REGIONAL ECONOMIC PROSPERITY, POPULATION GROWTH AND LOCAL SPENDING IN U.S. MICROPOLITAN AREAS, 2002-2014

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ABSTRACT

CHARLES C. MCSHANE. Regional Economic Prosperity, Population Growth and Local Spending in America's Micropolitan Areas, 2002 to 2014. (Under the direction of DR. WILLIAM W. GRAVES.)

The following dissertation adds to the literature on income convergence and population growth in the United States. It also expands knowledge on the relatively underexplored geography – the American micropolitan area. The study identifies determinants of changes in Economic Prosperity and Population Growth, as operationalized by Relative Per Capita Income and Percentage Population Growth in a sample of more than 500 micropolitan areas in the United States between 2002 and 2014. These micropolitan areas are relatively newly defined, county-based statistical areas built around small urban cores of 10,000 to 50,000 people. The study finds no evidence of income convergence during this time period in micropolitan areas. Other findings include: Proximity to a metropolitan area of 250,000 or more population predicted population growth for micropolitan areas, but relative income growth was higher in micropolitan areas more than 120 miles from larger metro areas. Relative Per Capita Personal Income grew faster in non-South Atlantic Region micropolitan areas than in the South Atlantic, but population growth in micropolitan areas was more likely in the South Atlantic region than in other regions. Manufacturing and Professional Services industry growth strongly predicted relative income growth. The dissertation concludes with qualitative analysis of outlier micropolitan areas and recommends future areas of study.

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CHAPTER 1. INTRODUCTION

1.1 The Non-Metropolitan Crisis

Recent media accounts and analyses have described small-town America in economic decline. In their 2017 series, "One Nation, Divisible," *Wall Street Journal* reporters Janet Adamy and Paul Overberg catalogued worsening outlooks on a grim list of measures – male job participation, disability claims, teenage pregnancy and premature death – in what they termed "small towns and rural areas," rural counties or those counties anchored by urban centers of less than 50,000 people as they defined them. The outlook was so dire in these areas that the newspaper claimed "rural America is the new inner city," comparing the plight of rural residents to the nearly intractable social and economic isolation of disinvested urban areas. All these problems were made worse by the fact that internal migration was at its lowest level since World War II, meaning people in these economically struggling areas had become less likely to seek better fortunes in larger cities. This, the authors claim, had led to an increasing economic inequality and social divisions between rural America and urban and suburban America (Adamy and Overberg, 2017).

The *Wall Street Journal* series popularized for the educated lay audience themes that regional economists, geographers, demographers and historians had been studying for years. Regional income convergence and/or divergence (Ganong and Shoag, 2012; Gerald A. Carlino and Leonard Mills, 1996; James and Campbell Jr, 2016; James and James, 2015; Lim and Kim, 2015), the effects of declining manufacturing base on rural areas and small towns (Mulligan, 2013; Vias, 2012; Vias, Mulligan, and Molin, 2002),

and slowing internal migration (Goworowska and Gardner, 2012; Ozgen, Nijkamp, and Poot, 2010; Plane, Henrie, and Perry, 2005; Plane and Jurjevich, 2009) intersect in the study of U.S. small towns.

What the *Wall Street Journal* article failed to do was note the economic and demographic diversity within what it calls "rural and small town America." As of 2003, the U.S. Census Bureau introduced a new classification of core-based statistical areas called micropolitan areas (Brown, Cromartie, and Kulcsar, 2004; Mackun, 2005). These county-based areas, centered on urbanized areas of 10,000 to 50,000 people, and their definition, represent not only a more precise refinement of the urban hierarchy. The idea of "small town America" also exerts a tremendous influence on political and sociological narratives of the American past and cycles of decline and renewal (Jakle, 1999; Richard V. Francaviglia, 1996; R.O. Davies, 1998; R.R. Lingeman, 1980). The contrast of the large, impersonal and amoral though prosperous city with the close-knit if Spartan social and economic relationships within rural areas and small towns, is a long-standing American trope. This vision of the idyllic small-town has made recent concerns over employment decline, civic group participation decline and methamphetamine and opioid epidemic in rural and small-town America seem even more dystopian (Putnam, 2001, on civic group participation decline). Economic disintegration and social alienation among white voters in small-town America, some scholars and pundits have speculated, may be contributing to the recent wave of populism that led to the election of Donald Trump in 2016.

With such concerns now raised about the current state and future outlook of "small-town America" in general, it is an appropriate time to analyze the recent change and evolution of micropolitan area economies, the diversity of such economies, the impact of demographic and migratory trends, as well as the impact of public policies, on micropolitan America. While previous studies have pointed to a generalized decline in small towns and micropolitan areas, this study identified whether decline in economic prosperity and population growth has occurred. Economic prosperity will be operationalized as Per Capita Personal Income relative to the US national average and population growth will be operationalized as percentage population change between 2002 and 2014. Independent variables drawn from the literature as specified below, will be used to determine some reasons behind relative income and wage changes. Finally, the study will introduce a qualitative examination of outliers on both ends of the change spectrum – i.e., those micropolitan areas that have experienced income and/or population growth as well as those who have experienced income and/or population wage decline – to identify commonalities as well as idiosyncratic events that may have affected changes in these areas.

1.2 Contribution to the Public Policy Literature

In doing so, the dissertation brings together two streams of research – the sparse and emerging literature on quality of life and economic growth in micropolitan areas as well as the much broader and already voluminous body of research on income convergence. Convergence is the neoclassical economic theory which posits that poor economies will grow faster than rich economies, leading, in the long run, to convergence

of economic status, assuming a steady state of savings rates, technological progress and population growth. (Solow 1956) Additional research on convergence has found largely inconclusive results depending on the geographical unit under study, the metric and measurement used to define "convergence," time period under study and method of analysis. Groundbreaking work by Barro and Sala-I-Martin (1991) on convergence between U.S. states confirmed convergence during the 1880 to 1990 period as measured by a logarithm of Per Capita Personal Income. States in the Southern region of the United States showed a particularly strong record of convergence. Further research re-affirmed the notion of convergence between U.S. states, regions, counties as well as other countries during much of the twentieth century. (Baumol 1986; Ray and Montouri, 1999; Carlino and Mills 1996; Hoffer and Worgotter 1995) . Economic geographers in particular have refined the theory through an emphasis on spatial variation in the geographic units used as well as dependent variable measurement. DiCecio and Gascon (2008) conducted a study of long-term income convergence between U.S. states from 1969 to 2005. While the authors did find evidence of convergence, further analysis and disaggregation of states into metropolitan and non-metropolitan components found that high rates of income convergence were evident only in the metropolitan portions of the states. "We interpret this as evidence" the authors state, "of the importance of suburbanization, as opposed to rural economic development, as the driving force behind convergence." Geographers James and Campbell (2013), also note large differences in the size of convergence effects between different units of analysis – states, Economic Areas (i.e. MSAs) and counties. Using spatial statistics, the authors conclude that among units of analysis, Economic Areas show the strongest evidence of convergence. In short,

states contain too many diverse local economies to adequately capture convergence but local economies may cross county lines. This makes the use of Economic Areas, such as Metropolitan Statistical Areas, optimal for studying convergence. This, combined with DeCecio and Gascon's finding of lack of convergence in non-metropolitan areas as a whole - highlights the importance of extending the examination of convergence to the relatively newly formed Economic Area of micropolitan areas. Disaggregating non-metropolitan areas into more urbanized micropolitan areas will expand knowledge of convergence processes in smaller urbanized economies in the United States. Further research from economists Ganong and Shoag (2012, 2017) found that per capita income convergence among states, while steadily rising from the 1880s through 1990, leveled off considerably between 1980 and 2010. From 1940 through 1960, convergence in per capita incomes averaged 2.1 percent per year. Between 1981 and 2010, annual convergence averaged less than 1 percent. The driving forces behind this, according to Ganong and Shoag, were that migration to highly productive places no longer garnered the same economic returns for lower-skilled workers, largely because of higher housing costs in these more productive places. This has led lower-skilled workers to migrate to places which might appear to have lower incomes but compensate for that with lower housing costs, meaning high real income net of housing prices.

Furthermore, the process of theory building related to the determinants of income and population growth have been focused mostly on the United States' largest metropolitan areas. The growth of human capital has been attributed to various amenities including natural amenities such as warm winters (Glaeser 2005; Glaeser and Berry

2005) and general political and social tolerance, which in turn attract highly skilled labor in knowledge-intensive sectors. These knowledge-intensive workers, who exercise a level of autonomy and judgment unthinkable in an industrial age, concentrate with like-minded workers which in turn spurs creativity and knowledge spillovers that in turn spur income, population and employment growth (Florida 2003, 2010). While creative class theories captured the imagination of consultants and economic developers throughout the world, further academic research failed to back up some of its claims (Moretti 2012). With few exceptions (McGranahan 2011), creative class theory has been limited to metropolitan areas as well. Still, parts of Florida's creative class theory – particularly the clustering of like-skilled workers, find support from other more traditional, neoclassical economists such as Edward Glaeser. Glaeser (2006) posits a balancing act of a neoclassical labor market where firms and individuals maximize their competitive advantages afforded by their skill sets and a regional market of amenities that are accessed by all in the region. The balance of the agglomeration effects and knowledge spillovers created by large concentrations of highly-skilled workers can be offset by better natural amenities, particularly warmer weather or lower crime rates. Historical evidence of this balancing act can be found in the history of the Sunbelt, which flourished as a relocation hub for firms and high-skilled workers. After the invention of air-conditioning in the 1940s and as northeastern cities struggled with high crime rates and urban decay, the disamenities of cold winters and high crime outweighed for many firms the agglomeration and knowledge spillover effects that had been built up over time in these Northern cities. In the early part of the twenty-first century, however, with crime rates lower in northeastern cities and technology sector knowledge becoming more specialized and workforce more

highly skilled, northeastern cities with significant talent clusters and research and development centers are again showing strong productivity growth. (Glaeser and Tobio 2007) (Storper and Scott, 2009).

While attempts to extend these theories of economic growth to non-metropolitan areas have found significant differences between the processes of growth in metropolitan and non-metropolitan areas (DeCecio and Gascon 2008) as well as the discontinuation of income convergence among wealthy and poorer state (Ganong and Shoag 2012), the following dissertation will examine these theories on a further disaggregated and understudied portion of the non-metropolitan United States – micropolitan areas. The study will identify the determinants of changes in Relative Per Capita Income Change and Population Growth across the 536 consistently defined micropolitan areas in the United States from 2000 through 2014. Following the work of DiCecio and Gascon (2008) and James and Campbell (2013, 2016), the use of relative dependent variables, which index Per Capita Income to national averages, will be to more directly reveal how closely changes in micropolitan areas track with the broader United States and whether or not evidence for income convergence as a theory can be found in these non-urban, non-rural "middle places."

Explanatory variables will be drawn from the small but growing body of literature on micropolitan areas. These will include natural amenities variables (M. Davidsson and Rickman, 2011), variables measuring level of urbanization or proximity to larger urban centers (Brown et al., 2004; Mulligan and Vias, 2006), net domestic migration (Hammond and Thompson, 2006; Plane et al., 2005; Vias, 2012), international

immigration (William R. Keeton and Geoffrey B. Newton, 2005), industry structure (Mulligan, 2013, 2015; Vias et al., 2002), and age demographics (Plane and Jurjevich, 2009).

Additionally, the analysis will examine the effect of county-level public policies on changes in Relative Per Capita Income and Population. This analysis will add several baseline micropolitan-area level economic variables for the year 2002 and examine if and how they affected the core dependent variables of Relative Per Capita Personal Income and Percentage Population Growth between 2002 and 2014. These baseline variables for the year 2002 will include Per Capita Education Spending, Per Capita Revenue from Property Taxes, Per Capita Highway Spending, Per Capita Health and Hospital Spending, and Total Debt Outstanding. Unfortunately, the discontinuation of the U.S. Census Bureau's USA Counties program after the Economic Census of 2002 has made these county-level spending variables for years beyond 2002 largely inaccessible, thus the study of policy variables for this dissertation will require a longer time-lag than is typical in the literature. These variables, particularly highway and education spending per capita, have been linked to economic and income growth in sub-state geographies by previous studies in earlier decades (Wink and Eller, 1998). A large literature base has found conflicting results on other measures of spending and economic development incentive policies' effectiveness (Patrick, 2014; Trogen, 1999). This analysis will test the effectiveness of overall economic development spending on the relative economic growth and population growth of micropolitan areas.

The dissertation will conclude with a qualitative, historical examination of outliers in both negative and positive change in Per Capita Relative Personal Income and Percentage Population Change. This will help to identify commonalities in economic trends, as well as idiosyncratic or regional events affecting these areas. In addition, I will also conduct a rich description of those areas that showed the strongest positive correlations between the economic spending variables and Relative Income and Population changes. This discussion could serve as a starting point for policy implication discussions for micropolitan public management and economic development practitioners.

Overall, this dissertation found that, while micropolitan areas closer to large cities were far more likely to add population, those more than 120 miles away from larger cities were more successful in retaining higher levels of income. Employment growth in two broad industry categories – Manufacturing and Professional Services - were shown to drive growth in both population and income. At the same time, areas outside of the South Atlantic Region tended to grow faster in terms of income, but slower in terms of population. Additional analysis of 11 "outliers," or micropolitan areas identified place-specific events and more localized economic changes affecting population and income growth. This outlier analysis pointed to the potential that industry sectors such as mining and transportation and warehousing, while not driving large scale changes in economies, can have significant, localized effects in some micropolitan areas. Future research in this area would be beneficial to deeper understanding of economic trends in micropolitan America.

CHAPTER 2: LITERATURE REVIEW

2.1 Historical Background

Rural and small town settings are abundant in United States history and literature. Sociologists and economists began focusing scholarly attention on these areas in the early twentieth century. The case study, as used in the well-cited Middletown studies of the 1920s, were the dominant method (Lynd and Lynd 1929, 1937). Still, the economic dynamism and social problems of the country's cities focused attention on urban concerns. On the other end of the spectrum, mass mechanization, rural electrification and other drastic changes to the farm economy of rural counties focused attention on changes in the most rural areas of the nation, such as Appalachia and the Mississippi Delta.

By the late 1970s, though, demographers and statisticians began paying closer attention to the places in between the two extremes of population density. This new attention was largely sparked by Beale's finding of population growth of 1.2 percent in nonmetropolitan areas and .8 percent in metropolitan areas between 1970 and 1975, a reversal of trends of declining population in nonmetropolitan areas in the 1960s. (C. Beale, 1977) Beale's conclusions were limited by U.S. Census data collection and delineation standards of the time, which distinguished only between metropolitan areas and non-metropolitan areas. These county-based areas were developed using commuting pattern and population density data, but only of cities larger than 50,000 people. This meant that purely rural counties with no significant urbanization patterns and smaller but significant regional population and employment centers were grouped together as simply, non-metropolitan.

With optimism in a "nonmetropolitan turnaround," on the rise, demographers and economic development practitioners, as well as geographers and economists in the burgeoning field of regional science, sought to identify, define and devise economic development strategies for these "micropolitan" areas (Luther Tweeten and George L. Brinkman, 1976; Thomas R. Leinbach and Robert G. Cromley, 1982). These strategies consisted largely of 1) highlighting natural amenities and enhancing "scale-dependent" amenities or lack of urban "dis-amenities" and 2) increasing the manufacturing employment base.

Growth in micropolitan areas continued through the 1990s. By some measures, manufacturing employment in micropolitan areas increased by more than 2 percent, while declining by nearly 3 percent nationwide (M. E. Davidsson, 2012). At the same time, scholarly and journalistic attention turned to urban revitalization in major metropolitan areas. Still, net domestic migration continued down the urban hierarchy, with micropolitan areas gaining net migrants from major metropolitan areas. (Plane et al., 2005)

These underlying trends prompted the U.S. Census Bureau to officially define and categorize "micropolitan areas" after the 2000 U.S. Census. This definition created 536 county-based micropolitan areas consisting of one or more counties that included an urban cluster of 10,000 to 50,000 people. This definition provides a more consistent sample of areas to study, helping to alleviate one issue with earlier studies – lack of consistent definition of what constituted a "micropolitan" area. The national press scarcely noticed the change, aside from a blurb tucked away on page 83 of the *New York*

Times Magazine that noted sardonically that "the census is far behind the business community, which has been tapping far-flung small-city America for at least two decades. Wal-Mart and Applebee's, in fact, have built vast empires from the legions who live there. So has the national Republican Party." (Gertner, 2004)

Micropolitan areas provide an advance in dealing with the Modifiable Unit Area Problem as applied to non-metropolitan areas. These areas, based on commuting flows data, represent more logically defined labor market areas, a clear improvement from the strictly politically-drawn boundaries of counties. As Hammond and Thompson (2008) note, the use of these Census-defined Labor Market Areas accounts for any population or income spillover to be omitted because the entire labor market is accounted for in the unit of analysis. However, these regions are still aggregated up to the county or multi-county level, meaning that the scale at which these boundaries are drawn might still overshadow income or population changes at smaller geographic scales (zip code or neighborhood level) which could be the result of different processes. Still, when examining questions and testing hypotheses at a regional scale, micropolitan areas are an appropriate geographic unit of analysis to use.

Johnson and Fuguitt (2000) noted turbulence in non-metropolitan migration trends over the last half of the twentieth century. First, the "nonmetropolitan turnaround" of the late 1960s and early 1970s, which constituted a break in previous migratory trends from less urban areas to more urban areas. This "turnaround" was short-lived however as in the 1980s, metropolitan growth reemerged and migratory trends began to favor urban as opposed to nonmetropolitan areas. This "turnaround reversal" reversed again in the

1990s, when a “rural rebound” of migratory trends increased net migration into non-metropolitan areas again, though to a smaller degree than the initial turnaround.

Because of the considerable fluctuation in migration trends in non-metropolitan areas, Johnson and Fuguitt examined estimated migration trends across 45 years from 1950 through 1995. The authors also proposed a classification of non-metropolitan counties in terms of socioeconomic character. Identifying commuting counties, where 15 percent or more workers commuted to metropolitan areas, college counties, which contained four-year state colleges, recreation counties, farm counties and “urban-center” counties, which contained cities of 10,000 people or more. Though counties overlapped categories considerably, the “urban-center” county category shows the beginnings of the micropolitan category. Ultimately, the authors found that migration patterns in these counties followed the general non-metropolitan directional trends over time. However, population losses were lower, and population gains greater, in these areas, hinting at a stabilizing effect of urban centers of a certain size. The relative population stability of these “urban center” non-metropolitan counties was attributed to their ability to provide economic opportunity to migrants from more traditional “non-metropolitan” America, reliant on extractive industries such as farming and mining.

Brown et.al (Brown et al., 2004) note that every decade except the 1970s, showed a “clear positive correlation between population size and population growth.” Even the “rural rebound” in the 1990s was not accompanied by the urban decline that occurred in the 1970s. Brown et al. (2004) examined the usefulness of this new micropolitan category as officially defined and found that micropolitan areas did identify a significant “middle

place" in the urban hierarchy. Despite the diversity of these areas, some regional centers for vast urban areas, some nearby large metropolitan areas, such as around Chicago or Dallas-Fort Worth, or some filling "in the interstitial space between nearby metropolitan regions, such as in the Carolinas," the authors found some unifying factors. While these areas contained significant clusters of urban services, they offered considerably fewer than smaller metropolitan areas. In addition, economic diversification had taken hold in many micropolitan areas to a greater extent than in non-core-based statistical areas but not to as great an extent as metropolitan areas. In addition, migration up the urban hierarchy was consistent, with the largest declines occurring in the small, non-CBSA based areas and larger growth rates occurring in micropolitan areas. Because of their differences in levels of urban service availability and economic diversification, the authors argued, micropolitan areas provided a concept that sufficiently differentiated "social and economic reality" of place in the United States and was therefore a useful concept for statistical modeling and other research. "As information about micropolitan areas makes its way into government data and publications alongside that about metropolitan areas, micropolitan areas will draw increased attention from policy makers and the social science research community. Accordingly, we see the new core-based classification system as a step in the right direction that will enhance our understanding of urbanization and spatial development In America during the 21st century."

2.2 Migration and Micropolitan Areas

Among the earliest topics social scientists studied, migration and its causes and effects have been extensively examined. Early researchers during the Industrial

Revolution noted the process of urbanization and a hierarchy of urbanization whereby a chain of rural-to-urban migration proceeded linearly. As Ravenstein (1885) put it: "the inhabitants of the country immediately surrounding a town of rapid growth, flock into it; the gaps this left in the rural population are filled up by migrants from more remote districts, until the attractive force of one of our rapidly growing cities, makes its influence felt, step by step, to the most remote corner of our kingdom." Later researchers, benefitting from more complete data sets and more advanced statistical procedures noted counter-urbanization effects, particularly in the later part of the twentieth century in the United States. While Ravenstein's early work perceptively noted the power of agglomeration economies in Britain's industrializing cities and that agglomeration's pull for rural citizens, more recent researchers have noted the counterbalancing effects of congestion and urban "disamenity" factors, coupled with improving communication and transportation infrastructure, as a "push" factor prompting urbanites in the largest metro areas to seek nearby suburban and exurban areas. (Gottlieb, 2006)

While rural-to-urban "step migration," as Ravenstein's theories came to be called, remains prevalent in developing countries, recent research has shown a more complex interplay of migration in the fully developed United States. Plane (et al., 2005) analyzed microdata on migration by age group for all United States counties from 1995 through 2000, aggregating these counties into a seven-category Core-Based Statistical-Area urban hierarchy, including the Census-defined micropolitan areas . The authors note that the largest net domestic outmigration flows during this time period came from the largest metropolitan areas, with migrants settling consistently across the lower levels of the

urban hierarchy, while micropolitan areas benefit from both significant in-migration from rural areas as well as major and smaller metropolitan areas. This trend, however, is reversed among young people, particularly prevalent among college graduates. Only the two largest categories of American metropolitan areas – those with populations greater than one million – showed net in-migration of those 21 to 29. On the other hand, migration to smaller metropolitan areas is stronger among 30-39 year olds when suburban amenities seem most relevant to mid-career professionals. Micropolitan areas drew most of their net positive domestic in-migration from "empty nesters" and younger retirees in their 50s and 60s.

Further research by Plane and Jujerevich (2009) expanded on this age-articulated migration theory by noting that migration appears the highest at ages during which migratory decisions are not tied to "intergenerational" concerns. These primary age-groups for large-scale migration, then, include early adulthood and early retirement. In this paper, the authors measured the probability of movement between categories on the hierarchy and found that movers in the 55 to 64 year old age group living in mega metro areas had the highest probability, 1.619, of selecting a micropolitan county as a movement destination. On the other hand, probabilities for the 20-44 year old age groups from major metros to choose a micropolitan destination were lower than 1 and steadily increased with age, from .744 at 20-29 years old, to .955 in the 35-44 years of age bracket. In fact, the only origin category in which moving to micropolitan destinations had probabilities greater than 1 for the 25-39-year-old age groups, were rural, non-CBSA categories; such moves would constitute moving up the urban hierarchy for rural young

adults. The authors also note a return migration to mid-sized metropolitan areas after 75 years of age, and hypothesize that this movement is correlated with a desire to be near adult children, as well as the medical infrastructure and amenities offered in these metros.

2.3. Amenities, Retirees, Baby Booms and Busts

This combination of downward migration of empty nesters and retirees from large metro areas, coupled with what appears to be "step migration" of younger and mid-career adults from more rural areas, Plane and Jujerevich note, is driven by amenities. Indeed, even the migration of young adults to larger metro areas may be considered driven by amenities as much as economic considerations in that amenities such as entertainment and cultural options take on greater priority at early stages of adult life. Intuitively, this model of competing priorities of life-stage migration appears to explain, at least in part, demographic and media narratives of the "rural rebound" of the 1990s, driven by in-migration of the large baby boomer generation as they entered their empty-nester years, inextricably linked to the "urban renaissance" driven by the "echo boomers" or millennials. With numbers much larger than other generations, the baby boom and millennials age-driven preferences have the capacity to sway development patterns. Thus, the emergence of micropolitan areas as retirement destinations has implications on income and wage disparities. If wealthy retirees move to high-amenity micropolitan areas, a service sector is likely to grow to provide more amenities, which could reduce the per capita income and wages of a region. (Mulligan, 2015)

Mulligan (2013) noted in a review of the literature on the future of non-metropolitan areas, that micropolitan counties experiencing the most growth during the

1990s were close to cities had varied typography, warm winters and included skilled and educated workforce. Tax variables and the degree of industrial specialization were not important. While noting that, over time, growth rates in micropolitan areas did undergo the ebbs and flows indicated by the turnaround 1970s, reversal of the 1980s and rural revival of the 1990s, those micropolitan areas that grew in the 1970s and 1980s, simply continued to do so in the 1990s.

2.4 Infrastructure Spending, Human Capital and Growth

"Unlike population changes, which seem to be stabilizing, income growth is more variable," noted Cortes and Davidsson (2013), making relative per capita personal income a more appropriate measure of economic well-being in micropolitan areas than pure population growth. Glavac (1998) found that transfer payments and retail sales showed positive effects on micropolitan area growth, indicating retirees could drive population and service-sector growth with their spending patterns. Vias (2002) grouped micropolitan areas in to nine clusters based on sector composition and found more diversified sectors grew faster than those dependent on agriculture, mining or government sectors while those economies dependent on manufacturing, services and trading remained stable.

While the literature reviewed so far has focused on the broader economic and demographic trends of urbanization, industry structure and migration, it is important to examine potential policy impacts on growth. One much studied policy in relation to economic growth is infrastructure spending. A recent meta-analysis of more than 900 studies of infrastructure spending and economic growth measured at sub-national units

and included U.S. data, data from EU member states and data from other countries such as Turkey, China and India. (Elburz, Nijkamp, and Pels, 2017) The meta-analysis found heterogonous results depending on the initial size of economy, type of model used, type of infrastructure studied and operationalization of infrastructure variable. Studies using data from the United States were more likely to find negative relationships between sub-national infrastructure development than studies using EU member state data, studies using non-monetary measures of infrastructure development (for example, miles of highway) were more likely to find positive impacts on economic growth than those studies using a measure of public spending on infrastructure, and studies that focused on roads, land transportation or telecommunications were more likely to find positive results than those focused on airports, seaports or railways, which tended to find negative results on regional economic growth.

One study most directly relevant to the United States, Wink and Eller (1998) examined county-level economic development spending variables and per capita income growth in North Carolina counties during the 1980s. Using a panel data approach and lagged variables, the authors find that paved-highway miles per capita and education spending per capita show significant and strong positive relationships with income growth. Other U.S.-centric studies have shown mostly positive relationships between transportation infrastructure investment and income levels. Bhatta and Drennan's (2003) meta-analysis of studies on transportation investment on economic benefits identified fourteen studies from the 1990s with a focus on income, wage or housing value growth as the dependent variable and a geographic focus at either the county, MSA or state level.

Nine of the fourteen studies found positive relationship, three found no relationship and two found a negative relationship.

Additional national level research has found GDP growth constrained by public debt (Reinhart and Rogoff 2010; Romp and De Haan 2007). With counties in the United State levying different rates of property taxes and issuing bonds for capital improvements, levels of public debt vary among counties and thus county-level equivalents such as micropolitan areas. U.S. state-level analysis of tax rates and both income growth and case studies of the alteration of tax rates on employment growth show mixed results depending on methods used. While Besci (1996) and Reed (R. W. Reed, 2008) found significant negative impacts in income growth based on tax rates in five-year periods and relative income growth for the period 1961-1992, a different analysis with tax rate cuts in New Jersey in 1994 functioning as a natural experiment, was unable to isolate found significant causal evidence that tax rates influenced employment growth because employment growth also occurred in the control group area. (W. R. Reed and Rogers, 2004)

Cortes (2013) and Davidsson (2011) added fiscal policy variables as well as geographic theories to their analyses of micropolitan areas when studying population growth. Davidsson and Cortes (2017) focus on the regulatory environment in micropolitan areas, including tax rates and spending on highways and other infrastructure as well as housing supply factors and their effects on population and employment growth. The authors find a positive correlation between an index constituting a “favorable

regulatory environment," which includes highway investment as a factor, and population growth.

Cortes (2013) found that employment growth in all industries except for construction were correlated to population growth. Initial levels of population and income were likely to have a direct impact on population growth, with micropolitan areas in the South Atlantic and Mountain regions growing faster. Distance to a metropolitan area had a slight positive impact on income growth. Cortes notes that this underscores the "tyranny of proximity" paradox for many micropolitan areas in that those close to metropolitan areas often benefit by the increased employment and other opportunities present in larger urban centers; however too close a proximity to these metropolitan areas can harm a micropolitan area's economic growth because of the competition for retail stores and other amenities available in urban areas. These effects are underscored by previous research by Rickman (2010) and Davidsson and Rickman (2011).

2.5 Micropolitan vs. Metropolitan and Income Change vs. Population Change

The question of isolation from metropolitan areas and its effects on the population and income growth of micropolitan areas hints at the different processes Hammond and Thompson (2008) offer an example from the economics literature focused solely on income growth, finds industry structure and human capital investment the most important determinants of income growth for labor market areas in general during the 1990s. However, these determinants had different effects on metropolitan and non-metropolitan areas. Manufacturing investment had positive effects on income growth in non-metropolitan areas, but not in metropolitan areas. Human capital investment, however,

was found to have a stronger positive relationship to income growth in metropolitan areas than in non-metropolitan areas.

To date, the scholarly literature in economics, geography and public policy has largely, and correctly, treated income growth and population growth as separate phenomenon with separate, if overlapping, determinants. (see Hammond and Thompson 2008, Johnson and Fuggit 2000) Another stream of literature has tested for both population growth effects and economic growth effects in micropolitan areas but has generated little discussion on the difference between population growth patterns and income growth patterns.

The fact that different processes might affect income and population changes appears in the literature but in dispersed studies. Using parts of the same data set, Cortes (2013) and Davidsson and Rickman (2011) made findings that support this difference. Cortes (2013) found that income growth among micropolitan areas was positively associated with linear distance to the nearest metropolitan area of 250,000 or more (meaning income rose as distance from a metropolitan area rose). Davidsson and Rickman's (2011) found a significant negative relationship of population growth with linear proximity to metropolitan areas (meaning population growth increased the closer a micropolitan area was to a metropolitan area).

The notion that population growth would be more likely to occur in micropolitan areas closely linked to large metropolitan areas while income growth would not necessarily follow suit also finds backing in the regional science literature among scholars studying "spread" and "backwash" effects of population and income growth

from urban to rural areas. Urban congestion and income growth, these scholars find, encourage population growth in "exurban" areas as businesses seek to reduce transport costs by locating on the perimeter of urbanized areas while rising housing costs push middle and lower-income residents further afield, increasing population in these exurbs but also potentially increasing income. (Ganning, Baylis, and Lee, 2013; Mulligan, Partridge, and Carruthers, 2012) These findings provide more reasons to test for potentially different processes affecting income growth and population growth as it relates to distance from metropolitan areas as part of the larger study of micropolitan areas in the early twenty-first century.

CHAPTER 3: DATA AND METHODS

3.1 Proposed Research Questions and Hypotheses

The primary research questions posed by this analysis will be as follows. **1) What are the determinants of changes in relative economic prosperity and population change in United States micropolitan areas in the twenty-first century?** Economic prosperity and population are operationalized here as changes in Relative Per Capita Income and Percentage Change in Population, respectively. **2) To what extent did county-level policies on spending for economic-development related infrastructure affect relative income and population growth in micropolitan areas during this period?**

This analysis will require multiple regression analyses using Changes in Relative Per Capita Income and Changes in Total Population as dependent variables. The use of these dependent variables operationalize the concept of economic prosperity and employment opportunity. Explanatory variables are developed from the literature on micropolitan areas and convergence as explained above in the literature review. The following table explains the primary questions, unit of analysis, independent and explanatory variables. Table 3.1.1 in the following Hypothesis section more explicitly spells out hypothesized directional correlations and their basis in the literature.

TABLE 3.1.1: RESEARCH QUESTIONS AND ANALYSIS STRATEGY

	Research Question	**Unit of Analysis**	**Time Period**	**DV**	**IV**
1	What are the determinants of changes in economic prosperity (as defined by changes in relative per capita incomes in United States' micropolitan areas in the twenty-first century?	United States Micropolitan Areas	2002-2014	Change in Relative Per Capita Income 2002 to 2014,	Initial Relative Per Capita Income 2002, USDA Urbanization scale, USDA natural amenities scale; 2002 levels of Per Capita Education Spending, Per Capita, Per Capita Revenue from Property Taxes, Per Capita Highway Spending, Per Capita Health and Hospital Spending Distance from metropolitan area, presence of flagship university; 2002 to 2014 total of Net Domestic Migration, Incoming International Migration; 2002-2014 Change in Manufacturing Employment, Professional Services Employment, State Government Employment, Local Government Employment, Census Region
2	What are the determinants of population change (as defined by percentage change in population of the United States' micropolitan areas in the twenty-first century?	United States Micropolitan Areas	2002-2014	Percentage Change in Population 2002-2014	Initial Relative Per Capita Income 2002, USDA Urbanization scale, USDA natural amenities scale; 2002 levels of Per Capita Education Spending, Per Capita, Per Capita Revenue from Property Taxes, Per Capita Highway Spending, Per Capita Health and Hospital Spending Distance from metropolitan area, presence of flagship university; 2002 to 2014

					total of Net Domestic Migration, Incoming International Migration; 2002-2014 Change in Manufacturing Employment, Professional Services Employment, State Government Employment, Local Government Employment; Census Region

3.2 Hypotheses

This dissertation will test two primary hypotheses along two dependent variable dimensions incorporating nearly two dozen independent variables. The large number of variables can be subdivided into nine general categories – Demographic Changes, Migration, Educational, Natural Amenities, Locational Factors, Baseline Industry Structures, Changes in Industry Structures, Baseline Population and Local Public Policy Spending Variables. Based on a review of the literature, I hypothesized that the sub-variables within each of these categories would have either positive or negative effects of population growth and relative income change. The list of variables in these hypotheses is too long and cumbersome to present a full verbal description. Therefore, the hypotheses can be summarized in the following basic equations with the hypothesized directional relationship summarized for each independent variable to the dependent variable summarized in the table that follows.

Hypothesis 1: Changes in Relative Per Capita Income 2002-2014 = B + Baseline Relative Income 2002 + Demographic Changes + Migration Change + Educational

Change + Natural Amenities Factors + Locational Factors + Baseline Industry Structure 2002 + Changes in Industry Structures + Baseline Population + Local Public Policy Spending Variables 2002 + e

Hypothesis 2: Percent Change in Population 2002-2014 = B + Baseline Relative Income 2002 + Demographic Changes + Migration Change + Educational Change + Natural Amenities Factors + Locational Factors + Baseline Industry Structure 2002 + Changes in Industry Structures + Baseline Population + Local Public Policy Spending Variables 2002 + e

TABLE 3.1.2: CATEGORIZATION AND HYPOTHESIZED DIRECTIONAL RELATIONSHIP OF INDEPENDENT VARIABLES

Category of IV	*Hypothesized Directional Correlation*	*Backing in Literature*	*Year Period*
	Demographic		
Change in % of population 25-44	+	Plane 2005; Plane and Jujerevich 2009	
Change in % population 65 and older	-	Plane 2005; Plane and Jujerevich 2009	
Change in % population Hispanic	-	Xu, Garand and Zu 2016; (Keeton and Newton, 2005)	1990-2000; 1990-2010
Change in % population AA	-	Davidsson and Rickman 2011	1990-2000
Baseline population	+	Mulligan and Vias 2006	1980-2000
Change in total population	+	Davidsson and Rickman 2011	1990-2000
Change in % BA or higher	+	Davidsson and Rickman 2011	1990-2000
	Migration		
Change in Net Domestic Migration	+	Mulligan 2015, Plane and Jujerevich 2009	1980-2000

Change in International Migration	-	Xu, Garand and Zu 2016	1990-2000
	Industry Structure		
Baseline % employed in Government	+	Mulligan and Vias 2006	1980-2000
Change in % employed in Government	-	Mulligan and Vias 2006	1980-2000
Baseline % employed in Professional Services	+	Davidsson and Rickman 2011; Cortes et al. 2013	1990-2000; 2000-2007
Change in % employed in Professional Services	+	Davidsson and Rickman 2011; Cortes et al. 2013	1990-2000; 2000-2007
Baseline % Employed in Health Care	-	Davidsson and Rickman 2011; Cortes et al. 2013	1990-2000; 2000-2007
Change in % employed in Health Care	-	Davidsson and Rickman 2011; Cortes et al. 2013	1990-2000; 2000-2007
Baseline % employed in Manufacturing	-	Mulligan 2015	1980-2000
Change in % employed in Manufacturing	-	Mulligan 2015; Vias et al. 2002	
	Location Factors		
Distance from metro area	-	Partridge and Rickman 2008	1990-2000
Presence of flagship university	+	Cortes et al. 2013	2000-2007
Census Region	+ South, West	Cortes et al. 2013	2000-2007
	Amenities Factor		
USDA Natural Amenities Scale	+	McGranahan 2011	1990-2004
	Public Policy Variables		
Per Capita Property Tax Revenue 2002 as % of PC income	-	Davidsson and Rickman 2011	1990-2000
Per Capita Highway Spending 2002	+	Wink and Eller 1998; Bhatta and Drennen 2003; Davidsson and Cortes 2017	1981-1990; metaanalysis 1945-2000; 1990-2010

Per Capita Education Spending 2002	+	Wink and Eller 1998; Bhatta and Drennen 2003; Davidsson and Cortes 2017	1981-1990; metaanalysis 1945-2000; 1990-2010
Health and Hospital Spending per capita 2002	-	Cortes et al. 2013	2000-2007

Limitations of the data include some issues of measurement. While the unit of analysis is those areas classified as micropolitan areas using the 2013 U.S. Census definitions without regard to whether or not these geographies were defined as micropolitan in the original 2003 Census micropolitan definitions. As Gottlieb (2006) notes, this use of standardized regions across time periods will be biased in favor of those areas that have grown into their micropolitan status over the intervening time period. Gottlieb's recommendation to avoid this bias is to use geographies defined using consistent population standards during the decennial census year of measurement. While this recommendation might work for longer-term studies, the use of decennial data only prevents the inclusion of fine-grained migratory patterns, particularly return migrations between counties and regions and indeed migration patterns during the first five years of any decennial census. While the Census' American Community Survey products offer yearly migratory estimates, previous decennial census products have offered only estimates of migration five-years prior to the decennial year, leaving out early decade moves and return migrations within five years. And though the ACS suffers from less than complete coverage, coverage of smaller communities such as micropolitan areas may in fact be more complete than for larger areas such as metropolitan statistical areas. (Franklin and Plane, 2006)

3.3 Methods

This study will use two cross-sectional OLS regression models to test several independent variables on two dependent variables - Percentage Point Change in Relative Per Capita Income and Percentage Change in Total Population from 2002 to 2014 - among the 532 micropolitan areas in the continental United States. The purpose of OLS regression in this instance is not to create a causal model of these change. On the other hand, it provides the best method to uncover the characteristics of micropolitan areas where income and population growth has occurred. In addition, incomplete data on public policy spending variables due to the discontinuation of the USA Counties Program after the 2002 Economic Census makes other methods such as time-series or panel regression methods impossible. This follows the most recent methods used to study this question in the regional science literature such as the 2011 analysis by Davidsson and Rickman and Cortes' 2013 analysis of employment and population growth in select micropolitan areas from 1990 to 2010. Davidsson and Rickman (2011) use reduced-form regressions with 52 independent variables to test for correlation with population changes, wage changes and changes in housing rents. Cortes (2013) used the same set of variables to test for employment and population changes in micropolitan areas between 2000 and 2007.

Independent Variables are listed in the results table and were culled from a larger list of demographic, industry structure, geographic and economic variables through an initial regression which identified multicollinearity. Variance Inflation Factor (VIF) tests were then conducted and those variables with higher than 5 were excluded. This allowed for the main potential explanatory variables as described in the Descriptive Statistics

chapter to be included in the final model. For an explanation of using the VIF threshold of 5 as a meaningful cutoff for removing independent variables see (Thompson, Kim, Aloe, and Becker, 2017).

TABLE 3.1.3: VARIANCE INFLATION FACTORS OF EXCLUDED IVS

Variable	VIF	Percentage of total population 2000
2002 % White Non-Hispanic	15.04	0.066
2002 % African American	8.94	0.11
Median Age	8.76	0.113
2002 % 65 and older	10.26	0.097

The use of the remaining independent variables were drawn from previous literature as will be explicated in the following chapter on Descriptive Statistics and Analytical Results.

3.3 Study Area and Time Period

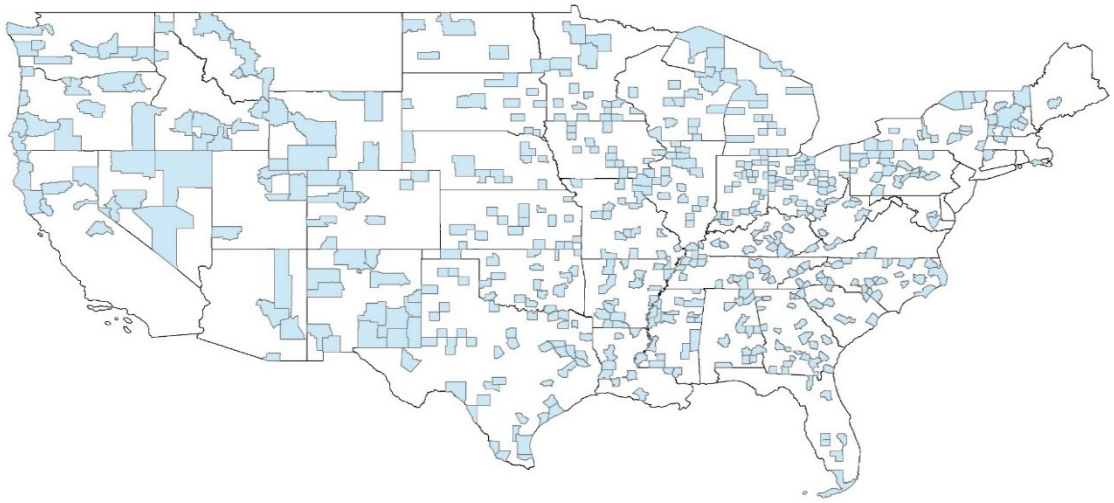

Figure 3.3.1: Micropolitan Areas in the United States, 2013. Source: U.S. Census Bureau

A look at descriptive statistics on the economic health of micropolitan areas gives some insight into how these areas are changing relative to the rest of the country. Clearly, during the first 14 years of the twenty-first century, the majority of population growth in the United States has come in its metropolitan regions. While the total United States' population has grown 12.9 percent during this time period, metropolitan regions have shown a 14.8 percent growth rate and have grown in their share of the United States' total population from 84.1 percent in 2000 to 85.5 percent in 2014, according to Bureau of Economic Analysis estimates. At the same time the share of non-metropolitan population has decreased. Still, sufficient variation in growth rates between micropolitan areas (4.9 percent) and purely rural areas (0.4 percent) hint at different economic and demographic

factors at play and argue for the importance of studying these smaller non-metro, non-rural urbanized economies.

TABLE 3.3.1: GROWTH RATES AND URBAN-RURAL CLASSIFICATION, 2000-14

Geography	Total Population growth 2000-2014	Percentage of total population 2000	Percentage of total US population 2014	Total population 2014
Metropolitan US	14.8%	84.1%	85.5%	272,468,701
Micropolitan US	4.9%	9.4%	8.7%	27,677,577
Rural US	0.4%	6.5%	5.8%	18,417,178
Total US	12.9%	-	-	318,563,456
Source: US Bureau of Economic Analysis				

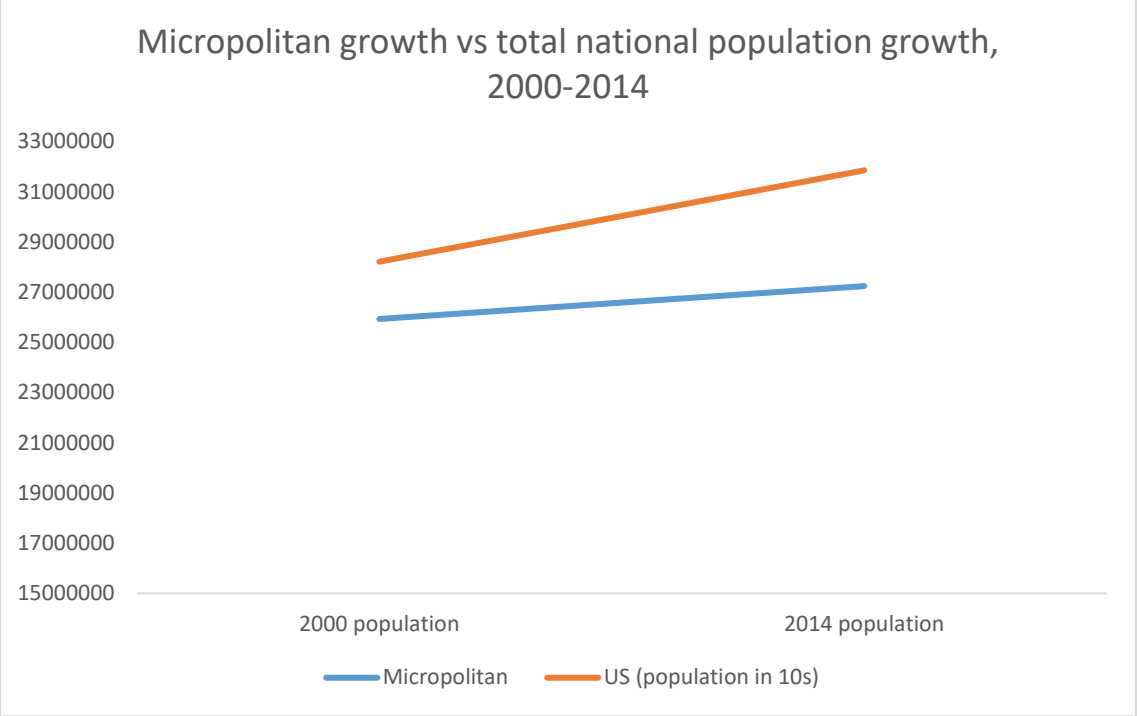

Figure 3.3.2: Micropolitan vs. National Population Growth, 2000-2014

In order to provide further evidence that micropolitan areas constitute a significantly different and coherent unit of analysis, it is necessary to compare trends in micropolitan areas with their Economic Area counterparts of metropolitan areas during the study period. As this examination shows, micropolitan America bears significant differences with micropolitan America in both Income and Wage trends as well as in Industry Structure. As Brown et al. (2004) found and Hammond and Thompson (2008) confirmed, micropolitan areas were much more reliant on manufacturing employment at the beginning of this study period. Indeed in 2002, 16.4 percent of jobs in micropolitan America were in Manufacturing as opposed to 9 percent in metropolitan America. Declines in manufacturing employment were also less pronounced in metropolitan America, which saw 18 percent decline in manufacturing employment as opposed to 11 percent in micropolitan America. Micropolitan America's workforce is also significantly more reliant on local government employment than Metropolitan America. While only 8 percent of jobs in Metropolitan America are local government dependent, nearly 13 percent of jobs in micropolitan area were local-government dependent.

TABLE 3.3.2: INDUSTRY STRUCTURE: MICROPOLITAN VS. METROPOLITAN AREAS

	Metropolitan	Micropolitan	Metropolitan	Micropolitan
	2002 % of Employment	2002 % of Employment	2002-2014 Change in Employment	2002-2014 Change in Employment
Manufacturing	9.01%	16.40%	-18.1%	-11.10%
Professional Services	6.75%	2.40%	27.2%	14.50%
Health Care	9.72%	12.10%	34.8%	17.40%
Federal Government	1.31%	1.50%	-5.6%	-11.60%
State Government	3.04%	4.30%	6.2%	0.50%
Local Government	7.89%	12.70%	3.4%	2.20%
Source: US Bureau of Economic Analysis				

An examination of relative Per Capita Personal Income trends also reveals significant differences between metropolitan, non-metropolitan and micropolitan areas while also pointing to some level of income and wage convergence during this time period with relative income and wages rising in both the rural and micropolitan areas but falling slightly in the metropolitan areas. Relative Per Capita Income is higher than Relative Per Job Average Wages in both micropolitan areas and rural areas but slightly lower in metropolitan areas. This indicates the greater share of income constituted by transfer payments and other non-wage income in non-metropolitan areas as opposed to metropolitan areas, points to greater employment opportunities in metropolitan regions. And while levels of Relative Per Capita Income and Wages are above the national average in the metropolitan United States and below the national average in the

micropolitan and rural United States, relative average wage per job levels are significantly higher in micropolitan areas than rural areas, further supporting the idea that these two types of non-metropolitan economics are different in structure and on different future trajectories.

TABLE 3.3.3: RELATIVE INCOME AND WAGE CHANGES URBAN-RURAL CLASSIFICATION, 2000-2014

	Relative Per Capita Personal Income 2000	Relative Per Capita Personal Income 2014	Percentage Point Change 2000 to 2014	Relative Per Job Average Wages 2000	Relative Per Job Average Wages 2014	Percentage Point Change 2000 to 2014
Metropolitan US	104.9%	103.5%	-1.4	104.3%	103.6%	-0.7
Micropolitan US	76.5%	80.5%	4	70.4%	74.0%	3.6
Rural US	70.1%	77.8%	7.1	57.3%	63.4%	6.1
Source: US Bureau of Economic Analysis						

The time period under study requires some caution. In addition to one of the most severe recessions in American history from 2007-2009 and its after-effects, the 2002 to 2014 time period also included a housing bubble, which some scholars note artificially inflated regional economies, particularly in metropolitan areas around 2002. (Gabe and Florida 2011) For this reason, many earlier analyses such as Davidsson and Rickman (2011) used the 1990s as the time period under study. In addition, the use of time series analysis during this time period would likely be skewed by abnormal year-to-year fluctuations in these "false economies." While using change variables from 2002 to 2014 sacrifices the determination of causal findings, this time period is more likely to represent

longer-term economic trends as the effects of the false boom of the early 2000s and the lingering effects of the recessions, at least the ones more temporary in nature, would be likely to have passed by 2014.

CHAPTER 4: RESULTS

After establishing the reality of significant economic and demographic variation between the micropolitan areas and other types of geographic and economic units in the United States, we now turn to exploring variations between micropolitan areas themselves. While overall population increased by 4.9 percent during this time period, 183 of 536 micropolitan areas lost population with population changes ranging from nearly 80 percent increased to nearly 25 percent population loss.

TABLE 4.1: DESCRIPTIVE STATISTICS PER CAPITA PERSONAL INCOME

	Average Per Capita Personal Income	Maximum Per Capita Personal Income	Minimum Per Capita Personal Income	Standard Deviation Personal Per Capita Income
2000	76.3%	194.0%	33.4%	14.8
2014	81.7%	310.5%	47.1%	21.1

TABLE 4.2: DESCRIPTIVE STATISTICS PER JOB WAGES

	Average Relative Per Job Wages	Maximum Relative Per Job Wages	Minimum Relative Per Job Wages	Standard Deviation Relative Per Job Wages
2000	72.3%	147.4%	49.2%	9.1
2014	74.2%	158.2%	54.0%	11.2

TABLE 4.3: DESCRIPTIVE STATISTICS 2000 to 2014 CHANGE IN POPULATION, RELATIVE PC INCOME AND RELATIVE PER JOB WAGES

	Average Change 2000-2014	Maximum Change 2000-2014	Minimum Change 2000-2014	Standard Deviation Change 2000-2014
Population	5.3%	79.7%	-24.2%	11.10%
Relative Per Capita Personal Income	5.4	189.2	-15.8	14.1
Relative Average Per Job Wages	1.9	94.6	-27.5	9.0

Average Relative PCPI has increased among the entire set of micropolitan areas from 76.3 percent of the national average to 81.7 percent in 2014. However, 164 micropolitan areas declined in terms of relative per capita personal income while 370 micropolitan areas increased in per capita personal income. Variation in the largest gaining micropolitan areas and micropolitan areas with the largest declines in Relative Per Capita Personal Income is significant. The average change of +5.4 percentage points is significantly lower than the standard deviation of 14.1 percentage points. Changes in relative per job wages are less various than changes in Relative Per Capita Personal Income. Changes in Relative Per Job Wages were also less extreme – with the Maximum Change in Per Job Wages from 2000 to 2014 being about half the change in Per Capita Personal Income. However, the minimum change in Relative Per Job Wages was considerably lower than the minimum change in Relative Per Capita Personal Income, indicating the ability of non-wage income, likely transfer payments, to prop up per capita income in some areas while other types of non-wage income such as interest, rent or

capital gains may be driving large increases in economic prosperity in some areas. This is consistent with the findings in Carlino and Mills (1996), who found evidence of convergence in per capita income among United States but not wage rates.

TABLE 4.4: TEN BIGGEST GAINERS AND LOSERS
IN POPULATION, 2000 to 2014

Top 10 Micro Areas	% Change Population 2000-2014	Bottom 10 Micro Areas	% Change Population 2000-2014
Heber, UT	79.7%	Helena-W. Hel., AR	-24.2%
Williston, ND	63.1%	Greenville, MS	-21.9%
Fernley, NV	48.8%	Indianola, MS	-19.7%
Jefferson, GA	47.9%	Clarksdale, MS	-18.7%
Vernal, UT	46.2%	Cleveland, MS	-16.4%
Bozeman, MT	42.3%	Blytheville, AR	-14.7%
Gillette, WY	42.2%	Greenwood, MS	-14.1%
Cedar City, UT	39.0%	Bastrop, LA	-13.6%
Dunn, NC	38.6%	Camden, AR	-12.7%
Oxford, MS	36.6%	El Dorado, AR	-11.7%

Table 4.5: TEN BIGGEST GAINERS AND LOSERS IN RELATIVE PER CAPITA PERSONAL INCOME, 2000 to 2014

Top 10 Micro Areas	Pct Point Change PC Personal Income 2000-2014	Bottom 10 Micro Areas	Pct Point Change PC Personal Income 2000-2014
Williston, ND	189.2	Pinehurst-SP, NC	-15.8
Dickinson, ND	120.1	Brevard, NC	-15.3
Jackson, WY-ID	116.5	New Castle, IN	-12.6
Andrews, TX	52.2	N. Wilkesboro, NC	-12.3

Summit Park, UT	51.5	Adrian, MI	-12.3
Woodward, OK	51.1	Cornelia, GA	-10.5
Snyder, TX	45.4	Lewisburg, TN	-10.1
Gainesville, TX	43.9	Gardnerville Ranchos, NV	-10.1
Minot, ND	38.7	Forest City, NC	-9.7
Carlsbad, NM	38.7	Los Alamos, NM	-9.7

Table 4.6: TEN BIGGEST GAINERS AND LOSERS IN RELATIVE PER JOB WAGES, 2000 to 2014

Top 10 Micro Areas	Pct Point Change Per Job Wages 2000-2014	Bottom 10 Micro Areas	Pct Point Change Per Job Wages 2000-2014
Williston, ND	94.6	Corning, NY	-27.5
Dickinson, ND	67.2	Connersville, IN	-25.4
Zapata, TX	38	Ionia, MI	-22.4
Andrews, TX	37.9	New Castle, IN	-21.7
Snyder, TX	37.7	Brevard, NC	-20.3
Levelland, TX	32.9	Union City, TN-KY	-18
Alice, TX	31.1	Sandusky, OH	-16
Hobbs, NM	30.1	Newton, IA	-15.5
Elk City, OK	29.1	Fairfield, IA	-13.5
Woodward, OK	27.1	Bedford, IN	-13

An examination of outliers in income, wage and population change reveals interesting state-level clusters. Mississippi and Arkansas micropolitan areas account for nine out of 10 of the largest declines in population. Two North Dakota micro areas – Williston and Dickinson – show up as top gainers in all categories – likely the result of

the oil boom of the early 2000s. In terms of wage growth, seven of the top 10 gainers in wage growth were in Texas or Oklahoma. Four of the ten micropolitan areas with the largest relative per capita income declines are in North Carolina. This indicates a need for holistic review of state- and local-level events and policies. This analysis of outliers will take place through rich description in the final chapter of this dissertation.

Descriptive data from overall migration rates also informs part of the analysis strategy. Plane (2005) notes the importance of age-articulated migration in the growth of regions. While net domestic migration was on the rise in micropolitan areas as a whole from 2003 through 2008, net migration rates did not recover after the recession and remained negative from 2010 to 2014.

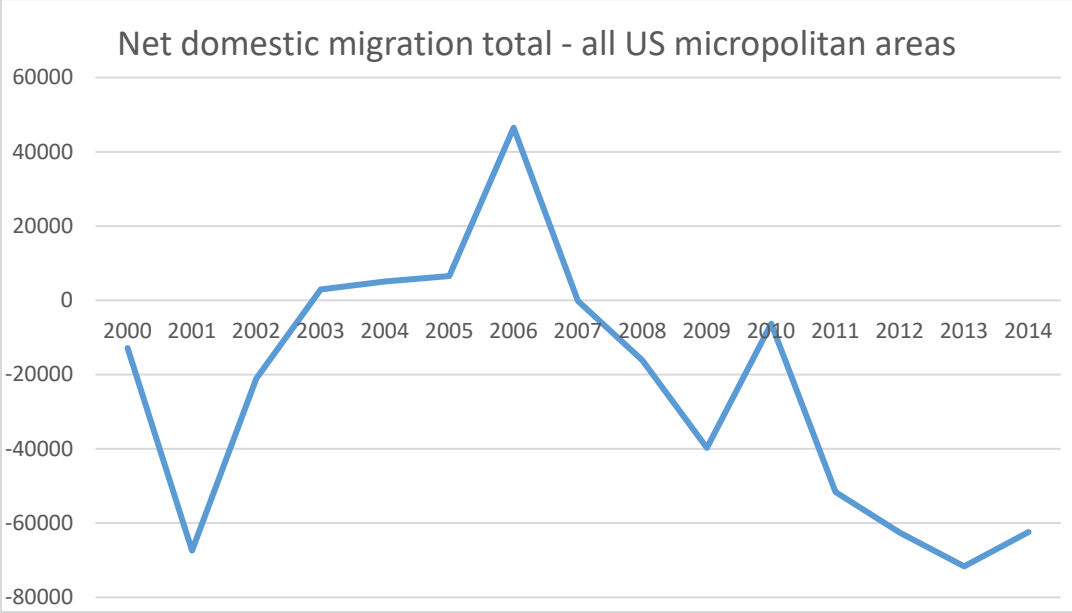

Figure 4.3. Net Domestic Migration of US Micropolitan Areas 2000 to 2014

Accurate statistics on net immigration are difficult to come by as outmigration to non-US locations is not tracked by the US Census Bureau in a systematic and subnational scale. However, a look at total immigration to micropolitan areas shows a similar pattern of a pre-recession peak in 2006 followed by a decline through 2011, with a slight uptick not reaching pre-recession levels as of the end of the study period in 2014.

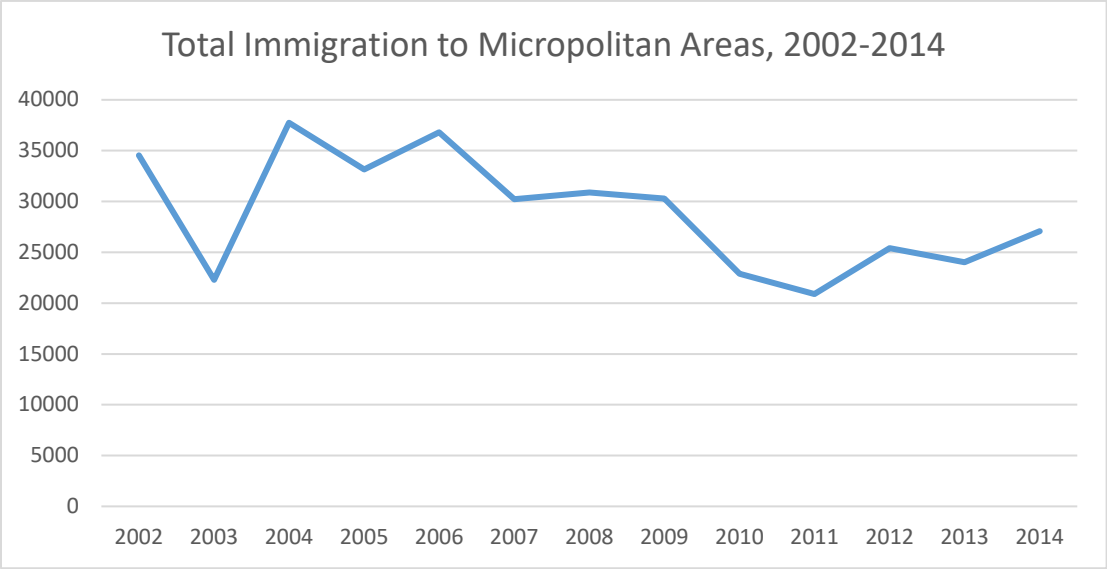

Figure 4.4. Total Immigration to Micropolitan Areas

4.1. Industry Structure

I chose to examine the six sectors that make up about half of the micropolitan economy – health care, manufacturing, professional services and federal, state and local government. Manufacturing was chosen for its status as an exporting industry adding to a region's base and thus impacting the regional economy through multiplier effects to other supporting local industries. In addition, the loss of many manufacturing jobs during the postindustrial study period could reveal useful regional insights. This follows Hammond

and Thompson's (2008) finding of the importance of manufacturing investments in non-metropolitan income growth.

Health Care also emerged during this time period as the largest employment sector in the United States' economy. Given the aging of the baby boomer generation and simultaneous advances in medical care, health care has become increasingly important as an employment driver. Combined with losses in manufacturing jobs, this increase has resulted in many regions – metropolitan, micropolitan and rural alike – becoming more economically reliant on health care. While manufacturing employment in micropolitan areas declined by an average of 11.1 percent from 2002 through 2014, employment in health care increased by 17.4 percent on average during the same period.

Professional Services employment has also become increasingly important as an economic driver in metropolitan areas during the postindustrial era under study. Professional services employment is associated with better-educated population and higher wages and induced income that results in spillover effects. While Professional Services Employment in micropolitan areas averaged only 2.4 percent in 2002, it increased on average 14.5 percent through 2014, the second-fastest growing employment sector among micropolitan areas. The growth of professional services employment is expected to positively correlate to relative income growth.

Government employment can serve as a proxy for the presence of externally funded institutions such as federal military installations, state universities and/or centralized places where state revenues flow (i.e. state capitals). Federal Government played a relatively minor role in most micropolitan areas, averaging only 1.5 percent

across micropolitan areas in 2012. However, it reached as high as 22.9 percent in some micropolitan areas, indicating a wide range of impacts and events. Federal government employment in micropolitan areas also showed declines during this time period, averaging declines of 11.6 percent – even larger declines on average than manufacturing. Potential events affecting this decline include the Base Realignment and Closure Act, passed by Congress and implemented by the Department of Defense in the years following 2005, which resulted in the consolidation of smaller military facilities with larger ones.

State government employment represented a larger share of employment on average in micropolitan areas as of 2002, averaging 4.3 percent of total employment. Given budget crises impacted by the Great Recession of 2007-2009, some states decreased their workforces during the time period under study. Overall, state government employment showed slow growth on average, increasing by only 0.5 percent during that time period. Micropolitan areas showed vast variation in state government employment increases varying from decreases of more than 86 percent to an increase of 714 percent.

Local government employment began as a larger proportion of employment at the beginning of the study period – averaging 12.7 percent of total employment among micropolitan areas in 2002. Local government also showed more stability, given that many services provided by local government are mandated by law. In addition, some services provided by local government may be economically counter-cyclical, federally funded assistance programs requiring local administration for example. These may result in increases in local government employment even during economic downturns. Local

government employment grew on average by 2.2 percent during this time period and showed a bit less variation a standard deviation of 17.8 percent.

TABLE 4.1.1. INDUSTRY STRUCTURE BASELINE IN MICROPOLITAN AREAS

	Average	Minimum	Maximum	Standard Deviation
2002 Health Care Employment	12.1%	2.6%	26.9%	3.7%
2002 Manufacturing Employment	16.4%	.06%	48.6%	10.1%
2002 Professional Services Employment	2.4%	0.07%	17.9%	1.4%
2002 Federal Government Employment	1.5%	.03%	22.9%	2.4%
2002 State Government Employment	4.3%	0%	36.7%	5.2%
2002 Local Government Employment	12.7%	5.6%	31.4%	4.0%

TABLE 4.1.2: INDUSTRY STRUCTURE CHANGES IN MICROPOLITAN AREAS

	Average	Minimum	Maximum	Standard Deviation
02-14 Health Care Employment Growth	17.4%	-62.7%	163%	22.7%
02-14 Manufacturing Employment Growth	-11.1%	-95.4%	306%	39.1%
02-14 Professional Services	14.5%	-69.4%	542%	51.2%

Employment Growth				
02-14 Federal Government Employment Growth	-11.6%	-55.7%	299%	28.6%
02-14 State Government Employment Growth	0.5%	-86.4%	714.6%	50.5%
02-14 Local Government Employment Growth	2.2%	-40.8%	189.5%	17.8%

4.2. Demographic Variables

Economic, public policy and economic geography literature has noted the importance of demographics and demographic change for regional income change and population change. Two major demographic trends were underway during the 2002-2014 study period in question. First, the aging of the baby boomer generation pushed up the median age in the United States from 35.3 to 37.3. At the same time, an influx of international immigrants from Latin America (and to a lesser extent Asia) reshaped the composition of the labor pool in some industries – particularly construction and agriculture. While previous immigration trends had concentrated around major gateway cities, immigration spread to a broader spectrum of urban areas, and even non-metropolitan areas.(William R. Keeton and Geoffrey B. Newton, 2005) Therefore, an examination of changes in Hispanic population in micropolitan areas and its effect on economic prosperity and population change in micropolitan areas. Hispanic share of the population averaged about 7.7 percent in 2002 and ranged from virtually nothing to 97.7

percent in some micropolitan areas along the Mexican border. Growth in the Hispanic share of the population averaged 2.4 percentage points among all micropolitan areas, but was as high as a 47.7 percentage point gain and as low as a 28 percentage point decline. Total immigration as a portion of 2002 population also varied, averaging 1.6 percent and ranging from 0 percent to 17.9 percent with a standard deviation of 1.9 percent. Internal migration has also played an important role in the economic prosperity and the population growth of regions, particularly in the Sunbelt. Total internal migration averaged 2.3 percent of the 2002 population during the time period with some micropolitan areas adding 22.2 percent of 2002 population and as little as 0.02 percent of the 2002 population.

As the United States economy transitioned from manufacturing-based to knowledge-based during the postindustrial era, post-secondary educational attainment became increasingly important as a predictor of economic success and a prerequisite to the highest-paying jobs in the professional services sector. Bachelor's Degree attainment on the whole was lower than the national average in micropolitan areas as of 2002, averaging 16.7 percent but varied from 6.7 percent to 61.1 percent. From 2002 to 2014, the share of bachelor's degree holders increased on average by 2.7 percentage points, ranging from a loss of 12.3 percentage points to a gain of 12.4 percentage points. Studies on the effect of human capital investment on population and income growth in non-metropolitan areas has shown mixed results. Davidsson and Rickman (2011) found clear connections between baseline bachelor's degree attainment and population and wages. Hammond and Thompson (2008), while noting the importance of human capital as

measured by the change in average annual change in years of schooling, also noted that the change influenced income growth in metropolitan areas with much more intensity that in the non metropolitan labor market areas during the 1990s.

In times of economic change, early-to-mid-career workers comprise an important demographic driving innovation and employment in established and new fields. (Plan 2005, Plan and Jujerevich 2009) Therefore, this study will examine the share of 25 to 44 year olds as well as the change in the share of 25 to 44 year olds in each micropolitan areas. The aging of the United States population during this time period as well as increasing preferences of young Americans for urban areas led to an average decline in the share of 25 to 44 year olds in micropolitan areas. While the average share in micropolitan areas was 26.7 percent in 2002, the average micropolitan area saw a 2.9 percentage point decline in this demographic through 2014. Among demographic variables, this share variable appears to be the least volatile with a standard deviation of 1.8 percentage points.

Other demographic variables are omitted to avoid multicollinearity as explained in the Variance Inflation Factor Analysis mentioned in the past chapter and to focus on the variables that the literature identifies as those most likely to influence economic prosperity and growth (Xu, Garand and Zu, 2016 and Keeton and Newton, 2005)

TABLE 4.2.1. DEMOGRAPHIC CHANGE IN MICROPOLITAN VARIABLES

	Average	Minimum	Maximum	Standard Deviation
2002 Hispanic Percentage	7.9%	0.03%	97.7%	14.5%
02-14 Point Growth in Hispanic Percentage	2.4	-28.0	47.7	4.3
2002 BA or Higher Percentage	16.7%	6.7%	61.1%	6.7%
02-14 BA or Higher Percentage Growth	2.7	-12.3	12.4	2.0
2002 25 to 44 year old Percentage	26.7%	19.1%	43.3%	2.5%
02-14 25 to 44 year old Percentage Growth	-2.9	-13.9	5.4	1.8
02-14 Domestic Migration as % of 2002 Population	2.3%	.02%	22.2%	2.4%
02-14 Immigration as % of 2002 Population	1.6%	0%	17.9%	1.9%

4.3 Local Spending Variables

Local public policies, particularly highway and education spending have been shown to influence income and other economic growth factors. (Wink and Eller, 1998) As one of the potentially modifiable variables in this model of income and population

growth, local spending policies are of particular importance for regional public administrators and economic development practitioners.(Bhatta and Drennan, 2003)

Unfortunately, federal budget cuts during this time period have made it more difficult to ascertain local-level funding variables on a broad, national scale. The discontinuation of the USA Counties program by the United States Census Bureau after 2002, means county-level spending data is not available. While the Census of Governments aggregates local spending at the state level, it does not note county or sub-state-level geographies.

However, using the 2002 public policy variables at the county-level (modified in the case of multi-county micropolitan areas by population-weighted averaging) can reveal initial levels of funding and long-run effects. This is particularly useful in the case of education funding, which may have a longer lag effect than the others in this category. Spending priorities showed large variation. The table below shows the wide variations in per capita property tax collections, per capita education spending, per capita health care spending and per capita highway spending.

TABLE 4.3.1. LOCAL SPENDING VARIABLES, 2002

	Average	Minimum	Maximum	Standard Deviation
Per Capita Property Tax Collection	$698	$97	$5,778.5	$467
Per Capita Education Spending	$1,042	$601	$3,820	$400
Per Capita Health Care Spending	$360	$0	$3,720	$520
Per Capita Highway Spending	$180	$10	$790	$110

4.4 Locational Factors: Distance to the Nearest Metropolitan Area

In a time of urbanization such as the early twenty-first century, proximity to urban areas has been noted as an important driver of population growth. We have seen from the previous statistics that population growth in metropolitan areas has outpaced that in micropolitan and rural areas since the turn of the twenty-first century. Previous studies of micropolitan areas have also confirmed that population growth has been greater in those micropolitan areas closer to metropolitan areas. Indeed, many areas that were initially identified as micropolitan areas in the initial 2003 definition by the U.S. Census Bureau have subsequently become subsumed by the expanding boundaries of metropolitan areas after the 2013 Census re-definitions. To avoid issues of the Modifiable Unit Area Problem, this study uses only those micropolitan areas identified in the 2013 definitions to provide for consistency, though they may understate trends in the fastest-growing micropolitan areas or those closest to larger metropolitan areas, which may have

expanded their boundaries after the 2013 redefinition of Core Based Statistical Areas. Cortes and Davidsson (2013) found that while population increased in micropolitan areas closer to metropolitan areas, distance to nearest metropolitan areas in fact had a slight positive relationship with income, indicating a "tyranny of distance" where micropolitan areas close to metropolitan areas fail to generate their own basic industries and become ever more reliant on population and industrial growth in nearby metros. While Cortes and Davidsson found used linear distance as the independent variable in this model, this study will used a categorical variable based on potential commuting distance and will focus on metropolitan areas of 250,000 population or more. The four-categories examined include potential commutable areas of less than 40 miles away, potentially commutable exurban areas of 40-70 miles, far-flung exurbs of between 70 to 120 miles and completely isolated micropolitan areas of 120 miles or more away. Descriptive statistics related to distance reveal population growth on average throughout as well as relative income growth on average throughout. Interestingly, relative income in the isolated micropolitan areas increased faster than any other category and, in fact, emerged as the highest on-average relative income of any of the categories as of 2014. This likely reflects the influence of western mountain resort towns as well as the discovery and harvest of the Bakken oil reserves after 2006.

TABLE 4.4.1. DISTANCE TO METROPOLITAN AREAS OF 250,000 OR MORE

	Less than 40 Miles	40 to 70 Miles	70 to 120 Miles	More than 120 Miles
Micro Areas	25	146	168	193
Relative Per Capita Personal Income 2002	79.9%	78%	75.5%	77.3%
Relative Per Capita Personal Income 2014	80.7%	78.3%	79.5%	85.5%
Average Population 2002	60,498	56,205	47,165	42,469
Average Population 2014	64,039	58,088	48,769	44,780

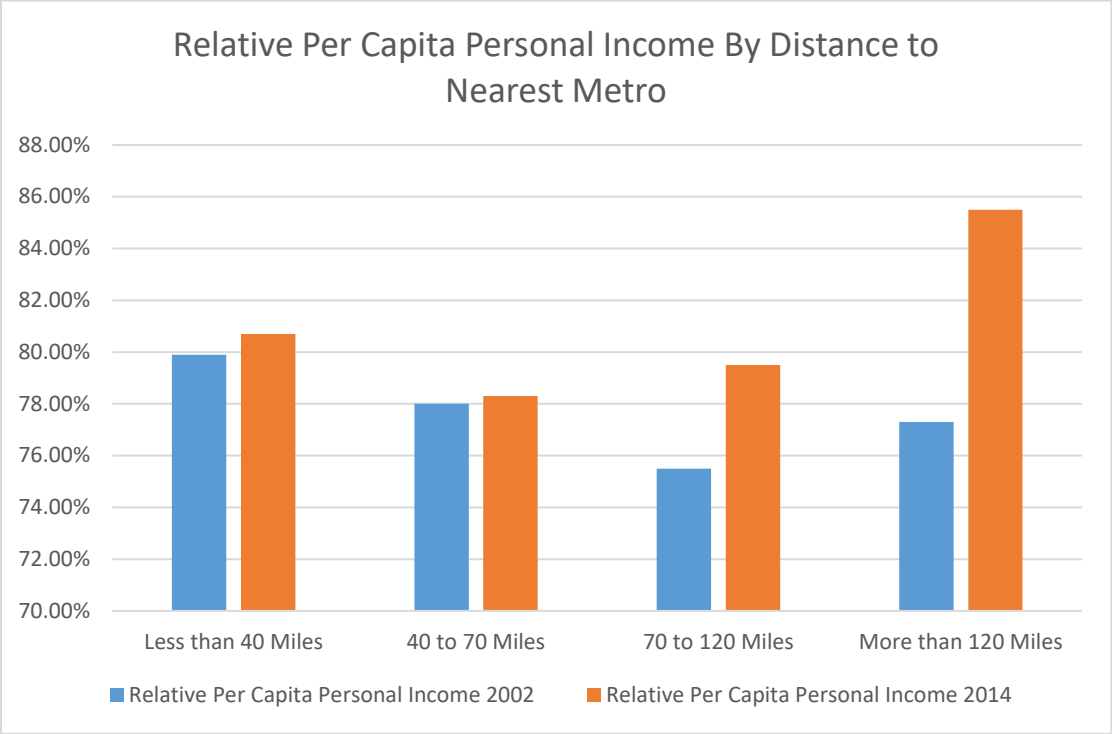

Figure 4.4.1 Distance to Nearest Metro and Relative Income Change

Historical patterns of growth have led to an uneven geographic distribution of micropolitan areas across Census Divisions. The heavily industrialized and urbanized New England and Mid-Atlantic states, as well as the Pacific Coast states have the fewest number of micropolitan areas, while East North Central States (Ohio, Indiana, Illinois, Wisconsin and Michigan) have the largest number of these areas, followed by the West South Central, West North Central and South Atlantic States. Relative Income on average has declined only in the East North Central and South Atlantic Census Divisions while increasing on average in the other seven regions. New England micropolitan areas are the only to have a higher-than-national-average relative income throughout the study period.

The decline of incomes on average in South Atlantic micropolitan areas is particularly interesting given that micropolitan population (in consistently defined micropolitan areas) actually increased in the South Atlantic Region by 6.1 percent during the study period. That was the third-highest increase among Census divisions surpassed by 6.1 percent growth in the Pacific division and more than doubled by the 14.2 percent growth in the micropolitan areas in the Mountain division.

TABLE 4.4.2. CENSUS DIVISIONS AND AVERAGE RELATIVE INCOME

Division	Micropolitan Areas	2002 Average Relative Income	2014 Average Relative Income
New England	12	101%	105%
Mid-Atlantic	30	75.9%	79.8%
East North Central	104	79.1%	78.9%
West North Central	86	81.4%	91.4%

South Atlantic	72	73.9%	71.3%
East South Central	58	70.8%	71.9%
West South Central	82	69.3%	80.2%
Mountain	58	84.3%	93.0%
Pacific	29	76.9%	79.5%

TABLE 4.4.3. CENSUS DIVISIONS AND MICROPOLITAN POPULATION CHANGES, 2002 to 2014

Division	2002 Total Micropolitan Population	2014 Total Micropolitan Population	Change in Micropolitan Population
New England	1,076,036	1,088,855	1.2%
Mid-Atlantic	2,116,441	2,078,984	-1.8%
East North Central	5,662,142	5,669,539	0.1%
West North Central	3,042,337	3,175,587	4.4%
South Atlantic	3,798,998	4,031,193	6.1%
East South Central	3,068,311	3,219,432	4.9%
West South Central	3,199,064	3,373,371	5.4%
Mountain	2,261,563	2,581,497	14.1%
Pacific	1,599,615	1,699,229	6.2%

4.5 Right to Work Policies

State-level policies such as right-to-work policies, which prevent "closed shops," requiring union membership, have been correlated with job creation and income at the state level. These policies were particularly important to explain wage levels among manufacturing employees due to the wage supports of collective bargaining and the higher levels of unionization in non-right-to-work states. Population and Relative Income Growth in Micropolitan areas in Right-to-Work States was higher than in Non-Right-to-Work states during the study period. While relative per capita income in Non-Right-to-Work micropolitan areas was substantially higher in 2002, the relative per capita income of micropolitan areas in right-to-work states has converged considerably, averaging 81.3 percent of the national average as of 2014, compared to 81.8 percent in Non-Right-To-Work micropolitan areas.

TABLE 4.5.1. RIGHT TO WORK STATES
AND POPULATION CHANGE, 2002 to 2014

	2002 Total Micropolitan Population	2014 Total Micropolitan Population	2002-2014 Change in Micropolitan Population
Non-Right To Work States	15,317,731	15,741,780	2.7%
Right to Work States	10,506,776	11,175,907	6.4%

TABLE 4.5.2. RIGHT TO WORK STATES
AND RELATIVE INCOME CHANGE, 2002 to 2014

	2002 Average Micropolitan Relative Income	2014 Average Micropolitan Relative Income	2002-2014 Change Avg. Micropolitan Relative Income
Non-Right To Work States	79.0%	81.8%	2.8
Right to Work States	74.9%	81.3%	6.3

In summary, the descriptive statistics and trends reviewed here identify that micropolitan areas in the United States are significantly diverse in their public spending and labor policies, industry structures, demographic composition, economic fortunes and geographic locations. Indeed, the period 2002 to 2014, which encapsulates the first full decade after the official identification and definition of "micropolitan areas" by the U.S. Census Bureau, as well as the twelve-year span from the end of twenty-first century's first recession to a few years after the end of the Great Recession, was a time of economic and demographic change for America's micropolitan areas. Manufacturing employment declined while professional services employment and health care employment increased in importance. Migration – both domestic and international – changed the demographic composition of some areas, with changes particularly pronounced in the share of population that was Hispanic. In addition, aging of the population as well as re-emerging preferences for urban living among younger people resulted in the decline on average of prime-stage working age populations, those 25 to 44 years old. The next chapter will focus on developing an explanatory model of relative income and population change in these micropolitan areas over the 12-year study period.

4.6 Regression Results

This study will use two cross-sectional OLS regression models to test several independent variables on two dependent variables - Percentage Point Change in Relative Per Capita Income and Percentage Change in Total Population from 2002 to 2014 - among the 532 micropolitan areas in the continental United States. The purpose of OLS regression in this instance is not to create a causal model of these change. On the other hand, it provides the best method to uncover the characteristics of micropolitan areas where income and population growth has occurred. In addition, incomplete data on public policy spending variables due to the discontinuation of the USA Counties Program after the 2002 Economic Census makes other methods such as time-series or panel regression methods impossible. This follows the most recent methods used to study this question in the regional science literature such as the 2011 analysis by Davidsson and Rickman and Cortes' 2013 analysis of employment and population growth in select micropolitan areas from 1990 to 2010.

Independent Variables are listed in the results table and were culled from a larger list of demographic, industry structure, geographic and economic variables through an initial regression which identified multicollinearity. Variance Influence Factor (VIF) tests were then conducted and those variables with higher than 5 were excluded. This allowed for the main potential explanatory variables as described in the Descriptive Statistics chapter to be included in the final model. For an explanation of using the VIF threshold of 5 as a meaningful cutoff for removing independent variables see (Thompson et al., 2017).

Principal Components Analysis was attempted as a data reduction technique but rotation revealed no component would explain more than 11 percent of the variation and the data could only be reduced into 12 components with eigenvalues higher than 1. In addition, the purpose of this dissertation is to identify specific determinants of income and population growth in micropolitan areas that can be translated into policy implications or recommendations for practitioners. Therefore, readily understandable and interpretable results are of high importance, making the use of a large model with many independent variables and OLS regression the most applicable and appropriate method.

Ordinary Least Squares Regressions (OLS) using the more parsimonious list of explanatory variables (culled through the VIF technique) were then performed using the entire sample of 532 micropolitan areas in the United States. High levels of heteroscedasticity were identified in these regressions using both the Change in Relative Income and Percentage Change in Population Variables, through White's test for heteroscedasticity. An examination of Studentized Residuals revealed six extreme outliers in the Relative Income Change model and seven extreme outliers in the Percentage Change in Population model. These extreme outliers had Studentized Residual values higher than 3 or lower than negative three, indicated their actual values more than 3 Standard Deviations different from their predicted values.

TABLE 4.6.1. STUDENTIZED RESIDUALS, RELATIVE INCOME CHANGE 2002-2014

Micropolitan Area	Studentized Residual with Relative Income Change as Dependent Variable
Los Alamos, New Mexico	-7.13
Vermillion, South Dakota	-3.47
Summit Park, Utah	3.87
Jackson Hole, Wyoming-Idaho	7.70
Dickinson, North Dakota	9.00
Williston, North Dakota	15.28

TABLE 4.6.2. STUDENTIZED RESIDUALS, PERCENTAGE POPULATION CHANGE AS DEPENDENT VARIABLE 2002-2014

Micropolitan Area	Studentized Residual with Population Change as Dependent Variable
Los Alamos, New Mexico	-5.05
Miami, Oklahoma	-4.55
Indianola, Mississippi	-3.0
Jefferson, Georgia	3.16
Andrews, Texas	3.28
Heber, Utah	5.20
Williston, North Dakota	5.42

Outliers were removed from both equations, resulting in a sample size of 526 for the equation based on Relative Income Change from 2002 to 2014 as the dependent variable and a sample size of 525 for the regression equation based on Percentage Population Change from 2002 to 2014 as the dependent variable. The regression using the same list of independent variables was then run, using robust standard errors to control for any lingering heteroscedasticity. Use of heteroscedasticity consistent standard

errors, or “robust” standard errors corrects to heteroscedasticity of unknown form and retains the efficiency of the coefficients in the regression model. (Long and Ervin, 2000) The two regressions were run again.

To assist with the interpretation of the model with many variables, a parsimonious table of only significant results is presented first, showing their directional relationship with the two major dependent variables. Then, results are presented for the entire model broken out into the major categories of variables followed by a textual representation.

4.6.1 Assumptions of OLS Regression and Diagnostics

Ordinary Least Squares Regression assumes that error terms are normally distributed, residuals are homoscedastic and that the model is absent of multicollinearity. Because the data set here is cross-sectional and does not include a time component as an independent variable, autocorrelation is not a concern. (Berry, 1993; Kennedy, 2008) Tests to ensure these assumptions were met or corrected for after the removal of extreme outliers were conducted post-regression on the smaller sample of micropolitan areas (n=526) for both models with population growth and relative income growth as the dependent variables. After both regressions were run, Variance Inflation Factors tests were conducted to identify potential multicollinearity between independent variables. No multicollinearity was found as all independent variables maintained VIF scores below 5 (see Table 4.6.1.1)

TABLE 4.6.1.1. VARIANCE INFLATION FACTOR MULTICOLLINEARITY TEST

	Change in Relative Income	Change in Population
02 PC Relative Income	3.19	3.17
02 Population	2.36	2.22
Census Region	1.51	1.44
02 % Share Health Care Emp	1.71	1.62
02 % Share Manufacturing Emp	2.94	2.68
02 % Share Prof. Services Emp	1.74	1.70
02 % Share Fed. Gov. Emp	1.46	1.45
02 % Share State Gov. Emp	1.88	1.89
02 % Share Local Gov. Emp	2.31	2.26
02-14 % Grth Health Care Emp	1.48	1.51
02-14 % Growth Mfg. Emp	1.32	1.32
02-14 % Grth Prof. Services Emp	1.33	1.32
02-14 % Grth Fed. Gov. Emp	1.18	1.19
02-14 % Grth State Gov. Emp	1.09	1.08
02-14 % Grth Local Gov. Emp	1.23	1.31
02 PC Education Spending	1.55	1.54
02 PC Health Care Spending	1.32	1.33
02 PC Highway Spending	1.66	1.61
02 PC Property Tax Revenue	4.24	4.23
Right to Work State	1.34	1.33
02 % Hispanic	2.25	2.10
02 % BA or more	2.93	3.05
02 % 25-44 Year Olds	1.79	1.80
02-14 Growth % Share Hispanic	1.16	1.15
02-14 Growth % Share BA+	1.44	1.40
02-14 Growth % Share 25-44	1.74	1.70
02-14 Immigration as % of 2002 Total Population	1.76	1.79
02-14 Net Domestic Migration as % of 2002 Total Population	4.63	4.78
Annual Higher Education Completions (2014)	2.05	1.96
USDA Natural Amenities Scale	1.75	1.79
USDA Urbanization Scale	1.60	1.62
MEAN VIF	2.37	2.37

After the lack of multicollinearity was confirmed through VIF testing, a visual inspection of probability plot of the residuals in both the model with population change and relative income change as the dependent variables against a theoretical normal distribution. A visual inspection of these plots shows that, while these residuals are not perfectly normally distributed, the distribution is close enough in general form to a normal distribution that a different functional form is not necessary. Figures 4.6.1.1 and 4.6.1.2 show this relationship visually.

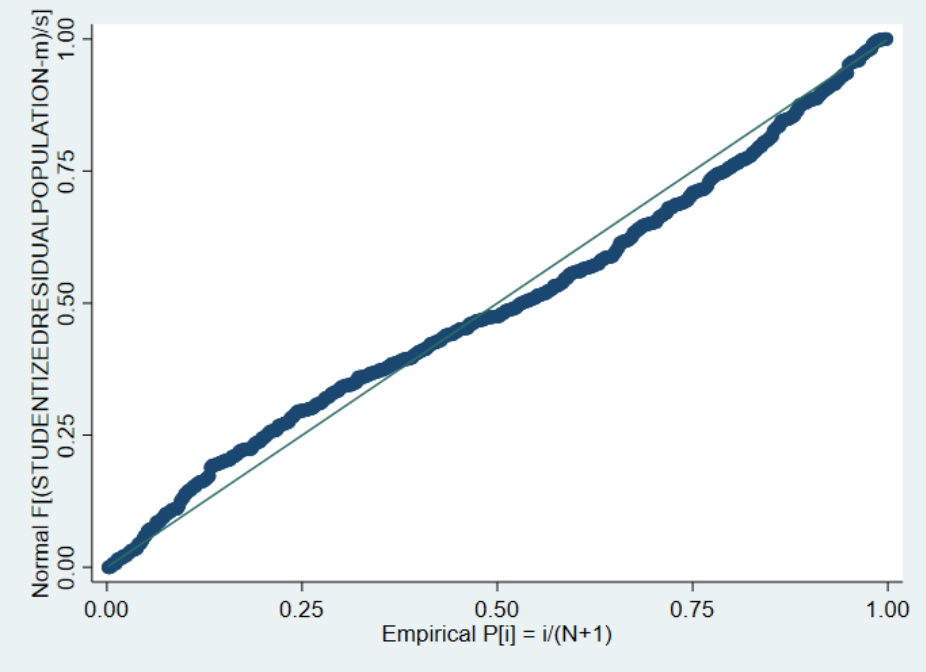

FIGURE 4.6.1.1. P-P PLOT TEST FOR NORMAL DISTRIBUTION OF ERRORS POPULATION CHANGE DEPENDENT VARIABLE

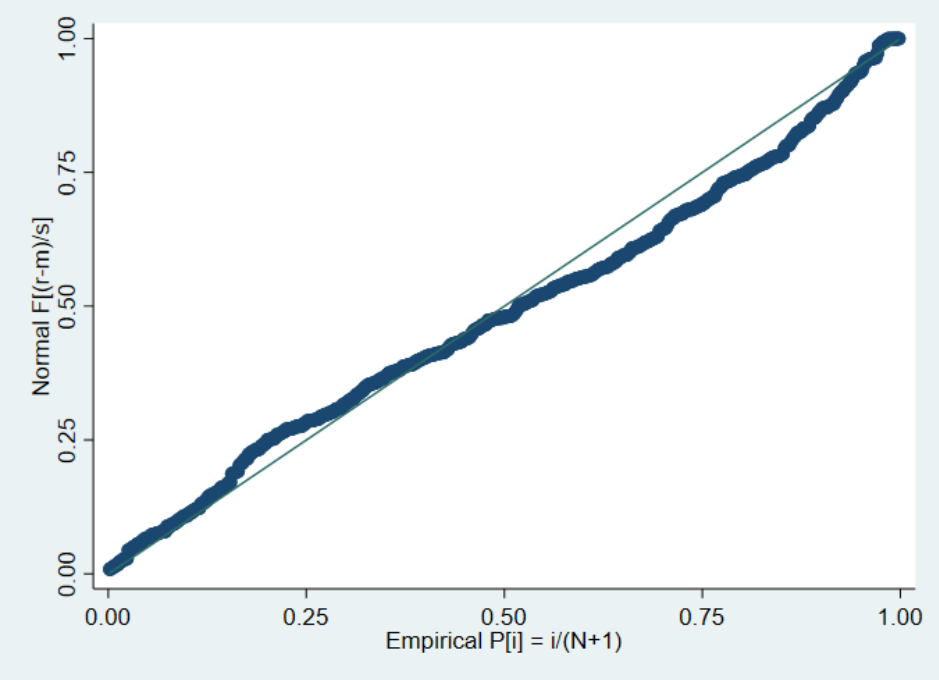

FIGURE 4.6.1.2. P-P PLOT TEST FOR NORMAL DISTRIBUTION OF ERRORS RELATIVE INCOME CHANGE DEPENDENT VARIABLE

With normality of residuals and lack of multicollinearity confirmed, the final test conducted was to determine if heteroskedasticity among error terms was extant in both models. A visual inspection indicated continued existence of heteroskedasticity in both models, though not to an extreme degree. To correct for this assumption violation of Ordinary Least Squares regression, the models were run with the use of heteroskedasticity consistent standard errors, Use of heteroscedasticity consistent standard errors, or “robust” standard errors corrects to heteroscedasticity of unknown form and retains the efficiency of the coefficients in the regression model. (Long and Ervin, 2000)

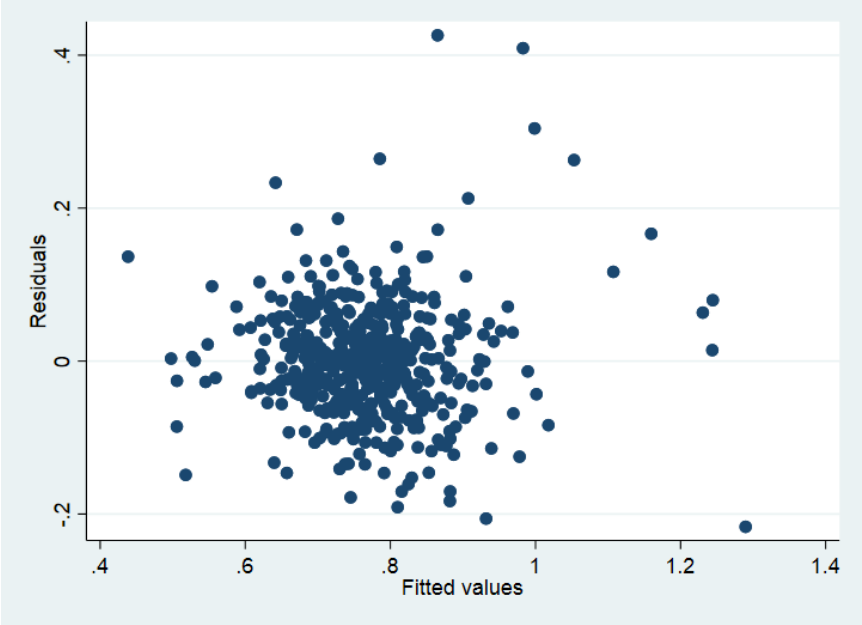

FIGURE 4.6.1.3. RVF PLOT RELATIVE INCOME CHANGE DEPENDENT VARIABLE – HETEROSKEDASTICITY TEST

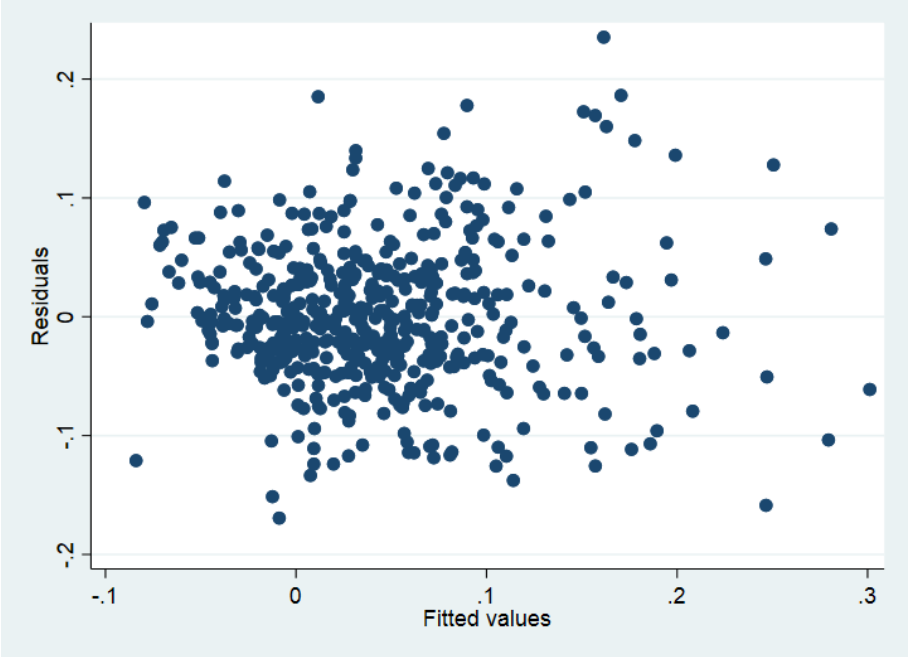

FIGURE 4.6.1.4 RVF PLOT POPULATION CHANGE DEPENDENT VARIABLE – HETEROSKEDASTICITY TEST

Based on the normality, consistency and use in previous literature on the economic prosperity and population growth in sub-national economic areas in the United States, such as micropolitan areas, the following set of independent variables can be used in our regression equations. With the assumptions of Ordinary Least Squares Regression met or corrected for, we can continue with the interpretation of results of the two main regression equations. Table 4.6.1.2 below lists the independent variables bearing statistically significant relationships with the two dependent variables. Further detail and analysis is conducted in the sections that follow.

TABLE 4.6.1.2. SIGNIFICANT VARIABLES AND DIRECTION OF RELATIONSHIPS

	Relative Income Change	Population Change
Baseline Population	-	
Baseline Health Care Emp Share		-
Baseline Manufacturing Emp Share	-	
Baseline State Government Employment Share		-
Baseline Local Government Employment Share	+	-
Growth in Manufacturing Employment	+	+
Growth in Professional Services Employment	+	+
Growth in Local Government Employment		+
Baseline Share of BA and Above		+
Baseline Share of 25-44 year olds		+
Growth in Share of 25-44 year olds		+
Annual Higher Education Completions		+
Baseline Per Capita Health Care Spending	-	
Right to Work State	-	
USDA Urbanization Scale		+
Distance to Nearest Metro 250K or more compared to Micros <40 miles		
71-120 miles		-
121 or more miles	+	-
Census Region Compared to South Atlantic		

New England	+	-
Middle Atlantic	+	-
West North Central	+	
East South Central	+	
West South Central	+	
Mountain	+	
N = 526		

4.6.2 Convergence or Non-Convergence

The results find evidence for neither convergence nor divergence among micropolitan areas as initial relative income in 2002 was not significantly correlated with changes in relative income during this time period. Initial Population, however, was negatively associated with Relative Income Growth, though the size of the coefficient was quite small. This means that micropolitan areas with larger initial populations showed slight declines in relative income during this period. This somewhat counterintuitive finding makes sense in the broader geographic context. The two Census Regions with the largest populations in micropolitan areas – the East North Central and South Atlantic Regions – were also the two regions to see Per Capita Personal Income fall during this period. Migration from the older, more established and industrial centers of the Midwest to the South Atlantic Region, where wage income is likely to be lower, may be a driver of this trend. This also provides support for Johnson and Fuguitt's 2000 finding that economic factors now play a diminishing role in migration decisions and Ganong and Shoag's (2012) findings that income convergence had drastically slowed after 1987 due to increases in housing prices, which led to lower incentives for lower-skilled workers to migrate to high-income areas. In addition, Dececio and Gascon's 2008

findings that most population and income growth in "non-metropolitan" areas had occurred in transitioning "non-metro" to "metro" counties during the 1969 to 2005 time period might also indicate that "greenfield" micropolitan areas near metropolitan areas, which began the period as sparsely populated rural counties, may have driven some of the population growth trend. These bedroom communities would also be more likely to contain non-income-earning residents such as children, reducing the per capita income.

Indicators influencing population growth during this time period were different than those influencing relative income growth, though they showed some similarities. Both Initial Population in 2002 and Initial Relative Income in 2002 were non-predictive and insignificant indicators of population growth during this time period.

TABLE 4.6.2.1. RESULTS ON BASELINE POPULATION AND INCOME VARIABLES

	Change in Relative Income	**Change in Population**
R^2	**.525**	**.521**
F-score	**10.18*** **	**11.7*** **
Independent Variable		
02 PC Relative Income	**.03 (0.63)**	**-0.047 (-1.16)**
02 Population	**-2.66e-07 (-2.33)****	**6.14e-08 (0.52)**
*$p < .10$. **$p < .05$. ***$p < .01$. (R^2 and F-score for entire model presented in sections and in full on pages XX-XX.		

4.6.3 Industry Structure Results

The industry structure-related variables lend support to previous conclusions that the manufacturing industry played a larger role in micropolitan economies than metropolitan or non-metropolitan areas. (Vias 2002, Brown et al. 2004) Initial

employment in manufacturing and local government were the two sectors showing significant relationships with changes in relative income change. Though micropolitan areas who began this period with a higher reliance on manufacturing employment as a percentage of total workforce showed a significant correlation with decline in Relative Per Capita Income during the study period. This likely indicates that areas with higher levels of manufacturing employment were more vulnerable to losses in manufacturing employment. This finding mirrors Vias (2002), who found that the deindustrialization of micropolitan areas to be delayed in its occurrence compared to metropolitan areas. By contrast, areas with a higher initial share of local government employment showed statistically significant but small increases in relative income. However, this correlation was significant only at the 90 percent confidence level.

Growth in Manufacturing Employment and Professional Services Employment both showed significant positive relationships with growth in relative income in micropolitan areas during the study period. Growth in Health Care Employment was associated with decline in relative income, but was significant only at the 90 percent confidence level. This is likely because health care industry growth was relatively even across the nation during this time period and may even respond counter-cyclically, becoming more necessary in areas with higher median age.

Share of Health Care Employment in 2002 was also associated with subsequent declines in population at a statistically significant level. The Initial Share of State Government Employment and Local Government Employment were also associated with statistically significant decreases in population growth. This may indicate that areas with

already aging populations or already reliant on transfer payments and the state and local governmental jobs required to administer those programs, continued to lose ground during this 12-year period. Areas with higher levels of employment in Health Care and Government may have already seen significant declines in other industries before the time period began. Initial Professional Services Employment was also associated with an increasing population but that relationship was significant only at the 90 percent confidence level.

Growth in the Share of Manufacturing and Professionals Services Employment showed strong and significant relationships with population growth as did the Growth in Local Government Employment. This, coupled with the strong positive relationship between Manufacturing and Professional Services Growth and relative income indicates that these two sectors are key drivers of economic vitality in America's micropolitan areas. Though manufacturing growth declined overall by an average of 11 percent; areas that were able to grow manufacturing employment in advanced sectors of manufacturing were able to lift per capita personal incomes. While it is beyond the scope of this paper, a deeper dive into the manufacturing sectors that show the most promise for mid- to higher-paying jobs would be worth policymakers and regional economists' time. (For a literature review on the topic, see Poole 2019). Professional Services Employment Growth mirrors trends Vias identified in micropolitan areas in 2002. Professional Services Growth also shows more promise as a growing sector of the economy, as it grew by an average of nearly 15 percent across micropolitan areas during the study period, while this remains a smaller portion of most micropolitan areas' workforces, beginning the study period with

only 2.5 percent of employment. Local Government employment growth association with population growth is logical but could also be interpreted as population growth driving demand for local government services and thus creating the need for more Local Government employment. Growth in Health Care Jobs showed a positive correlation with population as well but was significant only at the 90% confidence level.

TABLE 4.6.3.1. INDUSTRY STRUCTURE FACTORS RESULTS

	Change in Relative Income	Change in Population
02 % Share Health Care Emp	-0.042 (-0.39)	-0.230 (-2.18)**
02 % Share Manufacturing Emp	-0.121 (-2.49)**	-0.044 (-0.81)
02 % Share Prof. Services Emp	0.066 (0.28)	0.514 (1.84)*
02 % Share Fed. Gov. Emp	-0.239 (-1.52)	-0.255 (-1.36)
02 % Share State Gov. Emp	-0.120 (-1.64)	-0.227 (-2.98)***
02 % Share Local Gov. Emp	0.182 (1.91)*	-0.254 (-2.48)**
02-14 % Grth Health Care Emp	-0.025 (-1.71)*	0.033 (1.83)*
02-14 % Growth Mfg. Emp	0.060 (7.00)***	0.031 (3.20)***
02-14 % Grth Prof. Services Emp	0.022 (2.31)**	0.022 (2.80)***
02-14 % Grth Fed. Gov. Emp	-0.092 (-0.83)	0.019 (1.17)
02-14 % Grth State Gov. Emp	-0.0001 (-0.60)	0.000 (1.47)
02-14 % Grth Local Gov. Emp	0.0004 (0.02)	0.120 (2.89)***
$*p < .10$. $**p < .05$. $***p < .01$.		

4.6.4 Public Spending Variables

Consistent with prior research by Wink and Eller (1998), initial per capita education spending was associated with positive growth in relative per capita income, though only at the 90 percent confidence level. The 12-year time lag is necessitated by the lack of consistently recorded data at the per-capita and county-based scale after the discontinuation of the USA Counties program in 2002. However, the time lag is

appropriate for educational funding as it coincides with the length of a primary and secondary education.

Neither Per Capita Highway Spending nor Property Tax Revenue were significantly associated with relative income changes in this model. The other public-policy related variable in this equation – presence in a Right to Work state – was negatively correlated with changes in relative income though only at the 90 percent confidence level.

The counter-cyclical nature of health care can also be seen in the relationships between public policy spending variables and changes in relative income. Initial Per Capital Health Care Spending in 2002 was associated in a statistically significant way with negative changes in relative income through 2014, which may indicate mandated investments in health care services in aging and otherwise struggling micropolitan areas.

None of the initial public policy spending variables were significantly correlated with population growth during this time period. Unfortunately, the lack of quality and consistent data on local-level spending variables limits the policy recommendations that can flow from this analysis.

TABLE 4.6.4.1. PUBLIC SPENDING VARIABLES RESULTS

	Change in Relative Income	Change in Population
02 PC Education Spending	0.013 (1.17)*	0.008 (0.99)
02 PC Health Care Spending	-0.013 (-2.28)**	0.009 (1.53)
02 PC Highway Spending	0.009 (0.36)	-0.33 (-1.24)
02 PC Property Tax Revenue	.00001 (1.46)	-0.0001 (-1.32)
Right to Work State	-0.016 (-1.77)*	0.009 (1.00)
*$p < .10$. **$p < .05$. ***$p < .01$.		

4.6.5 Demographic Factors Results

No demographic variables were significantly correlated with growth in relative income except for the growth in the 25-44-year-old share of population, which was positively correlated with growth in relative per capita income. The 25-to-44-year old age group is most likely to be employed and to move for employment and thus has a large impact on the income statistics and general economic prosperity of geographic regions.

Demographic variables that were significantly correlated with population growth included the initial share of bachelor's degree holders, which was positively correlated with population growth, and the initial share of 25 to 44 year olds, which was also positively correlated with population growth. The number of Higher Education Completions per 100 population, an indication of the activity of higher education institutions in a micropolitan area, was also positively correlated with population growth, though not with population growth. This measure goes a step further than previous analyses of the importance of higher educational institutions for micropolitan growth. While Cortes and Davidsson (2013) and Davidsson and Rickman (2011) used the binary variable of "presence of a flagship university" to capture this regional impact. However, this disregards the broader spectrum and scale of post-secondary education in a region including many non-flagship universities or community colleges that in many cases educate more students that flagships.

TABLE 4.6.5.1. DEMOGRAPHIC VARIABLES RESULTS

	Change in Relative Income	Change in Population
02 % Hispanic	-0.015 (.624)	0.009 (0.31)
02 % BA or more	-0.053 (-0.49)	0.228 (2.98)***
02 % 25-44 Year Olds	0.028 (0.20)	0.705 (3.94)***
02-14 Growth % Share Hispanic	0.023 (0.21)	-0.031 (-0.45)
02-14 Growth % Share BA+	0.247 (1.49)	0.235 (1.47)
02-14 Growth % Share 25-44	0.341 (1.65)*	0.721 (3.07)***
02-14 Immigration as % of 2002 Total Population	1.94 (1.19)	1.803 (1.24)
02-14 Net Domestic Migration as % of 2002 Total Population	1.266 (3.87)	-0.203 (-0.46)
Annual Higher Education Completions (2014)	-2.94e-6 (-1.14)	9.38e-06 (2.73)***
$*p < .10$. $**p < .05$. $***p < .01$.		

4.6.6 Geographic Factors Results

Geographic factors were also found to be significant. Using the South Atlantic division as a reference region, the regression found that micropolitan areas in New England, the Middle Atlantic, the West North Central, the East South Central and the Mountain Census Division had significantly higher relative income increases than micropolitan areas. Geographic region and geographic proximity to larger urban areas showed significant relationships with relative income growth. Cortes and Davdisson (2013) used linear distance in miles between centroids of micropolitan areas to the nearest metro area of 250,000 miles and found a positive correlation in income growth and linear distance, meaning that micropolitan areas further away from metropolitan

areas had higher positive changes in income. For a more detailed explanation of different levels of difference, this regression equation classified these micropolitan areas intro four levels of distance based on commuting capability. Using micropolitan areas within 40 miles (conveniently commutable) to metropolitan areas of 250,000 or more people as the reference category, the regression finds that micropolitan areas more than 120 miles away showed higher increases in per capita relative income. While micropolitan areas between 40 and 70 miles and 70 and 120 miles from metropolitan areas of more than 250,000 people showed no statistically significant relationship with relative income changes.

TABLE 4.6.6.1. DISTANCE TO NEAREST 250K+ METRO
(REFERENCE: <40 MILES)

	Change in Relative Income	Change in Population
40 to 70 miles	0.003 (0.25)	-.027 (-1.78)*
71 to 120 miles	0.017 (1.52)	-0.040 (-2.53)**
121 or more miles	0.028 (2.34)**	-0.035 (-2.13)**
*$p < .10$. **$p < .05$. ***$p < .01$.		

Again using the South Atlantic Census Division as the reference category, the regression found regional variations in population growth with micropolitan areas in New England, the Middle Atlantic and the East North Central divisions all more likely to lose population than micropolitan areas in the South Atlantic. Correlations between the other regions were insignificant. This corresponds with recent trends and research that has found migration away from industrial, cold weather states to the Sunbelt states of the South and West.

TABLE 4.6.6.2. CENSUS REGION RESULTS (REFERENCE: SOUTH ATLANTIC)

	Change in Relative Income	Change in Population
New England	.049 (2.59)***	-0.068 (-3.29)***
Middle Atlantic	.045 (3.49)***	-0.038 (-2.61)***
East North Central	-.005 (-0.48)	-0.025 (-1.86)*
West North Central	.044 (3.79)***	-0.016 (-1.27)
East South Central	.034 (3.69)***	-0.020 (-1.45)
West South Central	.079 (6.05)**	-0.019 (-1.42)
Mountain	.037 (2.18)**	0.018 (1.01)
Pacific	.014 (0.79)	0.004 (0.24)
*$p < .10$. **$p < .05$. ***$p < .01$.		

Despite the finding of differential population growth factors between cold weather Census divisions and the South Atlantic division, Changes in Relative Income were significantly higher in every region except for the Pacific, in relation to the South Atlantic Census Region. Combined with the fact that population decreases occurred in New England, the Middle Atlantic and East North Central regions in comparison to the South Atlantic, this lends some support to earlier findings from Vias (2006) and Brown et al (2004) that population shifts from the Northeast to Southern and Western states had broken the linkage between migration and employment.

TABLE 4.6.6.3. NATURAL AMENITIES AND URBANIZATION RESULTS

	Change in Relative Income	Change in Population
USDA Natural Amenities Scale	-0.004 (-0.84)	.007 (1.32)
USDA Urbanization Scale	0.002 (0.94)	.005 (2.31)**
*$p < .10$. **$p < .05$. ***$p < .01$.		

The natural amenities factor, a USDA code that considers weather, topography and water features, bore no significant relationship to population growth or relative

income growth, which runs counter to previous findings that growth in non-metropolitan areas was heavily correlated to natural amenities (McGrahnahan 2011). However, the use of a Natural Amenities Scale, which aggregates a variety of amenities, such as temperature, topography and water coverage, into one ordinal score may return different results than other analyses, which have broken down component parts and found significant relationships with, for example, median January temperatures. (Davidsson and Rickman 2011)

Urbanization, however, was particularly important in context of population growth. The USDA Urbanization Code variable was significantly and positively correlated with population growth, meaning that micropolitan areas with greater population density and other urban factors at the beginning of the study period in 2002 were more likely to gain population on average than less urbanized areas. Proximity to metropolitan areas was also a driver of population growth. Somewhat paradoxically, micropolitans 71-120 and 121 or more miles away from a metro area of 250,000 or more people showing negative growth compared to micros within 40 miles of a 250,000-plus-population metro. Micropolitans in the 40-70-mile range also showed a negative correlation with the closer-in micros but the correlation was only significant at the 90% confidence level.

TABLE 4.6.6.4. FULL REGRESSION RESULTS

	Change in Relative Income	Change in Population
R^2	.525	.521
F-score	10.18***	11.7***
Independent Variable		
02 PC Relative Income	.03 (0.63)	-0.047 (-1.16)
02 Population	-2.66e-07 (-2.33)**	6.14e-08 (0.52)
Census Division (South Atlantic Reference Region)		
New England	.049 (2.59)***	-0.068 (-3.29)***
Middle Atlantic	.045 (3.49)***	-0.038 (-2.61)***
East North Central	-.005 (-0.48)	-0.025 (-1.86)*
West North Central	.044 (3.79)***	-0.016 (-1.27)
East South Central	.034 (3.69)***	-0.020 (-1.45)
West South Central	.079 (6.05)**	-0.019 (-1.42)
Mountain	.037 (2.18)**	0.018 (1.01)
Pacific	.014 (0.79)	0.004 (0.24)
Industry Structure		
02 % Share Health Care Emp	-0.042 (-0.39)	-0.230 (-2.18)**
02 % Share Manufacturing Emp	-0.121 (-2.49)**	-0.044 (-0.81)
02 % Share Prof. Services Emp	0.066 (0.28)	0.514 (1.84)*
02 % Share Fed. Gov. Emp	-0.239 (-1.52)	-0.255 (-1.36)
02 % Share State Gov. Emp	-0.120 (-1.64)	-0.227 (-2.98)***
02 % Share Local Gov. Emp	0.182 (1.91)*	-0.254 (-2.48)**
02-14 % Grth Health Care Emp	-0.025 (-1.71)*	0.033 (1.83)*
02-14 % Growth Mfg. Emp	0.060 (7.00)***	0.031 (3.20)***
02-14 % Grth Prof. Services Emp	0.022 (2.31)**	0.022 (2.80)***
02-14 % Grth Fed. Gov. Emp	-0.092 (-0.83)	0.019 (1.17)
02-14 % Grth State Gov. Emp	-0.0001 (-0.60)	0.000 (1.47)
02-14 % Grth Local Gov. Emp	0.0004 (0.02)	0.120 (2.89)***
Public Policy Variables		
02 PC Education Spending	0.013 (1.17)*	0.008 (0.99)
02 PC Health Care Spending	-0.013 (-2.28)**	0.009 (1.53)
02 PC Highway Spending	0.009 (0.36)	-0.33 (-1.24)
02 PC Property Tax Revenue	.00001 (1.46)	-0.0001 (-1.32)
Right to Work State	-0.016 (-1.77)*	0.009 (1.00)
Demographic Variables		
02 % Hispanic	-0.015 (.624)	0.009 (0.31)
02 % BA or more	-0.053 (-0.49)	0.228 (2.98)***
02 % 25-44 Year Olds	0.028 (0.20)	0.705 (3.94)***
02-14 Growth % Share Hispanic	0.023 (0.21)	-0.031 (-0.45)

02-14 Growth % Share BA+	0.247 (1.49)	0.235 (1.47)
02-14 Growth % Share 25-44	0.341 (1.65)*	0.721 (3.07)***
02-14 Immigration as % of 2002 Total Population	1.94 (1.19)	1.803 (1.24)
02-14 Net Domestic Migration as % of 2002 Total Population	1.266 (3.87)	-0.203 (-0.46)
Annual Higher Education Completions (2014)	-2.94e-6 (-1.14)	9.38e-06 (2.73)***
Amenities		
USDA Natural Amenities Scale	-0.004 (-0.84)	.007 (1.32)
USDA Urbanization Scale	0.002 (0.94)	.005 (2.31)**
Distance to nearest 250k+ Metropolitan Statistical Area (reference category <40 miles)		
40 to 70 miles	0.003 (0.25)	-.027 (-1.78)*
71 to 120 miles	0.017 (1.52)	-0.040 (-2.53)**
121 or more miles	0.028 (2.34)**	-0.035 (-2.13)**
*p < .10. **p < .05. ***p < .01.		

4.6.7 Results Interpretation and Discussion

While no evidence for convergence or divergence was found in the previous regression, the results add to our understanding of economic prosperity and population growth in micropolitan areas at the beginning of the twentieth century. They also underscore updated findings in the convergence, migration, demographic and regional science literature that the relationship between income or employment growth and population growth in the United States has become, in recent years, much more nebulous and uncertain than in the period ending roughly around 1990. (Johnson and Fuiggitt 2000; Brown et al., 2004; Ganong and Shoag, 2012; Mulligan and Vias, 2006) While urbanization and proximity to larger metro areas appear closely and strongly correlated with population growth, relative per-capita income growth was found to be stronger in

more isolated micropolitan areas 120 or more miles from the nearest metropolitan area of 250,000 or more people were found to have higher growth in relative per capita income. These findings are particularly interesting in light of regional shifts on a broader, national scale. In the context of recent "Sunbelt" migration trends, that micropolitan areas in South Atlantic States were gaining population at higher rates than Northeastern or Midwestern regions while changes in relative per capita income growth in the South Atlantic is in fact slower (or indeed negative) than in the regions that are showing slower population growth. (Vias 2006)

Further research is needed to untangle the processes that are driving these changes. Are struggling workers moving out of more isolated micropolitan areas, leaving more established communities of professionals and/or being backfilled by retirees in these areas and thus propping up income statistics? Are cost of living variables masking the incentives of lower-skilled workers and families to move to lower-income areas of the country as Ganong and Shoag noted in their 2012 work on the decline in income convergence between states? Within states, are micropolitan areas closer to metropolitan areas becoming migration magnets for lower-skilled workers from both urban, high-cost counties and low-opportunity rural counties, as Vias (2002) postulated? More case studies are needed to explicate these trends.

The makeup of industry structure variables underscored the continued importance of manufacturing to the micropolitan economy, while also highlighting the effects of deindustrialization and automation on the broader micropolitan manufacturing sector, mirroring findings from Brown et. al (2004) and Vias (2002) that manufacturing played a

larger role in micropolitan economies than metropolitan economies and that the economic shifts faced by the metropolitan economy (i.e. deindustrialization) filtered through the micropolitan economy later and were most noticeable during the 2002 to 2014 period. While growth in Manufacturing Employment was strongly correlated with rising relative per capita income, higher levels of initial employment in Manufacturing was correlated with declines in Relative Per Capita Personal Income. While the relative income declines mirrored Vias and Mulligan's findings (2015), the increase in relative per capita income correlated with growth in manufacturing did not. Few micropolitan areas achieved Manufacturing Employment growth (136 out of 526) during this time period, and overall employment in Manufacturing declined by more than 11 percent across micropolitan America. While deindustrialization reduced incomes in many manufacturing-dependent micropolitan areas, some areas were able to add manufacturing jobs and those areas tended to be more successful in terms of income growth. While this lends credence to Brown's 2004 finding that economic restructuring was taking longer in micropolitan areas than in metropolitan areas and may have sped up in the 2000s as evidenced by declines in manufacturing employment and increases in Professional Services employment. Still, the growth of manufacturing employment in 25 percent of micropolitan areas during the 2002 time period is worthy of further study. While outside the scope of this study, additional cluster analyses of manufacturing successes in micropolitan areas are worthwhile to study.

Growth in Professional Services Employment was correlated with both relative income growth and population growth, also supporting theoretical work on economic

restructuring (Vias 2006; Brown et al. 2004) and more recent regression analyses on micropolitan areas (Davidsson and Rickman 2011). It was also much more widespread, with 61 percent of micropolitan areas (322 of 526) in the United States experiencing some increase in Professional Services Employment during this time period. To the extent that micropolitan areas can attract a Professional Service Sector or Professional Service-related jobs, practitioners in these areas should pursue them as they have shown remarkable growth across the micropolitan category, hinting at the delayed economic restructuring from manufacturing to service-based economies that occurred in metropolitan areas in the later 20th century. The distribution of growth in professional services sector is interesting and worthy of further study. While the average distance to the nearest 250,000-population or larger metropolitan for micropolitan areas that experienced growth in professional services employment was 82.2 miles, the average distance for micropolitan areas that saw declines in professional services employment was 73.3 miles. While these descriptive statistics, in and of themselves, cannot be used to make a causal or correlation judgment, they do lend credence to the "spread and backwash" and "tyranny of proximity" hypotheses put forward by Partridge and Rickman (2008), (Mulligan et al., 2012) and Davidsson and Cortes (2013). While distance from urban centers reduces the returns to agglomeration in outlying areas, relative proximity of micropolitan areas to these urban agglomerations may inhibit the creation and growth of professional services sectors that already exist nearby. In this way, micropolitan areas further away from larger metros may develop stronger professional services sectors because of lack of competition from nearby.

While Health Care employment is an increasingly important segment of the national economy, it appears relatively evenly distributed across micropolitan areas; and shifts in employment levels appear to be related to underlying demographic and economic trends. Initial employment in Health Care was associated with declines in population growth, while growth in Health Care employment was correlated with lower income growth but higher population growth. The effects of Health Care employment are largely understudied in the literature, though Davidsson and Rickman found the same negative correlation between income growth and health care employment in their 2011 study of micropolitan areas. Initially higher levels of employment in Health Care could be a reflection on an already aging population base requiring more health care services. This would logically lead to population loss. However, population growth could also drive increases in health care employment. If that growth was driven by older Americans, more likely to be retired and dependent on transfer payment income, this could result in declines in per capita income. The migration literature supports the notion that amenity-driven migration by older Americans could be driven by access to health care (Plane and Jurjevich, 2009)

Government employment is also an important economic component of many micropolitan areas. Previous work by Mulligan and Vias (2006) noted that the number of micropolitan areas that were reliant on government employment as a key specialization had increased between 1980 and 2000. In addition, these areas have less diversified economies and lower rates of employment growth (though higher rates of population growth) than other areas. While Mulligan and Vias used generalize government

employment, this dissertation disaggregated government employment into local, state and federal components. While higher shares of baseline local and state government employment correlated with population decline, baseline local government employment was correlated with income growth. Growth in local government employment was also correlated with population growth, though no significant relationship was found between government employment growth and income growth. More research on the interaction with local and state government employment and lower population growth is needed. It is possible that the presence of large numbers of local and state government jobs "crowd out" other, more dynamic industries while simultaneously propping up income in these government-dominated economies

None of the local spending variables influenced population growth, but the negative relationship of health care spending with relative income had been also found in previous literature. This study also found that education spending was positively correlated with relative income growth, which aligns with previous research at the county level by Wink and Eller (1998). However, the finding of no significant correlation between highway spending and relative income growth was not consistent with previous work. The 12-year time lag imposed by data availability and quality likely influenced this. The discontinuation of the U.S. Census' USA Counties program influenced in 2002 has harmed the capability of researchers to study impacts of local policies on sub-state regions. While the U.S. Census of Governments continued estimating local government spending on infrastructure, education, health care, etc., their datasets for years after 2002 are inconsistent in coverage and methodology. Indeed, less than 1,500 counties out of

more than 3,000 in the United States had data available for the study years. Indeed, the Census urges researchers not to use this data for time-series or other comparative purposes.

Educational and Prime-working-age population changes aligned well with the previous literature when examining percentage population growth as the dependent variable, though only the growth in the share of 25 to 44 year olds was significantly and positively correlated with growth in relative income in micropolitan areas. Initial share of bachelor's degree holders and growth of the share of bachelor's degree holders were also found to be significantly and positively correlated to population growth during the time period but not relative income growth. The greater reliance of micropolitan areas on manufacturing employment, employment that typically doesn't require bachelor's degrees, may have something to do with this and is worth studying further. In addition, the growth of non-wage income as a driver of service-sector-reliant micropolitan areas – where a minority of high-non-wage-income retirees or tourist drive demand for service sector jobs for a broader segment of the population. The cross-sectional nature of this study limits the policy recommendations that can be drawn from this. Economic growth could simply attract more 25-to-44 year olds, resulting in their growing numbers, instead of the other way around. More causational research is needed in this area.

The sheer volume, diversity and complexity of micropolitan areas is worthy of study in its own right. While the regression analyses have pointed to significant indicators and trends in population growth and relative income growth, several micropolitan communities varied significantly enough to be considered outliers. While parsimonious

and rigorous regression equations help us uncover underlying correlational factors influencing population and relative income growth, other idiosyncratic factors may influence population shifts and economic changes. Therefore, the next chapter will focus on a descriptive and brief historical analysis of the 11 micropolitan areas that were found to be outliers, those areas whose residuals were found to be more than three standard deviations away from their expected values. First, we will descriptively examine other outliers to determine potential regional or spatial effects.

4.6.8 Within Model Outliers

In addition to the 11 extreme outliers with observed values more than 3 standard deviations from their expected values, another 50 micropolitan areas were found to have observed values more than 2 standard deviations lower or higher than their expected values. An informal descriptive analysis can point to potential limitations in the model and potential spatial correlation issues. Beginning with the outliers that saw steeper-than-expected declines in income, these outliers appear relatively evenly distributed geographically, with two in the South Atlantic, three in the East North Central, two in the West South Central, one in the West North Central, one in the East South Central, and one in the Pacific. An interesting finding is Sevierville, Tennessee, which had observed population growth more than two standard deviations *higher* than its expected value and an observed relative per capita income value more than two standard deviations *lower* than its expected value. Sevierville, located about 39 miles from the Knoxville, Tennessee Metropolitan Statistical Area, saw 27 percent population growth while

manufacturing employment fell by 21 percent and overall per capita relative income fell from 82 percent of the national average to 71 percent of the national average.

An examination of other outliers that had higher than expected population growth observed values and lower than expected relative income change observed values reveals some similarities. Along with Sevierville, several other Stephenville, Texas; Sanford, North Carolina; Oxford, Mississippi; Cedar City, Utah; Moses Lake, Washington; Dunn, North Carolina, all appear to follow the same pattern. All of these micropolitan areas are also in the South or West and between 30 and 100 miles from a metropolitan area.

TABLE 4.6.8.1 INCOME NEGATIVE OUTLIERS

MICROPOLITAN AREA	US CENSUS REGION	INCOME STUDENT RESIDUAL	POPULATION STUDENT RESIDUAL
Aberdeen, SD	4	-2.700	0.189
Kingsville, TX	7	-2.577	-1.629
Clewiston, FL	5	-2.410	-0.449
Del Rio, TX	7	-2.387	-1.011
Canton, IL	3	-2.368	-0.749
Sevierville, TN	6	-2.354	2.616
Newport, OR	9	-2.217	-0.592
Mountain Home, ID	8	-2.184	-1.443
St. Marys, GA	5	-2.172	-0.826
Wisconsin Rapids-Marshfield, WI	3	-2.038	0.851
New Castle, IN	3	-2.024	0.973

While lower-than-expected income change values are well-distributed geographically, higher-than-expected relative income change observed values are clustered largely in the natural-resource-rich West South Central (7), Mountain (8), and West North Central (4) regions. This indicates that level of mining employment and/or

some other natural resource variable might have been used to better specify the model. Other micropolitan areas that had higher relative income growth than predicted by the model were Key West, Florida and Oxford, North Carolina, both southern micropolitan areas. While Key West is a well-known tourist destination with amenities-driven income growth, Oxford, North Carolina is a hinterland area about 34 miles north from the fast-growing Raleigh-Durham metropolitan area. Oxford, North Carolina's higher-than-expected relative income growth and higher-than-expected population growth stand in contrast to Dunn, North Carolina and Sanford, North Carolina, also hinterland micropolitan areas a similar distance south of the Raleigh-Durham area. While these areas have also seen higher-than-expected population growth, they have also seen lower-than-expected relative income growth. This points, firstly, to some unobserved state-level effects leading micropolitans in North Carolina to gain population but lose relative income, aside from the exception of Oxford.

TABLE 4.6.8.2 INCOME POSITIVE OUTLIERS

MICROPOLITAN AREA	US CENSUS REGION	INCOME STUDENT RESIDUAL	POPULATION STUDENT RESIDUAL
Oxford, NC	5	2.004	2.055
Weatherford, OK	7	2.025	0.971
Fredericksburg, TX	7	2.041	0.863
Ardmore, OK	7	2.126	-0.568
Opelousas, LA	7	2.147	-0.553
Rock Springs, WY	8	2.288	1.901
Marshall, TX	7	2.299	0.477
Minot, ND	4	2.410	1.800
Key West, FL	5	2.609	-1.677
Guymon, OK	7	2.640	0.806
Hailey, ID	8	2.643	-1.531
Carlsbad-Artesia, NM	8	2.771	0.386
Storm Lake, IA	4	3.106	-0.324
Duncan, OK	7	4.171	-0.300
Snyder, TX	7	4.545	0.676

TABLE 4.6.8.3 POPULATION NEGATIVE OUTLIERS

MICROPOLITAN AREA	US CENSUS REGION	INCOME STUDENT RESIDUAL	POPULATION STUDENT RESIDUAL
Bennettsville, SC	5	-0.731	-3.007
Breckenridge, CO	8	-0.627	-2.603
Greenville, MS	6	0.617	-2.451
Fort Polk South, LA	7	-0.546	-2.335
Clarksdale, MS	6	-1.532	-2.229
Ada, OK	7	0.633	-2.215
Blytheville, AR	7	0.420	-2.107
Cleveland, MS	6	0.441	-2.020

Regional effects can also be seen in the micropolitan areas with lower-than-expected population growth. The East South Central (6) and West South Central (7) were dominant characteristics of the majority of these micropolitan. The West South Central

Region (7) was also home to the largest number of outliers with higher-than-expected relative income change observed values, underscoring the divergence in population growth and income growth in micropolitan America in the 21st century. Three of the eight micropolitan areas in this category are in the state of Mississippi, indicating some state-level forces that are not considered by the model.

TABLE 4.6.8.4 POPULATION POSITIVE OUTLIERS

MICROPOLITAN AREA	US CENSUS REGION	INCOME STUDENT RESIDUAL	POPULATION STUDENT RESIDUAL
Oxford, NC	5	2.004	2.055
Elizabeth City, NC	5	0.548	2.075
Stephenville, TX	7	-1.718	2.115
Sanford, NC	5	-1.216	2.163
Oxford, MS	6	-0.466	2.205
Moses Lake, WA	9	-0.305	2.225
Cedar City, UT	8	-1.104	2.271
Twin Falls, ID	8	-1.560	2.312
Sevierville, TN	6	-2.354	2.616
Fernley, NV	8	-1.843	2.675
Junction City, KS	4	0.737	2.897
Shelbyville, TN	6	-0.588	2.950
Dunn, NC	5	-0.524	3.014

CHAPTER 5: OUTLIER EXPLORATORY ANALYSIS

The previous chapters have outlined a general model explaining more than half of the variation in changes in relative income and population growth in America's micropolitan areas in the 2002 to 2014 period. The coming chapter turns our focus to the particulars of change in micropolitan areas that don't fit the model. This focus on the idiosyncrasies and unique events is important for policy analysis because unique events and economic trends may create policy windows allowing for the adoption of previously unfeasible policies (Anderson 2011). In addition, economic and natural disasters as well as economic boons and natural resource discoveries, are likely to have disproportionate impact on smaller regional economies, such as micropolitan areas.

The regression models identified 11 micropolitan areas as true outliers – those with observed values more than three standard deviations different from their expected values as measured by studentized residuals. Two had observed values more than three standard deviations below their predicted value in the equation with changes in relative income as the dependent variable – Los Alamos, New Mexico and Vermillion, South Dakota – meaning their changes in relative income were less than expected by the model. Four had observed values more than three standard deviations above their predicted values in the relative income equations – Summit Park, Utah, Jackson, Wyoming-Idaho, Dickinson, North Dakota, and Williston, North Dakota.

In the population change equation, three areas were outliers with lower-than-predicted population changes, again using the three-standard deviation criteria. These included Miami, Oklahoma, Los Alamos, New Mexico, and Indianola, Mississippi. Four

additional micropolitan areas had higher-than-predicted population growth. Those included Jefferson, Georgia, Andrews, Texas, Heber, Utah, and Williston, North Dakota.

TABLE 5.1 INCOME GROWTH NEGATIVE OUTLIERS

Change in Employment	Los Alamos, NM	Vermillion, SD
Total Employment Change	65.7%	9.6%
Mining	-71.0%	54.2%
Utilities	45.8%	-21.5%
Construction	-49.0%	3.8%
Manufacturing	21.0%	306.4%
Wholesale Trade	-24.2%	110.4%
Retail Trade	-6.0%	14.3%
Transportation and Warehousing	-44.4%	-12.8%
Information	-35.6%	-61.5%
Finance and Insurance	-16.3%	14.3%
Professional Services	542.4%	98.4%
Administrative Services	-71.8%	-64.7%
Educational Services	33.3%	12.6%
Health Care	-6.5%	3.6%
Arts, Entertainment and Recreation	2.3%	19.3%
Accommodation and Food Services	-32.7%	50.3%
Federal Government	2.6%	-43.4%
State Government	140.9%	21.9%
Local Government	6.0%	1.6%
Census Division	8	4
Relative Per Capita Income 2002	161.9%	85.4%
Relative Per Capita Income 2014	136.0%	92.0%
Inflation Adjusted PCPI 2002	$90,216	$47,558
Population 2002	18,060	13,505
Population 2014	17,682	13,932
% Population Change 02-13	-2.1%	3.2%

% BA or Higher 2002	61.1%	39.5%
USDA Urbanization Code	3	7
USDA Amenities Code	5	3
Per Capita Education Spending 2002	$198	$92
Per Capita Health Care and Hospital Spending 2002	$0.00	$1.00
Per Capita Highway Spending 2002	$25	$23
Right to Work State	No	Yes
Distance to Nearest Metro (miles)	96	191
Per Capita Property Tax Levied 2002	$492	$701
% 25 to 44, 2002	27.0%	22.7%
Immigration as a Percentage of 2002 Population	4.6%	1.7%
Net Domestic Migration as Percentage of 2002 Population	3.3%	6.7%
Higher Education Completions per 100 Population	0.58	15.69

At the negative extremes of observed vs. predicted relative income growth, the model outliers revealed two very different micropolitan areas. While Los Alamos, New Mexico saw relative income decline despite large-scale Professional Services Employment Growth; Vermillion, South Dakota, a college town, increased its relative income and grew slower than the national average in terms of population. This slow population growth came despite high-level percentage growth in Manufacturing and Professional Services sectors, though Vermillion began with lower aggregate numbers working in Manufacturing and Professional Services to begin with. While both regional economies make interesting case studies, neither can provide actionable policy recommendations because of the unique assets they contain – a federal nuclear laboratory in Los Alamos and a flagship university in Vermillion, South Dakota. The story of Los Alamos in the early 21st century underscores the need for micropolitan areas heavily

reliant on federal funding to diversify their economies, while Vermillion underscores the ability of larger universities to promote stability in isolated regions.

5.1 Los Alamos, New Mexico

Los Alamos, New Mexico is one of two micropolitan areas that were determined to be outliers in both population change and relative income change during the first 14 years of the twenty-first century. In Los Alamos' case, relative income fell from 162 percent of the national average to 136 percent of the national average and its population fell by about 2 percent to around 17,600 people. Los Alamos was barren desert until 1943, when the federal government built Site Y of the Manhattan Project to build the atomic bomb on the site. In fact, it does not appear in census population records until 1950, when the government counted just more than 10,000 people living there. Over the years, a community grew around the Los Alamos National Laboratory, which employed nuclear engineers and other scientists focused on researching and applying scientific advances in the interest of national security. As a result, Los Alamos has the highest higher education achievement rate of any micropolitan area – 61.4 percent of adults 25 and older hold bachelor's degrees or higher. A *Kiplinger's* Magazine study back in 2011 also noted that the area was home to the largest concentration of millionaires in the country with nearly 12 percent of households holding more than $1 million in assets. ("Los Alamos ranks at top of magazine's millionaires list | LAMonitor.com," 2011)

The Los Alamos economy is almost entirely dependent on the laboratory with more than 63 percent of all jobs classified as professional or technical services, which includes engineering jobs. After the management of the lab was transferred from the

University of California to two private management companies, layoffs and other staff-reduction efforts ensued. More than 10 percent of the lab's workforce – more than 1,000 jobs – were lost in two rounds of buyouts and layoffs in 2008 and 2012. "The lab sniffles and all of northern New Mexico gets a cold," one local told the *New York Times* on the eve of the 2012 layoffs. (Frosch 2012 "Los Alamos Braces for Deep Cuts at Lab" - The New York Times)

Proximity to Santa Fe, a metropolitan area of about 150,000 people about 33 miles away, may have a dampening effect on the ability of Los Alamos to create a sustainable, diversified economy outside of the laboratory. More than half of the workforce in Los Alamos lives outside of the county, with Sante Fe County the most common county for commuters. More than 20 percent of workers in Los Alamos live in Sante Fe. Environmental concerns, including nuclear waste leaks, have also dampened the feasibility of natural amenity-based tourism, despite a mixed topography. While efforts at branding the city "The Atomic City" for its role at the forefront of scientific discovery in an effort to prime the region for heritage tourism have yielded some results, employment in Accommodation and Food Services declined by 33 percent during the 2002 to 2014 time period.

5.2 Vermillion, South Dakota

Vermillion, South Dakota's economy has shown growth in relative income and employment across most sectors, including a remarkable 310 percent increase in manufacturing employment - thanks largely to a major expansion of the Polaris manufacturing and distribution center over the course of the study period. This 300-job

expansion more than tripled the manufacturing employment base, which in 2002 included only 68 jobs, so that high percentage increase is reflective of a large concentration of jobs but nevertheless was a driver of the equation. The large increase in manufacturing would have likely predicted a larger increase in relative income, which is why Vermillion wound up as an outlier with lower-than-expected relative income growth. Relative income in Vermillion increased from 86 percent of the national average in 2002 to 92 percent of the national average in 2014 while population increased only slightly, by about 3 percent during the 12-year period.

In reality, Vermillion appears to be a relatively stable college town. The economy in Vermillion is dominated by the University of South Dakota, the flagship state university of the South Dakota system with a medical school, law school and about 10,000 students. The predominant industry for employment remains Educational Services, which accounted for 28 percent of employment in 2002, increasing to 28.9 percent of employment in 2014. Health Care follows at about 13 percent of employment in the region, slightly higher than the national average and likely influenced by the medical school and regional hospital located in the area. Manufacturing, despite its steep rise during the study period, still only accounts for about 4 percent of employment in Vermillion. Only one company in the Vermillion area was required to file a federal Workforce Adjustment and Retraining Notification (WARN) during this time period. Stream Global Services Call Center laid off 180 people in 2012 as part of a merger with Convergys. Administrative employment declined 64.9 percent during that the study

period, likely driven by that layoff. (South Dakota Department of Labor and Regulation, 2012)

Despite a growing economy and growth in the manufacturing and professional services sectors, population growth rates have remained relatively stagnant, which is why Vermillion wound up as an outlier with population growth lower than expected. Vermillion is also located between two metropolitan areas – 65 miles south of Sioux Falls, South Dakota and 33 miles northeast of Sioux City, Iowa - though neither were large enough to make the 250,000-population cutoff for inclusion in the model. Migration patterns in and out of Vermillion are mostly contained within the four-state region whose borders it is near – South Dakota, Iowa, Minnesota and Nebraska. A closer look at migration patterns, shows net out-migration to nearby metropolitan areas such as Sioux Falls and Sioux City as wells as farther-flung metropolitan areas within South Dakota such as Fargo and Rapid City. Segmenting these patterns by age reveals one potential explanation for slower-than-expected population growth. While in-migration is strong among the 18-24-year-old demographic, the 25-34-year-old demographic show strong net outmigration back to these regional metropolitan areas. In fact, not a single county in the United States shows net migration of 25-34 year olds into the Vermillion, South Dakota micropolitan area. While some regional counties show net in-migration into Vermillion from retirement-age movers, the volume of retiree in-migrations is particularly low. Weather extremes may contribute to the lack of in-migration, as the area has consistent below-freezing average highs from November through March and has had record summer highs near 108 degrees Fahrenheit.

TABLE 5.2. INCOME GROWTH POSITIVE OUTLIERS

	Summit Park, UT	Jackson, WY-ID	Dickinson, ND	Williston, ND
Total Employment Change	43.2%	16.0%	113.5%	321.7%
Mining	12.9%	-71.0%	1475.3%	1786.6%
Utilities	1.4%	35.2%	16.5%	303.5%
Construction	-10.2%	-19.1%	237.5%	834.5%
Manufacturing	41.6%	-19.4%	40.0%	119.4%
Wholesale Trade	101.2%	45.5%	216.1%	483.9%
Retail Trade	40.6%	-1.5%	46.2%	89.7%
Transportation and Warehousing	73.7%	20.4%	405.7%	1045.2%
Information	29.7%	-16.5%	-15.4%	9.7%
Finance and Insurance	30.2%	1.9%	28.9%	33.4%
Professional Services	76.6%	20.5%	103.7%	394.4%
Administrative Services	46.3%	43.9%	30.5%	119.6%
Educational Services	42.3%	48.1%	29.9%	25.3%
Health Care	163.0%	34.3%	19.2%	5.3%
Arts, Entertainment and Recreation	40.4%	61.7%	80.2%	112.1%
Accommodation and Food Services	62.7%	30.0%	62.3%	216.3%
Federal Government	-36.9%	-3.0%	-9.5%	-37.8%
State Government	1.5%	-2.7%	-17.5%	2.8%
Local Government	38.1%	16.8%	38.1%	49.3%
Census Division	8	8	4	4
Relative Per Capita Income 2002	147.7%	202.4%	77.8%	81.3%
Relative Per Capita Income 2014	210.1%	310.5%	194.4%	263.9%
Inflation Adjusted PCPI 2002	$82,298	$112,740	$43,348	$45,289
Population 2002	31,536	25,686	22,384	19,729
Population 2014	39,105	33,271	30,372	32,130

% Population Change 02-14	24.0%	29.5%	35.7%	62.9%
% BA or Higher 2002	46.1%	37.3%	22.5%	16.9%
USDA Urbanization Code	6	8	7	7
USDA Amenities Code	6	5	3	3
Per Capita Education Spending 2002	$155	$131	$107	$121
Per Capita Health Care and Hospital Spending 2002	$9	$27	$5	$9
Per Capita Highway Spending 2002	$31	$41	$20	$23
Right to Work State	1	1	1	1
Distance to Nearest Metro (miles)	20	283	500	601
Per Capita Property Tax Levied 2002	$2,001	$1,409	$618	$783
% 25 to 44, 2002	33.0%	36.1%	25.5%	24.9%
Immigration as a Percentage of 2002 Population	4.4%	5.7%	2.0%	0.5%
Net Domestic Migration as Percentage of 2002 Population	6.5%	6.7%	5.1%	7.1%
Higher Education Completions per 100 Population	0.00	0.00	0.92	1.25

Despite the regression model's finding that the USDA Amenities Codes of micropolitan areas were not significantly correlated with relative income or population changes, four outliers show that natural resources and amenities have played a dominant role in the areas with the fastest-growing gains in relative income during the study period.

For Dickinson and Williston, North Dakota, which began the study period with relative incomes lower than the national average, natural resource discoveries led to rapid growth. In Jackson, Wyoming and Summit Park, Utah, already higher-than-average relative incomes compounded due to retirees. While the resort regions of Summit Park and Jackson Hole provide further evidence that the strong relationship between employment and migration has been weakened in the 21st century (Ganong and Shoag, 2012), Dickinson and Williston, North Dakota highlight the ability of resource booms and busts to completely reshape flagging regional economies. Few replicable policy recommendations can be gleaned from these outliers as amenities and natural resource discoveries cannot be induced in other micropolitan areas.

5.3 Jackson, Wyoming-Idaho

Anchored by the ski-resort town of Jackson Hole, Wyoming, the Jackson, Wyoming-Idaho micropolitan area in the Teton Mountains had the largest increase in relative income of any micropolitan area during the 2002 to 2014 study period. Jackson was an outlier with a much higher increase in relative income than the model would predict, and that is likely because income growth in Jackson during this time period has had very little to do with employment in any of the industries included in the model. In fact, income growth has had almost nothing to do with employment at all. While per capita income increased from $64,678 in 2002 to $146,995, average wages per job increased only $4,500, from $34,141 to $38,729 – barely enough to keep pace with the low inflation of the period. Per capita dividends, interest and rents, on the other hand, increased 228 percent, from $33,178 per year to nearly $110,000. (Bureau of Economic

Analysis) Nearly three quarters of all income came from passive sources based on real property or assets. A report from the Economic Policy Institute ranked the area the most unequal in the nation with the average income of the top 1 percent of residents in 2013 nearing $20 million annually. (Sommeiler and Price 2018) Average non-farm proprietor's income – a measure of income earned by unincorporated businesses in the area – fell by more than 57 percent during this time period as well, indicating a potential crowding out of local businesses with national or global luxury brands.

Population in Jackson Hole increased by about 30 percent to 33,271 people in 2014, while total jobs increased by only 15.9 percent. This population growth was driven by strong domestic migration, with a net total of more than 1,700 people moving from other parts of the country to Jackson. Domestic migration coincided with about 1,400 new immigrants arriving in the area. Though return international migration is not trackable by the Census figures, long-term immigration particularly from Central and South America did have an impact on the area, increasing the Hispanic population from about 10 percent in 2002 to nearly 16 percent in 2014.

Accommodation and Food Services remained the largest sector for employment, accounting for about 29.4 percent of all jobs in the micropolitan area in 2014, up from 26.2 percent in 2002, followed by Construction at 10.5 percent and Retail Trade at 10.3 percent. Manufacturing employment declined in the area by 19.4 percent during the study period but began from a low base of only 403 employees. Arts, Entertainment and Recreation employment increased by more than 60 percent from 774 jobs in 2002 to

more than 1,250, providing further evidence that the area had become a resort town for the nation's wealthiest.

Jackson Hole economic developers have seized on the concentration of wealth. The Federal Reserve's annual summer meeting takes place in Jackson Hole, allowing the city media exposure beyond its main brand as a tourism destination. Local initiative "22 in 21," noted in a 2011 SWOT analysis that the high cost of housing and perception of Jackson Hole as a tourism destination, not a business center, coupled with the area's remoteness, more than 600 miles away from the nearest 250,000-plus metropolitan area, were serious weaknesses in the area's quest for more sustainable economic development. The lack of a four-year college in the area, the report went onto note, kept the area from leveraging its high-level business connections into sustained economic drivers. ("22 in 21," 2018.)

Jackson Wyoming-Idaho, is an important exemplar for the increasing importance of non-wage income as a driving force in regional economics. With an aging population and continued retirements of the baby boom generation, retirement and interest income will continue to play an important role in regional economies.

5.4 Summit Park, Utah and Heber, Utah

Summit Park, Utah represents another resort-town-based micropolitan area whose relative income rise can be attributed largely to the portfolios of its wealthiest residents. Relative income increased from 147 percent of national income in 2002 to 210 percent in 2014. At the same time, population increased by 24 percent. While interest, dividends

and rents did not make up as large a chunk of total income as they did in Jackson Hole – at its highest in 2013, interest and dividend income accounted for 39.6 percent of per capita income in the micropolitan area compared to nearly 75 percent in Jackson Hole - this non-wage income did increase by 225 percent in Summit Park between 2002 and 2014. During the same period, average earnings per job increased by about 46 percent to $38,737.

Summit Park saw employment growth across all industries, except for construction and agriculture, which both saw declines of more than 10 percent. The predominant industries by employment remained Accommodation and Food Services, which increased to more than 21.5 percent of total employment; Arts, Entertainment and Recreation, which increased to 14 percent and Retail at 13.7 percent.

While this industry structure seems typical of a resort town, Summit Park's location less than 40 miles from Salt Lake City's 1.1 million population metropolitan area changes the commuting patterns and potential growth trajectory of the micropolitan area. More than 60 percent of workers in the Summit Park micropolitan area commute from outside of the county. (US Census Migration Mapper, 2015) An interesting shift in migration patterns can be seen, with Summit Park gaining residents from the Salt Lake City metro area and losing population to the neighboring micropolitan area of Heber, Utah. About 11 percent of Summit Park workers now live in the Heber micropolitan area.

Bordering Summit Park, Utah to the southwest, the micropolitan area of Heber has become increasingly linked to the resort town. It has also become a bedroom

community of nearby metro Provo, bordering Heber to the west. Heber is an outlier in this model in terms of population growth in that in grew by 63.2 percent during the 2002 to 2014 period. Relative income per capita did rise, but only by about 11 percentage points, from 72.6 percent of the national average to 83.9 percent of the national average in 2014. Much of the growth of the Heber area was contingent on the growth of nearby resort towns, but also the growth of Provo, Utah to the southwest as a headquarters and call centers growth market, Heber became an attractive and more affordable exurb. With average home prices at $280,000 in Heber in 2014 compared to more than $700,000 in Summit Park, Heber became something of a commuting city for both the resort town and the headquarters and call centers locations in Provo.

5.5 Dickinson, North Dakota and Williston, North Dakota

There is only one thing behind the booming income and population of both Dickinson and Williston, North Dakota, micropolitan areas – oil. While the oil formation was discovered on the property of farmer Henry Bakken as early as the 1950s, it was unrecoverable until advances in hydraulic fracturing and horizontal drilling in the early 2000s made it possible to tap the subsurface. Williston, North Dakota registered as an outlier with higher than predicted changes in both population and income change, rising from 81.3 percent of the national average in 2002 to more 263.9 percent of the national average in 2014. At the same time, population increased by 62 percent from 19,729 to 32,130 in 2014, as workers from throughout the country poured into the area to take advantage of high-wage jobs but dangerous jobs in the oil fields. The share of 25-to-44-year olds in the Williston population increased by 3 percentage points to 28 percent.

As the price of oil continued to rise in the run-up to the Great Recession, oil production expanded rapidly from 2006 through 2012, leading to a 1,405% increase in the Mining, Quarrying and Gas Extraction industry employment and subsequent 406% growth in the Transportation and Warehousing sector in Dickinson, North Dakota, and a 1,786% increase in the Mining, Quarrying and Gas Extraction Industry and a 1,045% growth in the Transportation and Warehousing industry. In Dickinson, mining grew from 2.7 percent of the workforce in 2002 to 20 percent of the workforce in 2014. In Williston, the increase was considerable higher, rising from 7.7 percent to 34.5 percent. Even as the total number of professional services jobs in Dickinson doubled, their share as a percentage of the workforce declined. The population boom and the area's lack of housing supply made headlines in 2012 as the average rent in the Williston, North Dakota area surpassed that of New York City or San Francisco at $2,394 per month for a one-bedroom. A subsequent boom in extended stay hotels and trailer parks led to large increases in the food services and accommodation sector. (Grandstrand, 2014)

As the price of oil declined after 2015, the pace of growth in the North Dakota oil fields will likely pull back as well. However, the depth of available oil in the region will make the general area an attractive place for natural resource extraction as the price of these resources boom and bust. Dickinson, with an established state university and a larger housing stock, is likely to weather the changes with more stability than Williston, which had little industry or professional services to speak of at the beginning of the period. The effect of the oil boom on the agriculture of the region is an open question, with many former wheat fields turned to oil fields, the productivity of the soil comes into

question. Agriculture's share of the economy in Williston declined from 4 percent to 1 percent in 2014 and from 3.2 percent to 1.4 percent in Dickinson. While in the early 2000s, economic development and city management officials in Williston launched a campaign to lure telecommuters longing for small-town living with the promise of free housing and no traffic, by 2014, concerns turned to increasing housing supply and making more police hires to deal with rapidly rising nuisance crimes perpetuated by the largely male, transient workforce in the oil fields.

5.6 Andrews, Texas

Another natural resources-driven, growing micropolitan area is Andrews, Texas. Rising oil prices after the recession drove increases in mining activity and by 2014 Mining had increased its share of employment to 25 percent of the micropolitan area's workforce. This led to a 34 percent increase in population, from around 13,000 to more than 17,000, leading the Andrews area to appear as an outlier in the population growth model. Income also rose from 70 percent of the national average in 2002 to 119 percent of the national average in 2014. Employment growth was strong throughout the 12-year period across all sectors except for state and federal government, which saw significant declines.

Growth in Andrews' per capita income was heavily reliant on earnings growth, indicating a large working age population with relatively lower retiree growth. Per capita earnings rose by 203 percent during the study period while per capita retirement income rose by only 28 percent. Consistent in-migration from other parts of Texas and immigration for Latin America during the period led the Andrews area to become

majority Hispanic/Latino as of 2014, with 52 percent of the population in 2014 reporting as Hispanic or Latino, up from 40.1 percent as of the 2000 Census. In fact, median age in Andrews declined from 34.1 in 2000 to 33.1 in 2014, reflecting larger families and a growing number of children in the area. This younger population may also account for the fact the Andrews had the highest Per Capita Education Spending in 2002 - $198 per capita - of any of the outliers listed here.

Like the North Dakotan towns of Williston and Dickinson, the growth of Andrews is likely to follow the fortunes of oil prices. A decline in those prices after 2015 was very noticeable and had ripple effects through the West Texas economy. More than 566 oil rigs in the Texas Permian Basin were active in November 2014, according to *Bloomberg.* That number was down to 165 by February 2016. Still, since the discovery of oil in Andrews occurred 90 years ago, the micropolitan area has had time to adjust to the ebbs and flows of the oil market, than comparable regions in North Dakota. This can be seen in the relative stability of other sectors in the economy, such as the construction sector, which grew its share of total employment by only 1.8 percent during the boom period under study. The infrastructure of a boom town/region is already in place to absorb what might be a temporary peak in population, and the larger family sizes of newer, largely Hispanic population appear to keep the demand for additional housing *units* down, compared to the largely single and male transient workforce in the North Dakota fields.

TABLE 5.6.1 POPULATION GROWTH POSITIVE OUTLIERS

Change in Employment by Sector	Jefferson, GA	Heber, UT	Andrews, TX
Total Employment Change	29.3%	43.8%	69.8%
Mining	66.2%	-13.3%	129.2%
Utilities	73.2%	-38.2%	14.2%
Construction	-38.1%	41.7%	99.2%
Manufacturing	23.1%	4.3%	9.4%
Wholesale Trade	105.9%	90.5%	127.0%
Retail Trade	0.6%	55.1%	31.7%
Transportation and Warehousing	169.7%	20.2%	147.3%
Information	24.2%	65.8%	47.0%
Finance and Insurance	71.3%	11.6%	104.0%
Professional Services	62.1%	64.2%	154.1%
Administrative Services	248.9%	376.3%	95.1%
Educational Services	16.9%	53.5%	6.3%
Health Care	41.5%	59.6%	19.1%
Arts, Entertainment and Recreation	134.9%	256.6%	102.7%
Accommodation and Food Services	50.4%	17.8%	98.5%
Federal Government	15.1%	-42.4%	-40.2%
State Government	-39.6%	24.3%	-11.5%
Local Government	10.6%	40.4%	17.2%
Census Division	5	8	7
Relative Per Capita Income 2002	77.5%	72.6%	70.0%
Relative Per Capita Income 2014	76.0%	83.9%	119.3%
Inflation Adjusted PCPI 2002	$43,184	$40,475	$39,026
Population 2002	44,940	16,975	13,022
Population 2014	61,870	27,714	17,477
% Population Change 02-14	37.7%	63.3%	34.2%
% BA or Higher 2002	12.3%	27.0%	11.9%
USDA Urbanization Code	6	6	6
USDA Amenities Code	3	6	4
Per Capita Education Spending 2002	$156	$133	$195
Per Capita Health Care and Hospital Spending 2002	$46	$9	$136
Per Capita Highway Spending 2002	$0.14	$0.27	$0.15
Right to Work State	1	1	1
Distance to Nearest Metro (miles)	40	45	117

Per Capita Property Tax Levied 2002	$538	$748	$2,718
% 25 to 44, 2002	31.2%	28.5%	26.8%
Immigration as a Percentage of 2002 Population	1.2%	2.9%	1.9%
Net Domestic Migration as Percentage of 2002 Population	1.3%	4.8%	21.9%
Higher Education Completions per 100 Population	0.00	0.04	0.00

5.7 Jefferson, Georgia

Nestled between the University of Georgia which dominates the economy of the Athens, Georgia metro area to the southeast and Gwinnet County, the edge of the Atlanta suburbs to the west, the micropolitan area of Jefferson, Georgia experienced 37.6 percent population growth, growing from 44,940 people in 2002 to 61,870 people in 2014. At the same time, relative per capita personal income fell from 77.5 percent of the national average to 76 percent. Jefferson's simultaneous population boom and income stagnation lend some credence to the finding of lower relative income growth and higher population growth in micropolitan areas closer-in to larger metropolitan areas.

Jefferson was an outlier in the population regression equation largely because its largest sector of employment growth was not included in the model. Transportation and Warehousing and Wholesale Trade, which is typically viewed as responding to broader Manufacturing job growth, showed tremendous growth in the Jefferson area during this time period, rising by 169 percent and 106 percent, respectively. Transportation and Warehousing jobs nearly tripled their share of total employment in the county to more

than six percent, while manufacturing employment slightly declined in its share from 25 percent to 23 percent.

Ten of Jefferson's largest 25 employers are in the distribution or "e-fulfillment" space, according to the Economic Development Alliance of Jackson County. This indicates the importance of distribution and warehousing as an employment sector. Jefferson's location just outside the perimeter of the ninth largest metropolitan area in the country and bordering Interstate 85 – a major interstate connecting some of the largest cities on the eastern seaboard. The rapid expansion of online shopping options have made micropolitans and other smaller metros on the periphery of larger cities attractive for warehousing operations, particularly areas with large former manufacturing properties that can be converted to warehouse use. These areas tend to have enough land for greenfield redevelopment of large warehouses as well as lower congestion costs, allowing for quicker delivery times to multiple cities. While Transportation and Warehousing sector employment growth was not systematically analyzed across all micropolitan areas in this study, other outliers showing growth in population also showed large growth in the Transportation and Warehousing sector. Andrews, Texas saw a 147 percent increase in its Transportation and Warehousing employment, while Heber, Utah, a micropolitan more dependent on tourism, saw an increase of only 20 percent in Transportation and Warehousing. In Williston and Dickinson, North Dakota, outliers in terms of relative income growth, increases in this sector approached or exceeded 1,000 percent. Even Indianola, Mississippi, which was an outlier in terms of population loss, increased its Transportation and Warehousing employment base by 225 percent and subsequently its

relative income from 50 percent of the national average to 58.3 percent. Further details on Indianola can be found in the next section. Future work on growth and development of micropolitan areas should take the warehousing and transportation sector into consideration as a driver of economic development and change. While typically seen as a response to manufacturing growth within a region, changing supply chain methods and the rise of e-commerce may allow strategically located micropolitan regions to capitalize on economic and production booms in other locations.

TABLE 5.7.1 POPULATION GROWTH NEGATIVE OUTLIERS

Change in Employment	Miami, OK	Indianola, MS
Total Employment Change	11.6%	-9.7%
Mining	161.4%	172.1%
Utilities	-17.2%	-24.5%
Construction	-24.8%	-14.8%
Manufacturing	-5.5%	-76.9%
Wholesale Trade	-57.4%	-45.1%
Retail Trade	-6.5%	-35.5%
Transportation and Warehousing	-22.4%	225.5%
Information	-53.7%	-20.4%
Finance and Insurance	-0.9%	-11.5%
Professional Services	8.9%	-12.4%
Administrative Services	-1.6%	21.9%
Educational Services	-13.8%	15.1%
Health Care	-7.0%	18.2%
Arts, Entertainment and Recreation	279.5%	133.1%
Accommodation and Food Services	130.0%	21.7%
Federal Government	-27.4%	-19.1%
State Government	-19.3%	-11.4%
Local Government	189.5%	11.5%

Census Division	7	6
Relative Per Capita Income 2002	62.9%	50.7%
Relative Per Capita Income 2014	71.5%	58.3%
Inflation Adjusted PCPI 2002	$35,067	$28,239
Population 2002	32,660	33,676
Population 2014	32,105	27,496
% Population Change 02-14	-1.7%	-18.4%
% BA or Higher 2002	12.4%	12.3%
USDA Urbanization Code	6	7
USDA Amenities Code	3	3
Per Capita Education Spending 2002	$158	$158
Per Capita Health Care and Hospital Spending 2002	$1	$34
Per Capita Highway Spending 2002	$12	$14
Right to Work State	0	1
Distance to Nearest Metro (miles)	91	151
Per Capita Property Tax Levied 2002	$483	$454
% 25 to 44, 2002	24.5%	30.1%
Immigration as a Percentage of 2002 Population	0.7%	0.1%
Net Domestic Migration as Percentage of 2002 Population	1.8%	1.8%
Higher Education Completions per 100 Population	1.54	1.07

5.8 Miami, Oklahoma

Miami, Oklahoma is a former zinc mining town near Peoria Native American Tribal lands in the northeastern corner of Oklahoma. Miami is unique among micropolitan areas for its larger than average Native American population, making up close to 15 percent as of 2014. In recent years, the growth and expansion of the Buffalo Run Casino and Resort has led to a rapid increase in the Accommodations and Food Services as well as Arts and Entertainment sector employment. Together, those two sectors account for more than 25 percent of the area's jobs.

Miami, Oklahoma shows up as an outlier for its negative population growth, declining by about 2 percent, from 32,660 to 32,105. At the same time, relative income of residents increased considerably, from 62.9 percent of the national average to 71.5 percent of the national average. Total employment in the one-county micropolitan area increased as well by 17 percent, adding more than 1,100 jobs as the casino and surrounding supporting businesses became hubs for commuting. The percentage of the Miami micropolitan area's workforce commuting from other counties increased from 22.8 percent in 2002 to 48 percent in 2014, the largest proportion of out-of-county commuters coming from Jasper County, Missouri, home to the 117,000-population metropolitan area of Joplin, Missouri.

The case of Miami raises another avenue for research on micropolitan and other non-metropolitan areas. Questions about how the casino industry might affect small towns and economic regions would be pertinent to economic development officials in these regions. While the appeal of casinos for economic development, what effects might these tourism-dependent industries have on the long-term health of the community. While other industries in the area have not suffered large-scale decline, neither has the casino and resort brought year-round residents and retirees as in other, more amenity-rich resort towns such as Jackson Hole. It appears, too, that the additional workers required to staff the casino are choosing to live outside of the micropolitan area, closer to more urban amenities in Joplin. Overall migration trends also show that 20-29 year olds are leaving on-net for the somewhat further afield and more urban areas of Stillwater and Tulsa. The tyranny of proximity seems to limit Miami's population growth, indicating that even

smaller metropolitan areas may exert influence on hinterland counties. The area's lack of natural amenities compounds the issue; it appears that while entertainment venues such as the casino have improved employment prospects, that has not resulted in increased population. Still, relative income has risen, making the prosperity of this micropolitan area somewhat ambiguous.

5.9 Indianola, Mississippi

It is hard to find many bright spots in micropolitan Mississippi these days. As we saw earlier in the descriptive statistics chapter, five of the ten micropolitan areas with the largest declines in population were in Mississippi. Indianola lost more than 19 percent of its population between 2002 and 2014, declining from 33,676 to 27,496 people. Relative income did increase in the area, from 50.7 percent of the national average to 58.3 percent of the national average, based largely on increases in transfer payments. The labor force participation rate of 47.9 percent is one of the lowest in the country, and total employment declined by more than 10 percent. Clearly, state-level factors can be counted among the missing values that the model could not account for.

Nearly half of employment in Indianola consists of the heavily subsidized and public sector industries of Health Care and Social Services, Educational Services, and Public Administration. As in other southern micropolitan areas profiled here, the Transportation and Warehousing sector was the strongest growing private sector industry in the Indianola economy, nearly tripling in size from less than 400 to more than 1,100 jobs (10.2 percent of the area's work force) after the expansion of the Dollar General Distribution Center and Averitt Trucking Center on the outskirts of the town of Indianola.

Dollar General's strategy of dominating the rural market with low-cost, smaller stores is lucrative in Mississippi and Indianola, just off a U.S. Highway 82 and about 60 miles from Interstate 55, provides a strategic location for warehousing operations.

Despite the positive growth of warehousing and transportation jobs, net outmigration flows to more urban areas continue for Indianola as well. The slightly larger surrounding counties such as Cleveland, Mississippi, home to Delta State University, regularly receives a net influx of migrants from Indianola. More strikingly, the larger regional cities of Birmingham, Alabama and Fort Worth, Texas, both averaged more than 100 net in-migrants per year between 2008 and 2014, specifically from Indianola.

While warehousing and transportation jobs have provided a brief lifeline to rural areas like Indianola, these jobs are susceptible to automation in the coming decades, which could lead to workforce gluts. However, for areas like Indianola so dependent on transfer payments, growing the tax base through warehousing operations is advantageous.

5.10 Outlier Summary and Practitioner Takeaways

Outlier analysis has revealed some unsurprising advantages of micropolitan areas with natural amenities, resources, and federal facilities, as well as some non-obvious driving forces in the changing economic prosperity and population growth, such as the rise of the transportation and warehousing industry. In addition, the performance of these outlier micropolitan areas points to limitations in this dissertation's model, including missing variables, which ideally can be built upon by future scholars in this interdisciplinary field.

Outliers such as Los Alamos, New Mexico or Vermillion, South Dakota, home to federal or state-run educational facilities are not likely to be useful models for micropolitan practitioners. Relocating a major federal nuclear facility or flagship university is unlikely in a time of federal contraction and slow growth in state university funding. In addition, Williston and Dickinson, North Dakota's massive income and population growth due to the Bakken Shale oil boom is not replicable in other micropolitan areas, though leaders in other natural-resource rich micropolitans might look to the experiences in those North Dakota regions as exemplars and/or cautionary tales for local and regional governance and policy in preparation for future booms. The natural amenities of Jackson Hole, Wyoming and Summit Park, Utah are also not exportable to other micropolitan areas.

The more interesting findings for policy practitioners will be in the micropolitan areas with proximity to larger metropolitan areas and the interplay between neighboring micropolitan areas. For micropolitan areas such as Summit Park, just 20 miles from the Salt Lake City metropolitan area, this examination, particularly the discovery of recent levels of commuting between the two economic areas, calls into question their status as "micropolitan" economies. It is likely that many of these areas could become reclassified as part of larger metropolitan areas after the 2020 U.S. Census redraws Economic Area borders, which will become effective in 2023. However, the economic interplay between Heber, Utah and Summit Park, Utah, also underscores the close economic relationships between micropolitan areas that border one another. The example of Heber and Summit Park is also an interesting case study for practitioners in rural counties or other

micropolitan areas bordering micropolitans undergoing amenity-driven employment and income growth.

In addition, the paradox of population growth coupled with income decline as evidenced in Jefferson, Georgia, also a "close-in" micropolitan area about 45 miles from the Atlanta metro area. Combined with other, less extreme outliers also in the South Atlantic Census Division, which were discussed in the previous chapter are also worth further study. A closer examination of these areas reveals growth in Transportation and Warehousing employment, in Southern micropolitan areas not particularly known for amenities-driven migration, that are both growing and declining in terms of population as evidenced by Jefferson, GA and Indianola, MS. (Pandy and Stevens 2018)

TABLE 5.9.1. TRANSPORTATION AND WAREHOUSING EMPLOYMENT CHANGE IN MICROPOLITAN OUTLIERS

Micropolitan Area	2002 Percentage of workforce in Transportation and Warehousing (NAICS Code 48)	2014 Percentage of workforce in Transportation and Warehousing (NAICS Code 48)	Miles from Nearest Metro of 250,000 or more
Jefferson, GA	2.9%	6.1%	40
Heber, UT	3.3%	2.7%	45
Andrews, TX	3.7%	5.3%	117
Summit Park, UT	2.0%	2.5%	20
Jackson, WY-ID	2.1%	2.2%	283
Dickinson, ND	3.8%	8.9%	500
Williston, ND	3.4%	9.1%	601
Indianola, MS	2.8%	10.1%	150

While analysis in previous chapters showed that the micropolitan designation encompasses areas that varied systematically from both metropolitan and non-metropolitan areas, the preceding chapter on outliers revealed some key differences

among micropolitan areas as well. Many of these differences – amenities and natural resources, federal facilities and universities are well reflected in previous literature and non-replicable. On the other hand, the examination of outliers close to micropolitan areas can offer some lessons for practitioners.

CHAPTER 6: CONCLUSION AND POLICY IMPLICATIONS

The narrative of small town and rural decline is strong in current popular cultural and political narratives; yet social science research has largely lacked systematic ways to delineate differences between non-metropolitan functional economies. The definition of micropolitan areas after the 2000 Census is one step toward refining this lack of precision. The preceding dissertation has shed light on the complexities of regional economic and demographic change in in the more than 500 micropolitan areas of the United State during the 12-year period from the end of the dot-com recession in 2002 to 2014, when the U.S. economy had largely recovered from the Great Recession of 2007 to 2009. This examination, while not causal in nature, has established that micropolitan areas are sufficiently different from both rural and metropolitan areas, a subtlety that can be overlooked be researchers and journalists lumping all "non-metropolitan" areas together. While the narrative of a "non-metropolitan" crisis is based in some evidence, this research makes clear that some micropolitan areas are thriving and points to some potential strategies for continued micropolitan prosperity.

Looking through the theoretical lens of Carlino and Mills (1987) evidence of income convergence between micropolitan areas in the United States was not found, aligning with more recent research by Ganong and Shoag (2012, 2017), who found that convergence had stalled since the mid-1980s on the heels of diminishing returns to migration for lower-skilled workers. This, Ganong and Shoag and subsequent researchers found, indicated that the relationship between migration and employment was becoming weaker as transfer payments and other non-earned income played an increasing role in

income growth and economic prosperity. Population is flowing to the more urbanized micropolitan areas, particularly those in the Southeast within close distance of larger metropolitan areas. This finding aligns with some previously observed research that found the fastest growing non-metropolitan counties were in fact emerging exurbs. (DiCecio and Gascon, 2008; Ganning et al., 2013) Despite the population migration to urbanizing micropolitans, relative income increased more in more isolated micropolitans, driven by natural resource booms as in the case of North Dakota or high-wealth retirees and vacation homes as in Summit Park, Utah and Jackson Hole, Wyoming. State and local government officials responsible for micropolitan counties near growing cities should take steps to nurture economic connections between their smaller markets and the larger metros. They should also prepare for continued population growth and the attendant social and physical infrastructure needs that follow.

The impacts of deindustrialization hit manufacturing-dependent micropolitan area economies hard during this period, as areas with initially high levels of manufacturing employment experienced declines in relative income and population. However, growth in Manufacturing employment was correlated with relative income growth and population growth, indicating that Manufacturing still plays a more important role in micropolitan economies than in metropolitan economies (Brown et al., 2004; Mulligan and Vias, 2006; Vias et al., 2002). A closer analysis of the specific types of manufacturing that have spurred employment growth in the minority of micropolitan areas where manufacturing growth occurred would be a boon to economic practitioners in these areas. Investments in

upfitting older factories for use in more advanced sub-sectors of manufacturing is a worthwhile goal for micropolitans undergoing deindustrialization.

Professional Services employment increases were associated with relative income growth, as was the share of 25-to-44-year-olds and the initial base of bachelor's degree holders. While this model does not allow for establishing a causal mechanism, it does establish that areas with more educated base populations were more likely to attract population and prosper. Economic developers in micropolitan areas should supplement industrial recruitment efforts with talent and workforce development to enable micropolitan populations to attract professional service and advanced manufacturing jobs.

Growth in the Health Care Sector employment was associated in decline. Though not included in the model, evidence from outlier micropolitan areas shows that Transportation and Warehousing growth has shown potential to coincide with relative income levels, even in some areas where population has declined. Economic development and public administration officials in micropolitan areas near transportation assets or evolving supply chains should pay attention to the potential for attracting warehousing facilities as a potential.

While local spending variables in general showed a weak relationship to income change, per capita educational spending in the baseline year does show significant correlations with increased relative income levels in micropolitan areas, supporting the results found by Wink and Eller (1998) in studying 1980s North Carolina counties. Initial Health Care Spending levels were associated with a decline in relative income on average, though there is likely endogeneity in these results as areas with older or more

dependent populations would have been more likely to spend additional money on health care to begin with. While the policy recommendation stemming from these local spending results is not earth shattering – micropolitan areas should invest more in local education spending – the real policy implication of this comes from what is missing. The lack of consistent and accessible local spending data at the county level after the discontinuation of the USA Counties program in 2002, makes longer-term and time-series analysis of local spending patterns cumbersome at best and unfeasible at worst. More funding, staffing and technological resources to support data dissemination efforts should be provided to the U.S. Census Bureau, though the current political landscape of 2018 makes that seem unlikely.

These policy recommendations can be summarized as follows:

- Despite deindustrialization, manufacturing (at least some types) is still important to micropolitan areas. Area officials should seek deeper understanding of those sub-sectors with the most potential
- Micropolitan Areas near metropolitan areas should seek suitable Transportation and Warehousing Sector economic development projects.
- Federal and state governments should invest in data collection and analysis of sub-state area finance variables to help researchers better evaluate spending policies.

Much research is left to be done to move our understanding and treatment of "small town America" away from a simplistic narrative of decline and towards actionable steps to make life better for the 28 million Americans living in these small-scale

economic areas. The establishment and refinement of the micropolitan area unit of analysis makes this type of research possible.

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