a whole. In addition, between 1989-92, the national growth rate for defense/procurement spending was negative. Tables 2 and 3 show the top Southeast nonmetropolitan counties for the federal spending growth rates for these time periods. Tables 4 and 5 present the top performing Southeast nonmetropolitan counties for levels of federal funding. Maps of these trends show that levels and changes in federal spending were relatively uniform throughout the Southeast nonmetropolitan counties.

Table 3. Top Performing Nonmetropolitan Southeast Counties Economic Growth 1989-92

Nonfarm Empl. Growth		Civilian Emply. Growth		Per Capita Inc Growth		Nonfarm Earnings Growth	
County	% Chg	**County**	% Chg	**County**	% Chg	**County**	% Chg
Hamilton FL	98	Dawson GA	69	Haywood TN	28	Clinch GA	31
Lincoln GA	84	Graham NC	58	Turber GA	28	Lawrence TN	27
Baker FL	50	Polk TN	46	Duplin NC	27	Calhoun GA	26
Clay GA	50	Long GA	42	Sampson NC	26	Crockett TN	26
Meigs TN	49	Moore TN	40	Clinch GA	26	Lewis TN	26
Dawson TN	49	Echols GA	35	Crockett TN	26	Duplin NC	25
Wilcox AL	47	Camden GA	33	Terrell GA	26	Cocke TN	24
Murray GA	47	Johnson TN	33	Williamsburg SC	25	Dooly GA	24
Pender NC	45	Clay GA	33	Hancock TN	25	Fentress TN	24
Long GA	32	Putnam GA	32	Cocke TN	24	Bullock AL	23
Pulaski GA	31	Charlton GA	31	Lake TN	24	Lake TN	22
Conecuh AL	31	Lawrence TN	31	Jones NC	24	Haywood TN	22
Walton FL	29	Clinch GA	30	Calhoun GA	23	Carroll TN	22
Echols GA	28	Jasper GA	29	Georgetown SC	23	Macon TN	22
Liberty GA	27	Hendry FL	29	Pulaski GA	23	Turner GA	22
Wayne TN	26	Quitman GA	29	Tyrrell NC	23	Pulaski GA	22
Lawrence TN	25	Worth GA	29	Avery NC	23	Clay TN	22
Grainger TN	24	Cannon TN	27	Glades FL	23	Brooks GA	21
Polk NC	24	Wakulla FL	27	Pickett TN	23	Terrell GA	21
Lake TN	23	Tyrrell NC	25	Monroe AL	23	Treutlen GA	21

Federal Spending Levels

Charts 1-4 show the trends in levels of federal spending between 1983-92. These charts also compare the U.S. per capita rate, Southeast metropolitan per capita rate, and Southeast nonmetropolitan per capita rate. The most obvious trend in this analysis is that Southeast

nonmetropolitan counties received significantly less per capita federal spending than Southeast metropolitan counties, and significantly less than the national per capita spending rate. The data also show that for all units of geography (U.S., Southeast metropolitan, Southeast

Chart 1. Federal Public Investment Spending
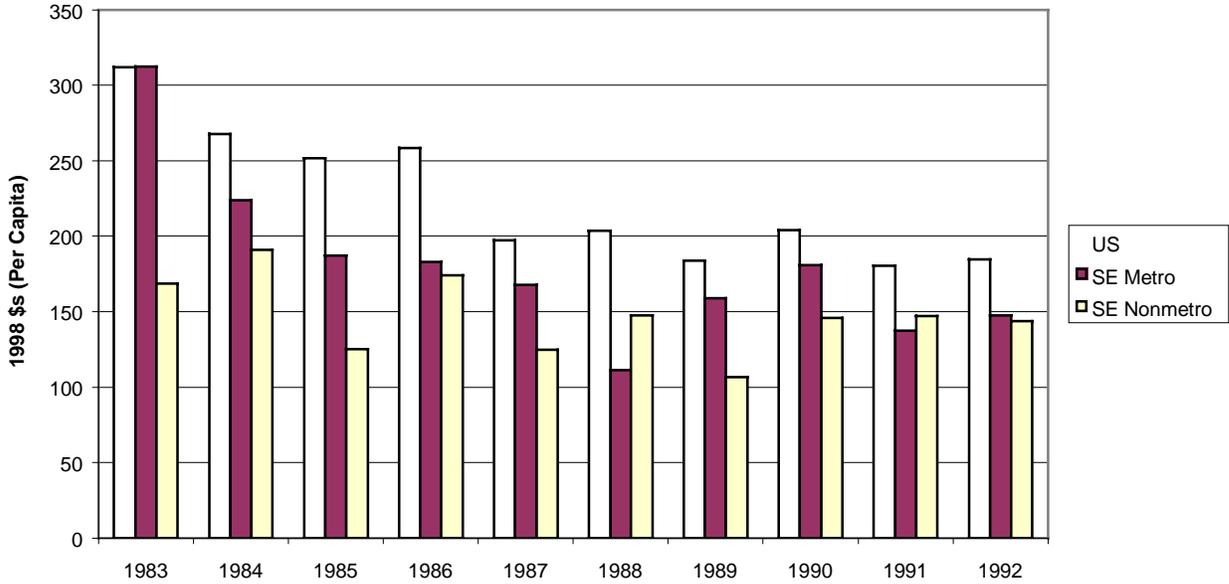
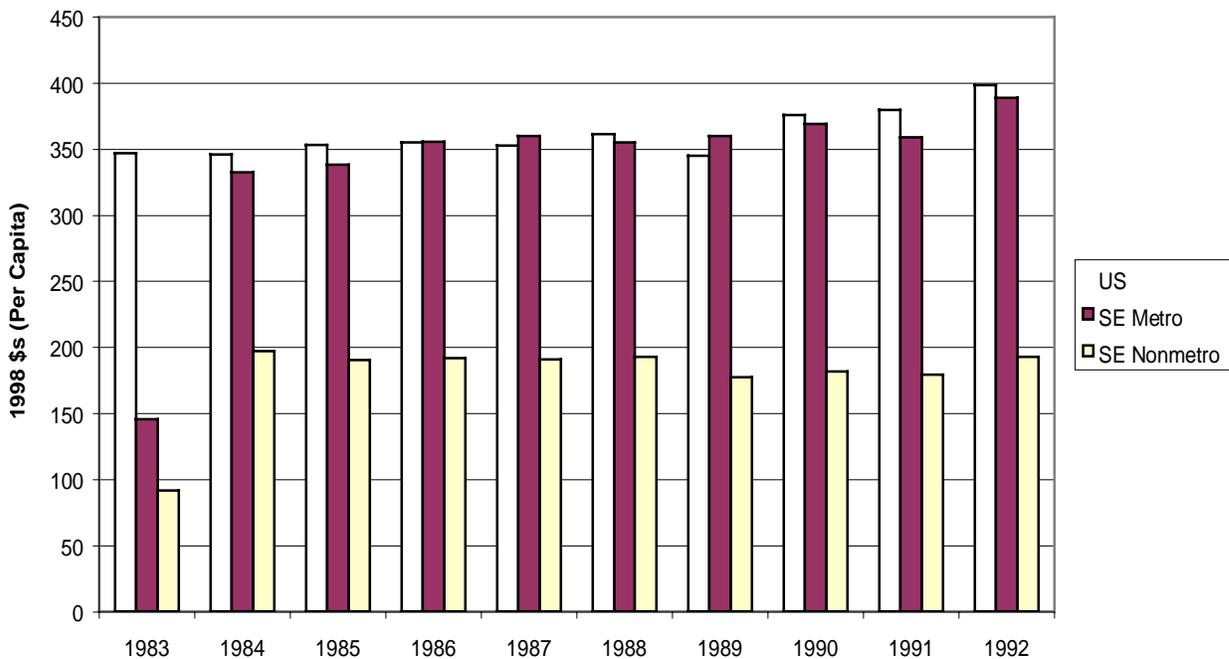**Chart 2. Non Defense Federal Salaries/Wages**

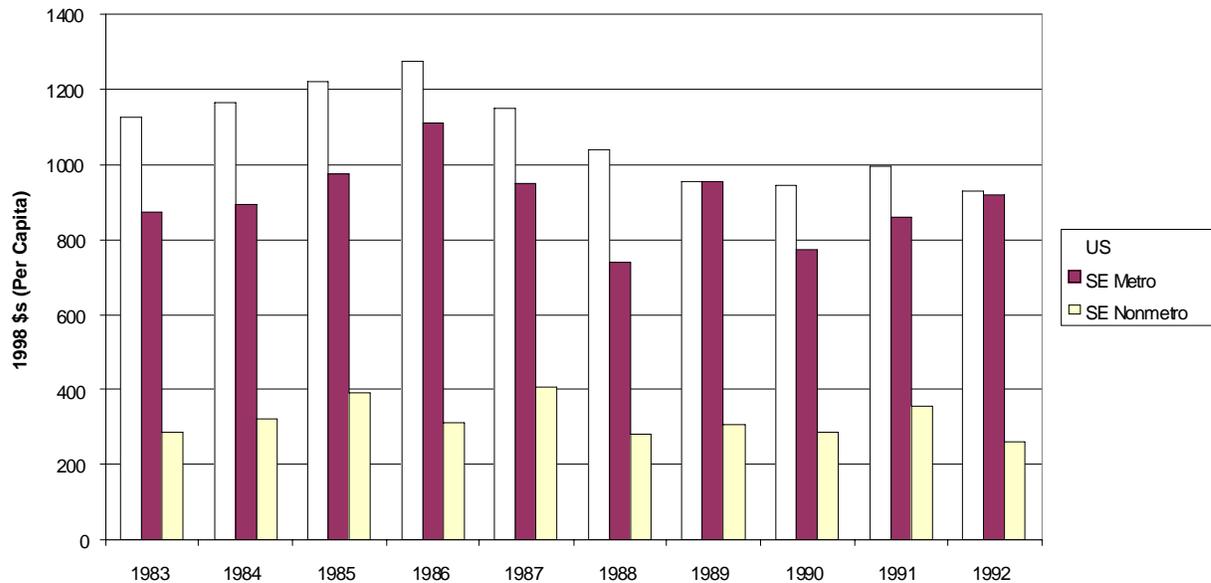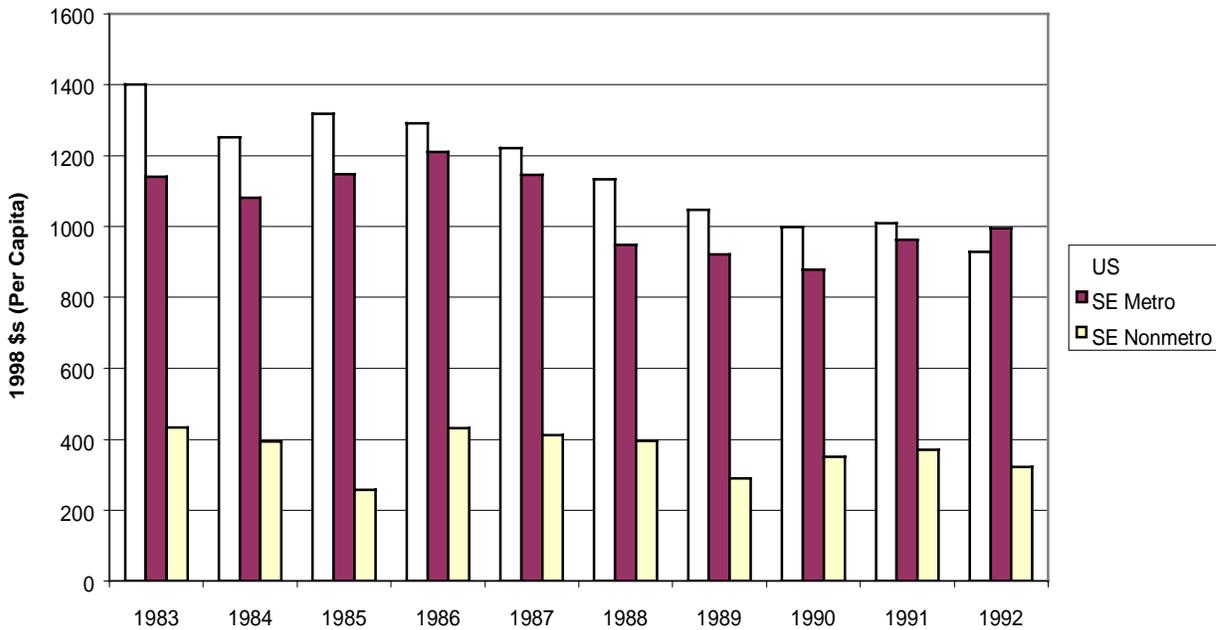**Chart 3. Per Capita Procurement Spending**

Chart 4. Per Capita Defense Spending

nonmetropolitan), the levels of per capita spending decreased for defense, procurement and public investment spending between 1983 and 1992 (in constant dollars). Only non-defense federal salary/wage spending increased

during this period. Tables 4-7 show top performing nonmetropolitan Southeast counties on levels and change in federal spending programs.

Table 4. Top Performing Nonmetropolitan Counties Federal Spending Levels 1983
Per Capita 1983 Dollars

Non Defense Salary		Public Investment		Procurement/Defense	
County	**Per Capita**	**County**	**Per Capita**	**County**	**Per Capita**
Candler GA	71.79	Candler GA	903.07	Lanier GA	10721.4
Decatur SC	69.29	Liberty FL	156.93	Coffee TN	9471.1
Conecuh AL	60.21	Towns GA	155.14	Coffee AL	8664.59
Taliaferro GA	48.25	Lowndes AL	118.16	Scott TN	4759.99
Gulf FL	47.57	Hampton SC	111.17	Elbert GA	4568.77
Grady GA	47.35	Alleghany NC	99.06	Gibson TN	3759.34
Macon GA	46.27	Sumter FL	72.50	Beaufort SC	3673.87
Lowndes AL	45.33	Decatur TN	55.52	Clinch GA	3344.26
Bacon GA	43.98	Calhoun SC	51.87	Craven NC	3324.25
Dare NC	43.51	Irwin GA	50.54	Polk GA	3226.01
Sumter FL	41.80	Lanier GA	49.99	Wakulla FL	3203.5
Alleghany NC	41.21	Smith TN	44.81	Clay GA	2443.04
Towns GA	41.00	Chattooga GA	29.73	Glynn GA	2347.25
Lanier GA	35.77	Grady GA	24.23	Columbia FL	1990.22
Smith TN	35.03	Conecuh AL	20.05	Camden GA	1889.37
Calhoun SC	33.53	Taliaferro GA	20.00	Sumter FL	1797.23
Swain NC	33.35	Dare NC	16.99	Fayette AL	1546.89
Hampton SC	31.79	Swain NC	15.54	Cherokee AL	1504.18
Liberty FL	28.19	Macon GA	12.49	Dallas AL	1310.29
Irwin GA	23.93	Gulf FL	11.70	Taylor FL	1029.68

Table 5 Top Performing Nonmetropolitan Counties Federal Spending Levels 1989

Per Capita 1989 Dollars

Non Defense Salary		Public Investment		Procurement/Defense	
County	**Per Capita**	**County**	**Per Capita**	**County**	**Per Capita**
Gulf FL	142.07	Swain NC	863.51	Coffee TN	11487.33
Macon GA	135.12	Gulf FL	862.81	Camden GA	6118.058
Alleghany NC	125.15	Taliaferro FL	700.64	Craven NC	5704.439
Decatur TN	117.27	Macon GA	659.18	Calhoun SC	4577.92
Towns GA	110.95	Sumter FL	618.32	Coffee AL	4158.875
Grady GA	106.27	Calhoun FL	584.64	Sequatchie TN	3944.194
Candler GA	104.10	Smith TN	554.46	Beaufort SC	3418.647
Swain NC	100.92	Towns GA	548.95	Decatur GA	3022.985
Irwin GA	93.22	Chattooga GA	466.85	McIntosh GA	2924.854
Dare NC	92.37	Lowndes AL	454.86	Jefferson GA	2487.417
Smith TN	90.31	Alleghany NC	397.82	Marion SC	2071.441
Calhoun SC	88.53	Conecuh AL	352.83	Terrell GA	1883.713
Sumter FL	86.15	Lanier GA	348.97	Taylor FL	1851.96
Lowndes AL	83.35	Hampton SC	346.54	Swain NC	1621.327
Hampton SC	82.40	Grady GA	336.64	Hardeman TN	1608.408
Taliaferro GA	82.40	Liberty FL	321.82	Lowndes GA	1565.562
Conecuh AL	76.33	Candler GA	314.19	Monroe FL	1483.263
Chattooga GA	70.16	Irwin GA	313.12	Montgomery NC	1391.309
Liberty FL	67.77	Decatur TN	303.90	Cocke TN	1371.966
Lanier GA	56.15	Dare NC	287.52	Taylor FL	1351.54

Table 6 Top Performing Nonmetropolitan Counties Federal Spending Growth Rates 1983-88

Non Defense Salary		Public Investment		Procurement/Defense	
County	**% Change**	**County**	**% Change**	**County**	**% Change**
Jackson FL	175	Bradley TN	1461	Colquitt GA	1158
Henderson NC	147	Anson NC	481	Webster GA	764
Pasquotank NC	144	Liberty FL	377	Sequatchie TN	741
Taliaferro GA	138	Moore NC	349	Dawson GA	721
Pamlico NC	137	Smith TN	347	Lafayette FL	616
Turner GA	134	Henderson TN	294	Echols GA	554
Quitman GA	133	Conecuh AL	286	Taliaferro GA	546
Monroe FL	131	Lanier GA	270	Glascock GA	534
Webster GA	117	Cannon TN	265	Marion GA	529
Calhoun GA	114	Alleghany NC	257	Jefferson GA	493
Levy FL	112	Habersham GA	252	Okeechobee FL	488
Allendale SC	111	Grady GA	250	Cocke TN	480
Atkinson GA	108	Union SC	245	Haralson GA	470
Carteret NC	108	Giles TN	234	Talbot GA	469
McCormick SC	106	Randolph AL	232	Washington NC	460
Montgomery GA	106	Vance NC	225	Jones NC	427
Glascock GA	105	Calhoun SC	221	Irwin GA	420
Telfair GA	103	Seminole GA	221	Hancock TN	402
Camden NC	102	Hertford NC	216	Alleghany NC	400
Crockett TN	102	Maury TN	216	Treutlen GA	398

Table 7. Top Performing Nonmetropolitan Counties Federal Spending Growth Rates 1989-92

Non Defense Salary		Public Investment		Procurement/Defense	
County	% Change	County	% Change	County	% Change
Greene NC	256	Atkinson GA	1360	Putnam TN	1083
Wayne GA	221	Gates NC	1169	Pamlico FL	443
Jackson FL	134	Taylor FL	1168	Wakulla FL	386
Moore TN	56	Graham NC	1164	Lincoln GA	383
Clay GA	48	Gilchrist FL	1143	Marion AL	371
Perry AL	47	Columbia FL	1138	Saluda SC	314
Granville NC	45	Baker GA	1130	Charlton GA	281
Washington NC	43	Oglethorpe GA	1101	Lee SC	278
Georgetown SC	41	Benton TN	1060	Pike AL	265
Meriwether GA	41	Lafayette FL	1057	Marlboro SC	264
Clinch GA	41	Suwannee FL	1029	Oglethorpe GA	262
Scott TN	39	Jeff Davis GA	1017	White TN	257
Talladega AL	38	Trousdale TN	997	Hyde NC	245
Hampton SC	38	Tyrrell NC	864	Camden NC	241
McIntosh GA	37	Randolph GA	697	Graham NC	239
Terrell GA	37	Wheeler GA	691	Wilkes GA	238
Lewis TN	36	Pike AL	622	Russell AL	230
Taylor FL	34	Allendale SC	576	Long GA	214
Cleburne AL	33	Abbeville SC	553	Atkinson GA	196
Bertie NC	33	Jefferson GA	519	Granklin FL	195

Hypothesis 1 Results

Tables 8 and 9 present the regression results that test Hypothesis 1 for Southeast nonmetropolitan counties for the 1983-88 period. In general, the results show limited support for Hypothesis 1. In the 1983-88 recovery, procurement/defense spending levels affect nonfarm employment growth. During the subsequent recession, public investment spending levels have positive effects on nonfarm and civilian employment, and procurement/defense spending levels have a positive effect on civilian employment growth. None of the federal spending level variables had an effect on earnings or income growth. Specifically, the analysis shows that per capita defense/procurement spending in 1983 had a lower-order positive effect on nonfarm employment growth between 1983 and 1988. In addition, there is an interesting interaction effect. The negative coefficient (b= -.019) for manufacturing employment in 1983 shows that in counties which did not receive defense/procurement spending, manufacturing employment has a negative effect on nonfarm employment growth (for each additional percent of employment in manufacturing the nonfarm growth rate was 1.9% lower, on average). However, for each additional percent of defense/procurement spending in the county, this negative effect of manufacturing was alleviated by .5%. This suggests that manufacturing related to

defense and procurement spending was more beneficial to nonfarm employment growth than manufacturing unrelated to defense/procurement spending. Federal spending had no significant effect on any of the other dependent variables. [iv]

The analysis for the 1989-92 period shows no net effect of federal spending on income or earnings growth. Defense/procurement spending had a positive effect on civilian employment growth, but no interaction effect with manufacturing. For each additional percent in level of defense/procurement spending, civilian employment grew by 1.8% on average. Public investment spending has a positive net effect on nonfarm and civilian employment growth. For each additional percent in the level of public investment spending, both grew by 1%, on average. However, the model for nonfarm employment does not fit well (only about 8% of the variance is explained) causing some concern that the effects of public investment spending may disappear as more relevant variables are identified and included. The analysis shows, at best, limited support for Hypothesis 1. The levels of federal spending had some positive impact only on employment growth in nonmetropolitan counties.[v]

[iv] Correlations among independent variables in all models were examined for potential multicollinearity. None of the correlations suggested serious problems.
[v] I also estimated models that examined the relative effects of the three federal spending measures that were constructed as per capita averages for each year in the business cycle. These results show similar results and are available upon request.

Table 8. Federal Spending Levels and Economic Growth in Nonmetropolitan Southeastern Counties 1983-88 (N=360) (Test of Hypothesis 1)

	Nonfarm Earnings	Per Capita Income	Nonfarm Employment	Civilian Employment
VARIABLE	*Coeff*	*Coeff*	*Coeff*	*Coeff*
Per Capita Pub. Inv. Spending '83 (ln)	-0.002	-0.001	0.009	0.007
Per Capita Non-Defense Sal. '83 (ln)	-0.003	-0.004	0.009	0.025
Per Capita Proc/Def Spending '83 (ln)	0.0002	0.0005	0.014 **	0.002
% in Manufacturing 1983 (ln)	-0.0001	0.0004	-0.019 ***	0.004
Proc/Def * Manuf. Emp.'83	0.0003	0.0002	0.005 ***	-0.0004
Population Density 1980	0.0005 **	0.0004	0.0007	0.001 *
Pct. Farm Families 1980	0.421 *	0.348 ***	0.591 *	0.189
Pct. Black (ln) 1980	0.003	-0.0004	-0.011	-0.012
Pct. 65 and older 1980	0.027	0.09 ***	-0.0006	-0.009
Pct GT High School Educ 1980	0.048 *	0.073 ***	0.137 **	0.037
Pop Change 1970-80	0.005	0.025	0.504 ***	0.464 ***
Mining Earnings 1983 (ln)	-0.002	-0.002	-0.006	0.003
Spatial Lag	0.418 ***	0.794 ***	-0.006	0.063
Time lag	-0.295 ***	-0.236 ***	-0.056 ***	-0.079 *
Constant	2.84 ***	2.47 ***	0.558 *	0.548 *
Pseudo R2	0.37	0.316	0.246	0.18

***p<.001; **p<.01; *p<.05

Table 9. Federal Spending Levels and Economic Growth in Nonmetropolitan Southeastern Counties 1989-92 (N=360) (Test of Hypothesis 1)

VARIABLE	Nonfarm Earnings *Coeff*	Per Capita Income *Coeff*	Nonfarm Employment *Coeff*	Civilian Employment *Coeff*
Per Capita Pub. Inv. Spending '89 (ln)	0.0003	0.0007	0.0100 *	0.0100 *
Per Capita Non-Defense Sal. '89 (ln)	0.0030	-0.0040	0.0170	-0.0070
Per Capita Proc/Def Spending '89 (ln)	0.0010	0.0010	0.0010	0.0180 *
% in Manufacturing 1989 (ln)	0.0010	-0.0001	-0.0180	-0.0310
Proc/Def * Manuf. Emp.'89	-0.0002	-0.0010	-0.0010	0.0080
Population Density 1990	0.0001	0.0006	0.0002	0.0002
Pct. Farm Families 1990	0.1310	0.1230	-0.1590	-0.3860
Pct. Black (ln) 1990	-0.0030 *	-0.0002	-0.0040	-0.0130 *
Pct. 65 and older 1990 (ln)	-0.0070	0.0070	-0.0540	-0.0820 **
Pct GT High School Educ (ln) 1990	0.0050	0.0190	0.0660	0.1010 **
Pop Change 1980-90 (ln)	-0.1270 *	-0.1280 ***	0.0360	0.2000 *
Mining Ernings 1989 (ln)	-0.0050 *	-0.0030	-0.0090	-0.0060
Spatial Lag	0.2490 ***	0.2070 ***	0.0690	0.0110
Time lag	-0.0740 ***	-0.1120 ***	-0.0230 *	-0.0660
Constant	0.6810 ***	1.2060 ***	0.0010	0.4880 **
Pseudo R2	0.226	0.317	0.08	0.15

*p<.05; **p<.01;***p<.001

Hypothesis 2 Results

Table 10 presents the regression results for the 1983-88 business cycle test of Hypothesis 2 for Southeast nonmetropolitan counties. The analysis shows that federal spending change had some impact on both measures of employment growth during this period, and no net effect on income or earnings growth. Interestingly, change in non-defense federal salaries had a strong negative effect on nonfarm employment growth. For each percentage increase in non-defense federal salary growth, the private nonfarm employment growth rate was 7% lower, on average. Hooks and Getz (1998) predict this negative effect for places that have Department of Energy facilities. It could be that increases in federal employment and salaries crowded-out private sector growth in nonmetropolitan counties; however, the analysis also shows no positive effect on civilian employment growth.

Table 10. Federal Spending Change and Economic Growth in Nonmetropolitan Southeastern Counties 1983-88 (N=360) (Test of Hypothesis 2)

VARIABLE	Nonfarm Earnings Coeff	Per Capita Income Coeff	Nonfarm Employment Coeff	Civilian Employment Coeff
Change Public Investment Sp.83-88	-0.00045	-0.00078	0.002	-0.01007
Change Fed. Salary Spend. 83-88	-0.024	-0.013	-0.075 *	-0.064
Change Proc/Defense Sp.'83-'88	0.001491	0.000759	-0.004	-0.0062 *
Change Manuf. Emp. '83-'88	0.000192	-0.00088	-0.003	-0.00883 *
Proc/Def ch.* Manuf. Emp. Ch	-0.00022	4.19E-05	0.01 ***	0.005 ***
Population Density 1980	0.000493 **	0.000463 ***	0.0007	0.001273 **
Pct. Farm Families 1980	0.442258 ***	0.461345 ***	0.424	-0.04326
Pct. Black (ln) 1980	0.004354	-0.00053	-0.011	-0.01507 *
Pct. 65 and older 1980	0.031044	0.095057 ***	0.024	0.00893
Pct GT High School Educ 1980	0.046598 *	0.07572 ***	0.143 ***	0.038472
Pop Change 1970-80	-0.00162	0.000569	0.477 ***	0.444546 ***
Mining Ernings 1983 (ln)	-0.00223	-0.00327	-0.007	0.002775
Spatial Lag	0.419161 ***	0.370528 ***	-0.025	0.056511
Time lag	-0.29164 ***	-0.24572 ***	-0.06 ***	-0.06797 ***
Constant	2.81732 ***	2.69368 ***	0.869 **	0.68316 **
Pseudo R2	0.3741	0.2906	0.239	0.207

*p<.05; **p<.01; ***p<.001

The effects of procurement/defense spending change on nonfarm employment growth are interesting. The analysis shows no lower-order effect for this type of spending (b= -.004). Given that this is an interaction effect, it is interpreted as the effect of changes in defense/procurement spending in counties that experienced no manufacturing growth (Aiken and West 1990). In addition to this finding, manufacturing change also has a lower-order, non-significant effect on nonfarm employment growth (b= -.003). This shows that manufacturing change had no impact on nonfarm employment growth in counties that experienced no change in procurement/defense spending. However, the interaction effect is both positive and significant (b=.01), showing that for each additional percentage increase in procurement/defense spending between 1983-88, each percent increase in private manufacturing employment created, on average, a 1% increase in nonfarm employment. The results show that the effects of manufacturing growth on nonfarm employment growth are dependent upon increases in defense/procurement spending in the nonmetropolitan Southeast between 1983 and 1988.

The analysis for civilian employment shows a similar pattern. Neither changes in federal non-defense salary/wages spending, nor public investment spending had any net effect on civilian employment growth. Change in per capita defense/procurement spending has a lower-order negative effect on civilian employment growth (b= -.006), as does change in manufacturing

employment (b= -.008).[vi] The negative effect for the per capita defense/procurement spending may indicate the concentration of military installations, since it is the effect of such spending in places that had no change in manufacturing. Counties which are homes to military bases could have lower civilian employment growth rates, in comparison to non-military base counties, because of a greater concentration of non-civilian (i.e. military) employment and fewer civilian opportunities. The interaction effect for this model underscores the importance of the interconnection between defense/procurement spending in the nonmetropolitan Southeast and manufacturing growth. The negative effect of manufacturing change on civilian employment growth is abated by .5% for each additional percentage increase in defense/procurement spending between 1983 and 1988. In other words, manufacturing change between 1983 and 1988 had a positive effect on civilian employment growth in counties that also experienced growth in per capita defense/procurement spending, but a negative effect in counties that experienced no change or decline in defense/procurement spending.

Table 11 presents the regressions for Hypothesis 2 for the 1989-92 period. The models for 1989-92 show that changes in federal spending had opposite effects on the dependent variables. In the 1983-88 models, defense/procurement change interacted with manufacturing change to impact positively both civilian and nonfarm employment growth. In the 1989-92 recession, these relationships were not present. However, the analyses for per capita income growth and nonfarm earnings growth show significant patterns. Manufacturing growth between 1989-92 has a lower-order negative effect

(b=-.0049) on per capita income growth in those counties that experienced no change in defense/procurement spending. Moreover, changes in defense/procurement spending have no effect on per capita income growth in counties that had no manufacturing change. However, the interaction effect shows a .5% net increase in per capita income growth for each percentage increase in joint manufacturing and defense/procurement spending. Counties which experienced both manufacturing growth and growth in defense/procurement spending had incrementally higher levels of per capita income growth between 1989 and 1992.

The effects for nonfarm earnings growth between 1989-92 are similar to per capita income growth. Manufacturing growth has no effect on nonfarm earnings growth unless there is defense/procurement growth in the county, as well. Moreover, defense/procurement growth has no effect on per capita income, nor on nonfarm earnings change unless there is manufacturing growth in the county.

The federal spending growth analysis shows some support for Hypothesis 2. Counties that received increases in defense/procurement spending had higher employment growth rates in the 1983-88 recovery and higher income growth rates in the 1989-92 recession. However, this positive effect of federal procurement/defense spending was dependent upon manufacturing employment growth. The implication is that procurement/defense spending targeted at manufacturing (e.g. production of some weapons or materials) created some additional economic growth in the nonmetropolitan Southeast. None of the other federal spending measures have consistent effects.

[vi] It is important to note that a negative regression coefficient in this analysis does not necessarily imply a negative growth rate (i.e. that civilian employment declined between 1983-88). It could also indicate a significantly lower predicted growth rate, relative to other counties.

Table 11. Federal Spending Change and Economic Growth in Nonmetropolitan Southeastern Counties
1989-92 (N=360) (Test of Hypothesis 2)

VARIABLE	Nonfarm Earnings Coeff	Per Capita Income Coeff	Nonfarm Employment Coeff	Civilian Employment Coeff
Change Fed. Salary Spend. 89-92	-0.0004	-0.0011	-0.0211	0.0055
Change Public Investment Sp.89-92	0.0008	-0.0014	0.0045	-0.0031
Change Proc/Defense Sp. 89-92	-0.0004	-0.0007	-0.0035	-0.0044
Change Manuf. Emp. '89-92	-0.0012	-0.0049 *	0.0225 *	0.0092
Proc/Def ch.* Manuf. Emp. Ch	0.0047 *	0.0047 **	0.0019	-0.0112
Population Density 1990	0.0001	0.0001	0.0001	0.0003
Pct. Farm Families 1990	0.0934	0.1021	-0.3352	-0.2100
Pct. Black (ln) 1990	-0.0046 **	-0.0007	-0.0052	-0.0112 *
Pct. 65 and older 1990 (ln)	-0.0103	0.0034	-0.0315	-0.0832 *
Pct GT High School Educ (ln) 1990	0.0091	0.0286 **	0.1095 *	0.0835
Pop Change 1980-90 (ln)	-0.1367 ***	-0.1263 ***	0.0626	0.2303 **
Mining Ernings 1989 (ln)	-0.0059 **	-0.0034 *	-0.0090	0.0017
Spatial Lag	0.2672 ***	0.2073 ***	0.0914	0.0236
Time lag	-0.0774 ***	-0.1156 ***	-0.0363 **	-0.0560 ***
Constant	0.7333 ***	1.2347 ***	0.3599 *	0.4274 *
Pseudo R2	0.22	0.323	0.084	0.143

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

Control Variables

While the analysis focuses on the impact of federal spending on economic growth, the effects of other variables are worth noting. First, as with many growth rate models, all growth rate measures exhibited regression toward the mean (Jackman 1980). Second, there was spatial autocorrelation present in each of the income and earnings growth models, but interestingly, in none of the employment growth models. Per capita income growth and nonfarm earnings growth in the nonmetropolitan Southeast during the 1983-92 period was, to a significant extent, a function of income and earnings growth in nearby, metropolitan counties.[vii] However, there was no spatial autocorrelation present in the employment growth measures for either time period, indicating that nonmetropolitan employment growth is statistically independent of metropolitan employment growth.

The human ecology measures show relatively consistent and anticipated trends for the 1983-88 period. The two most prominent effects are that counties with a greater population density tend to have greater economic growth in the

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[vii] This is a metropolitan effect. I re-estimated the nonmetropolitan county regression models using spatial effects variables constructed only with nonmetropolitan counties and found no significant net spatial autocorrelation.

1983-88 period. While for urban economies population density is generally an indicator of dense population concentration and lack of physical growth potential, in nonmetropolitan counties it may capture the effects of more populated places. Previous population change is an important positive predictor of employment growth in most models. From an ecological perspective, population change is a good indicator of a built environment conducive to social system expansion. The positive effects of population change on employment growth in the nonmetropolitan Southeast counties in this study tend to support this claim. However, the lack of consistent effects for population change on income and earnings growth underscore the importance of conceptualizing system growth in terms of both growth and development. The built environment may affect growth, but it does not have similar effects on quality of growth (i.e. earnings and income growth).

From the new urban/rural sociology, education has anticipated effects in most models. Counties with a better educated adult population had, on average, higher predicted income, earnings and nonfarm employment growth during the 1983-88 business cycle, and higher predicted per capita income and nonfarm employment growth during the 1989-92 business cycle. Percent of the county population black did not have consistent net effects in the analysis. While this may appear at odds with published research (Tomaskovic-Devey and Roscigno 1996), percent black is negatively correlated with population change (r=-.33). The impact of percent black may be captured by this other measure. Percent of population that is farm population in 1980 is the new urban/rural sociology measure with unanticipated effects. While much literature on farm families documents tough times during the 1980s (Lobao and Meyer 1996), this analysis shows that percent of farm families actually has a positive effect on earnings growth, per capita income growth and nonfarm employment growth between 1983 and 1988. I anticipated a negative effect, but found the opposite. This may in fact represent a federal spending effect. According to Crump and Archer (1993), farm support payments at the state level are positive predictors of economic growth because they stabilize farm communities. While some of these farm support programs were included in the public investment

spending measure, perhaps this was not adequate to capture this full effect.[viii] Percent of the population 65 and older in 1980 has a positive effect on per capita income growth in nonmetropolitan Southeast counties between 1983 and 1988; but age structure has no effect for the 1989-92 period. This finding may reflect the short-term benefits of elderly migration in the 1970s and 1980s anticipated by rural sociologists (Glasgow 1995).

Discussion

The analysis explores federal spending in nonmetropolitan counties throughout the southeastern United States. The descriptive analysis shows that nonmetropolitan Southeast counties experienced employment and income growth rates on par with the national growth rates. The nonmetropolitan Southeast also had higher rates of federal spending growth, for some categories. The nonmetropolitan Southeast counties did receive per capita levels of federal spending significantly lower than the Southeast metropolitan and national per capita rates. However, the regression analysis for the tests of Hypothesis 1 and Hypothesis 2 show that levels of spending do not appear to affect employment and income growth to the extent that changes in spending did in nonmetropolitan counties. However, the changes in spending effects were limited almost exclusively to procurement/defense spending targeted at manufacturing. As anticipated (Falk and Lyson 1993), public investment spending change showed average negative growth rates for the 1983-88 period (see Table 1). However, there was no real net negative effect present in the regression models.

The analysis has implications for policy and research. I framed the analysis in terms of competing theories of regional processes. Although the analysis did not directly test an unresolved question in this debate, the analysis does have implications. What stands out the most from this analysis is the lack of federal spending effects in the Southeast nonmetropolitan counties. Based on previous research (Mencken, forthcoming), I argued earlier that nonmetropolitan counties make for a context in which federal spending can have relative impact on economic growth. This framework was based

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[viii] I re-estimated this model with agriculture support programs as a separate measure. Percent of farm families still tested to be a better predictor.

on my research on Appalachian counties, in which I show that public investment spending was an important determinant of employment and income growth. Theoretically, my Appalachian analysis worked from the assumption that federal spending is important in lagging economic regions because it provides the built environment necessary for private capital accumulation. I assumed in the current analysis of the Southeast, perhaps wrongly, that nonmetropolitan counties throughout this region make for a lagging economic context in which federal spending would also be linked to economic growth. This assumption was based on the research which shows that nonmetropolitan counties fell further behind metropolitan counties on a number of economic indicators during the 1980s (Mencken and Singelmann 1998; USDA 1993).

The models presented here, however, do not show strong support for my claim. Perhaps the obvious reason why, which has links to theories of regional processes, is that nonmetropolitan counties in the Southeast are not 'lagging' to the extent that counties in Appalachia were in my previous study. The data presented in Table 1 show that while nonmetropolitan Southeast counties lagged behind metropolitan Southeast counties on employment growth, they did not lag behind the national growth rate. The same cannot be said for Appalachian counties (Couto 1994).

The implications for research are that my findings for this study do not contradict my basic assertion from previous work that federal spending can have an effect in lagging economic regions (to the extent that the nonmetropolitan Southeast was not a lagging region during this period). The findings also suggest that 'nonmetropolitan' status is not completely synonymous with lagging region, or at least that the regional context in which these counties are located should be considered. The South during much of this time period was still benefiting from the rustbelt-to-sunbelt industrial transformation (Wheat 1986). The extent to which these plants were moving South to benefit from cheaper production costs could create an employment advantage for nonmetropolitan counties (which compete with metropolitan economies on cheaper labor and land).

These findings should not be interpreted such that federal spending does not matter. My findings show limited direct effects of federal spending on employment and income growth in nonmetropolitan counties. My findings, however,

did not test for the indirect effects of federal spending. Again, the model of regional processes which frames this analysis assumes that private capital accumulation (and economic growth) requires a basic level of public sector investment. While I found in Appalachia that the effects are more direct, in the Southeast perhaps the effects are subtle, manifesting through other variables, such as population change and education levels. Unfortunately, not enough years of detailed spending data are currently available to test exhaustively these indirect effects.

The descriptive analysis shows some support for the 1980s federal budget cuts identified by the proponents of the New Federalism. However, my analysis presents less evidence to support a claim that these budget cuts had a direct negative effect on nonmetropolitan economies in the Southeast. Public investment spending was reduced, on average, 50% in constant dollars in nonmetropolitan counties. But the negative trend was present in metropolitan counties and for the nation as a whole. Moreover, nonmetropolitan counties that received more of this spending in 1983 did not perform significantly better, relative to other county variables, during the 1983-88 business cycle, the period in which the cuts were most severe. Again, this may be due to the relative performance of the Southeast region. In Appalachia, I found that this was a most important predictor of economic growth for that period (Mencken, forthcoming). By implication, Appalachian counties that received cuts also experienced less growth. In the Southeast, my analysis suggests that the cuts did not negatively and directly affect economic growth, relative to other factors. It could be that these cuts were more detrimental to other regions of the nation. It may also be the case that in the Southeast, the negative effects of these cuts may lag for a significant amount of time, and may materialize in analyses of data from the later 1990s.

The lack of non-defense federal salary/wage effects suggests that in nonmetropolitan counties federal employment facilities do not generate net economic growth. The finding is also consistent with my research on Appalachia (Mencken, forthcoming) and the research on the nation as a whole (Hooks and Getz 1998; Mencken and Singelmann 1998). The policy implications are that recruiting non-defense federal facilities, such as a federal prison, will probably not create long-term economic growth. This does not mean that places should not seek these facilities. They do

provide jobs. My research suggests, however, that such a facility needs to be part of a broader economic development plan.

The most consistent federal spending finding in the analysis is the effect of procurement/defense change on employment and income growth, and the interaction this type of spending has with manufacturing employment change. The analysis suggests that defense/procurement spending targeted at manufacturing growth (orders for produced goods) created some net benefit to nonmetropolitan counties. On the surface this finding is somewhat inconsistent with the findings of Hooks and Getz (1998), who suggest that this type of interaction is most prevalent in metropolitan economies with no anticipated effect in nonmetropolitan economies. I explored this issue further by re-estimating the regression models for Hypothesis 2 for metropolitan counties in the Southeast. These results are presented in Tables 12 and 13. The federal spending results for metropolitan counties are consistent with the results for nonmetropolitan counties in that what matters most is this interaction effect between defense/procurement spending change and manufacturing change. However, the magnitude of these effects are greater in metropolitan counties. For the 1983-88 period, this interaction predicts a 1% and .5% increase in nonfarm and civilian employment growth (respectively) for nonmetropolitan counties, while a 4.3% and 5.8% increase in nonfarm and civilian employment growth (respectively) in metropolitan counties.

Another major difference is that in metropolitan counties the effect is significant for every regression model for both time periods. Moreover, the impact of this interaction on the predicted growth rates are greater for metropolitan counties. Table 14 shows the differences the defense/procurement change by manufacturing employment change has on predicted employment and income growth in metropolitan and nonmetropolitan counties. For the 1983-88 period, the defense/procurement spending change by manufacturing employment change interaction predicts an additional $128,000 dollars in nonfarm earnings in metropolitan counties (on average) and no additional earnings in nonmetropolitan counties. This interaction also predicts 764 nonfarm jobs in metropolitan counties (on average) compared to 20 additional nonfarm jobs in nonmetropolitan counties. The effects for civilian employment growth are more substantial. In metropolitan counties, the interaction predicts 1,972 civilian employment jobs (on average), compared to 36 civilian employment jobs in nonmetropolitan counties. The interaction effect is even more important to metropolitan counties in the 1989-92 period. It 1,103 private nonfarm employment jobs (on average), and 2,446 civilian employment jobs (on average). There is no predicted effect on job growth in nonmetropolitan counties during this period.

This follow-up comparative analysis with metropolitan counties in the region has important implications for research on regional processes. Previously, I argued that changes in federal spending policy led to the re-emergence of the metro-nonmetro gap in socioeconomic well-being between 1980 and 1990 (Mencken and Singelmann 1998; USDA 1993). However, in previous tests of this hypothesis, we were unable to show support for this idea. However, this analysis shows that the procurement/defense and manufacturing growth interaction was responsible for generating greater income and employment growth in the metropolitan Southeast, relative to the nonmetropolitan Southeast. This informs my previous research in that the effects of procurement/defense spending in previous work (Mencken and Singelmann 1998) needed to be framed within the context of manufacturing growth. Without the contextual analysis, the net effects of defense/procurement spending do not materialize in metropolitan nor nonmetropolitan counties. In my earlier analysis (Mencken and Singelmann 1998), I concluded that federal spending had no net impact on the re-emergence of a metro-nonmetro gap in socioeconomic well-being. This analysis suggests that had I considered the impact of procurement/defense spending change within the context of manufacturing change, different conclusions might have been drawn.

Table 12. Federal Spending and Economic Growth in Metropolitan Southeastern Counties 1983-88 (N=174)

VARIABLE	Nonfarm Earnings Coeff	Per Capita Income Coeff	Nonfarm Employment Coeff	Civilian Employment Coeff
Change Fed. Salary Spend. 83-88	-0.0152	-0.0101	-0.0068	-0.0858
Change Public Investment Sp.83-88	0.0027	0.0026	-0.0154	-0.0044
Change Proc/Defense Sp.'83-'88	-0.0040	0.0003	0.0434 **	-0.0019
Change Manuf. Emp. '83-'88	0.0049	0.0045	0.0402	0.0349 ***
Proc/Def ch.* Manuf. Emp. Ch	0.0187 *	0.0187 ***	0.0434 **	0.0580 ***
Population Density 1980	0.0001	0.0001	-0.0001	-0.0001
Pct. Farm Families 1980	0.8554 ***	0.6612 ***	-0.0023	-0.4611
Pct. Black (ln) 1980	0.0052	0.0030	-0.0153	0.0069
Pct. 65 and older 1980	-0.0047	-0.0172 ***	0.1169 ***	0.0368
Pct GT High School Educ 1980	0.0137	0.0280 *	0.3889 ***	-0.0123
Pop Change 1970-80	0.0116	-0.0586 **	-0.0102	0.4806 ***
Mining Ernings 1983 (ln)	0.0011	0.0015	0.0043	-0.0052
Spatial Lag	0.0616	0.0453	0.2889	-0.3136
Time lag	-0.0107	0.0783 *	-0.0242	-0.0045
CONSTANT	0.4976 *	-0.1863	0.5614 ***	-0.1344
Pseudo R2	0.2070	0.2670	0.5190	0.4250

*p<.05; **p<.01; ***p<.001

Table 13. Federal Spending and Economic Growth in Metropolitan Southeastern Counties 1989-92 (N=174)

VARIABLE	Nonfarm Earnings *Coeff*	Per Capita Income *Coeff*	Nonfarm Employment *Coeff*	Civilian Employment *Coeff*
Change Fed. Salary Spend. 89-92	-0.0110	0.0002	0.0016	-0.0673 *
Change Public Investment Sp.89-92	0.0041	0.0047	0.0230 *	0.0218 **
Change Proc/Defense Sp. 89-92	-0.0003	0.0000	-0.0024	0.0041
Change Manuf. Emp. '89-92	-0.0386 *	-0.0300 *	0.0893 *	-0.0389
Proc/Def ch.* Manuf. Emp. Ch	0.0331 *	0.0361 **	0.1000 *	0.0996 ***
Population Density 1990	0.0000	0.0000	0.0000	0.0000
Pct. Farm Families 1990	-0.0030	-0.0026	-0.1958	-0.1306
Pct. Black (ln) 1990	0.1857	0.1506	-0.0203 **	-0.0086
Pct. 65 and older 1990	-0.0066 *	-0.0051	-0.0069	0.0088
Pct GT High School Educ 1990	0.0757 ***	0.0637 ***	0.0716	0.0911 **
Pop Change 1980-90	-0.1605 ***	-0.1261 ***	0.0185	0.1303 ***
Mining Ernings 1989 (ln)	0.0010	-0.0002	0.0045	0.0119 *
Spatial Lag	0.3788 *	0.4514 ***	0.3395	0.2168
Time lag	-0.0324	-0.0416 *	-0.0075	-0.0488 *
CONSTANT	0.4724 **	0.5962 ***	0.2437	0.6187 ***
Pseudo R2	0.4813	0.5502	0.2013	0.3897

*p<.05; **p<.01;***p<.001

Table 14. Predicted Outcomes from Metropolitan and Nonmetropolitan County
 Federal Spending Change Models 1983-88, 1989-92

 The Defense/Procurement Spending Change by Manufacturing Employment
 Change Interaction Effect Predicts the Following Outcomes in Metropolitan
 and Nonmetropolitan Counties

	1983-88		1989-92	
	Metro	**Nonmetro**	**Metro**	**Nonmetro**
Nonfarm Earnings	$128,000	0	$1,038,772	$36,489
Per Capita Income	$187.00	0	$277	$56
Nonfarm Jobs	764	20	1103	0
Civilian Labor Force Participants	1972	36	2446	0

This additional analysis also informs the two hypotheses tested here. In the analysis of nonmetropolitan counties, the regression results do not really differentiate between the two hypotheses. The federal spending effects are marginally greater in the analyses that test Hypothesis 2, but modeling federal spending change versus federal spending levels shows no real change in overall model fit (the model fits for both sets of analysis are essentially the same). I would expect that if federal spending change (Hypothesis 2) matters more than federal spending levels (Hypothesis 1), then the model for spending change would fit better and explain more of the variation in employment and income growth. This is not the case. However, I replicated the tests of Hypothesis 1 for metropolitan counties and found that the impact of federal spending in metropolitan counties, relative to nonmetropolitan counties is not substantial when levels of federal spending are compared (results available upon request).

However, as Table 14 shows, when the impacts of federal spending change are compared within the context of metropolitan and nonmetropolitan counties in the Southeast, these differences are quite substantial, particularly when it comes to employment growth. The lesson from this follow-up analysis is that federal spending change is more important than federal spending levels, but within the context of comparing economic growth between metropolitan and nonmetropolitan counties in the Southeast.

While this analysis focuses on the impact of federal spending on economic growth in the Southeast, other analyses that focus on other issues of economic development are warranted. In sociological theory, development implies improvements in quality of life, reductions in poverty and inequality (Fuller 1970; Tolbert *et al* 1998; Lyson and Tolbert 1996). In this analysis I examined the impact of federal spending on income and earnings growth. My analysis suggests that federal spending does affect these issues, but in a limited way. However, analysis which focus on the impact of federal spending on other indicators of development (inequality indices, poverty rates) will allow regional studies of federal spending patterns to make further contributions to studies of regional processes.

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