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UNDERSTANDING THE ECONOMIC PERFORMANCE OF METROPOLITAN AREAS IN THE UNITED STATES

Pamela Blumenthal
Edward W. (Ned) Hill
Hal Wolman

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George Washington Institute of Public Policy (GWIPP)
The George Washington University
805 21st St. NW
Washington, DC 20052

http://www.gwu.edu/~gwipp

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Biographical statements:
Pamela Blumenthal is a doctoral candidate in Public Policy at George Washington University. She is also a graduate research assistant at the George Washington Institute for Public Policy.

Edward W. (Ned) Hill is Cleveland State University's Vice President for Economic Development, Interim Dean of the Levin College of Urban Affairs, and Professor and Distinguished Scholar of Economic Development. He is also a Nonresident Senior Fellow at the Metropolitan Policy Program of the Brookings Institution.

Harold Wolman is the Director of the George Washington Institute of Public Policy (GWIPP) and Professor or Political Science and of Public Policy at the George Washington University

Abstract

Examining the drivers of metropolitan economic performance, we model two dependent variables: change from 1990 to 2000 in gross metropolitan product and MSA employment. We find that initial year economic structure (an above average share of manufacturing employment), agglomeration economies, human capital (share of population with bachelor degrees or higher), and presence of state Right-to-Work laws are positively and significantly related to GMP and employment growth, while economic age of the area, percentage of black non-Hispanic residents, and average wage at the beginning of the period are negatively and significantly related to both. We augment the regional dummy variables commonly used to explain economic growth, and typically highly significant, by including climate-related amenity, business environment, and economic age. When these three variables are included in the model as independent variables with the regional dummy variables, all three are significant for growth in GMP and the significance of region largely disappears.

Understanding the Economic Performance of Metropolitan Areas in the United States

In a previous paper (Furdell and Wolman, 2006), we developed a typology of economically distressed cities in the United States, which distinguished among types of cities based on the economic condition of the city and the economic well-being of central city residents. Using cluster analysis, we differentiated among the weak market cities based on different aspects of distress and explored the relationship between the economic health of cities and that of their metropolitan areas. At that phase of the research, we concluded that: 1) there are meaningful differences among types of economically distressed cities; and 2) the economic health of cities is inextricably bound up in the economic health of their metropolitan statistical areas (MSAs).

This article builds upon that work, as well as on the decade-long path of research that the authors have conducted on the determinants of economic success of the metropolitan areas and central cities of the United States and the wellbeing of their residents (see, e.g., Furdell, Wolman, and Hill, 2005; Hill, and Brennan, 2005; Hill and Wolman, 1997a and 1997b; Hill, Wolman, and Ford, 1995). In this article we use regression analysis to understand the determinants of economic change in metropolitan areas using two widely accepted indicators of economic performance for the period from 1990 to 2000: employment growth and growth in gross metropolitan product.

Employment is a critical outcome measure, because it is considered to be desirable in its own right. We measure change in total employment from 1990 to 2000 at the metropolitan level using Census data on employment by place of work.

The second performance measure is the local version of gross domestic product: gross metropolitan product (GMP). We use the change in GMP over a decade to measure the change in value of goods and services produced in the region's economy. We measure change in GMP using data from Moody's Economy.com.[1]

The Models: Understanding Economic Performance

The models include a set of variables to capture economic structure, urban spatial structure, demographic structure, and labor market conditions. (See Appendix Table A1 for variable definitions and data sources.) These are discussed after the data set is described.

Data Set

Our unit of analysis is the metropolitan area. The data set contained the 224 metropolitan statistical areas (MSAs) containing core cities that had populations of at least 50,000 in both 1990 and 2000. We use only 224 of the 370 MSAs (as defined in 2000), because we are interested in metro areas with a large central urban core. Since the outcomes of interest are change in employment and GMP, the criterion applied to both 1990 and 2000.

Economic Structure

When considering the determinants of economic growth, much of the literature focuses on industry structure, economic diversity, relative operating costs, and labor market characteristics. Economic structure is obviously an important driver of growth; however no magical combination of structural characteristics ensures economic success. We consider three aspects of economic

[1] The estimates that we use for this variable were produced before the US Bureau of Economic Affairs (BEA) released their estimates of GMP; therefore, the Economy.com data are not benchmarked to the BEA estimates. Additionally, the BEA estimates do not cover the time period we investigate in this article.

structure: industry composition, industry diversity, and whether the region contains a state capital city.

To address industry composition, we included the location quotients for the manufacturing sector and for the finance, insurance and real estate (FIRE) sector, using the Standard Industrial Classification (SIC) definitions.[2] We expect that a metropolitan area that had a high concentration of manufacturing in 1990 likely had an industrial structure and economic base characteristic of the old economy – relatively low-skilled operations requiring low levels of human capital and therefore increasingly susceptible to global competition. In contrast, a metropolitan area that was relatively heavily concentrated in FIRE was more likely to have a higher value service industry orientation.

We expect a low manufacturing location quotient in 1990 to be associated with increased employment growth between 1990 and 2000. These expectations are consistent with the findings of Glaeser, Scheinkman, and Schleifer (1995), which found that the share of employment in manufacturing in the beginning of the time period they studied to be negatively related to income and population growth. Regions with a high concentration of employment in manufacturing in 1990 could be expected to suffer the loss of high paying jobs for low-skilled workers, coupled with employment and GMP loss since employment in manufacturing decreased between 1990 and 2000 nationally.

We expect the FIRE location quotient to be positively associated with growth in both GMP and employment, because FIRE was a growing sector during the 1990s, so that an area that was well-positioned in FIRE in 1990 was likely to benefit from growth in that sector over the decade.

[2] The location quotients for both manufacturing and FIRE use employment figures from State of the Cities Data System Census files. We use SIC codes rather than NAICS codes, since NAICS codes were not available until 1998. We also used the SIC codes for the economic diversity index, discussed below.

While the manufacturing and FIRE location quotients give a sense of a region's industrial structure and specialization, they do not capture the diversity of industries that are located within a region. Economic diversity was measured using an index that is a variant of the Hirschman-Herfindahl Index (HHI).[3] The HHI is an index that sums the squares of the market shares of firms in an industry as a measure of market concentration, and it is a widely used measure of the diversity of holdings in an investment portfolio. We sum the squares of the decimal shares of regional employment that each two-digit SIC industry has and then subtract that sum from 1 so that larger numbers reflect greater regional employment diversity across industries.

Using a portfolio measure of employment concentration is a reasonable way of gauging the diversity of a region's economy, because the way a region's pool of jobs is distributed across industries is in a real sense the region's portfolio of work and income-earning opportunities. In much the same way that a stock portfolio that was loaded up on technology stocks before the tech stock bubble burst in 1998 was an undiversified risky portfolio that grew fast as the stocks climbed in value and also fell fast when the bubble was pricked, an undiversified economy is a gambler's portfolio of jobs that does well as long as the constituent industries in the portfolio do well. A regional economy with employment spread across a more diversified portfolio of industries will not grow or fall as quickly as a region with a gambler's portfolio.[4] We therefore

[3] Diversity is calculated according to the following formula: 1 –construction share^2 –manufacturing share^2 –TCU share^2 –wholesale trade share^2 –retail trade share^2 – FIRE share^2 – business and repair services share^2 – personal services share^2 – professional services share^2 – public administration share^2 – not classified share^2. The sum is subtracted from 1 so that larger numbers reflect greater diversity. The values in our universe ranged from .743 to .885, with a mean of 0.85 and a standard deviation of 0.02.

[4] This is consistent with Glaeser, Kallal, Scheinkman, and Schleifer (1992), which found that greater city industry diversity was positively associated with employment growth.

expect greater economic diversity to be positively associated with our economic growth measures.[5]

The presence of a state capital in an MSA is commonly perceived to have a positive association with employment growth. One reason we expect this association is that, beginning with the Reagan administration and the devolution of federal activities to the states, states have been assuming additional responsibilities, so that state government employment grew. The movement to outsourcing and privatization in the provision of government services leads us to expect private firms to be locating close to state capitals to be closer to their customer, resulting in employment and GMP growth.

Urban Structure

A region's comparative advantage is based on both the quantity and quality of the factors of production that are associated with a region's structural characteristics. Two characteristics of metropolitan areas are particularly important: agglomeration (as measured by population size) and economic age.

The size of a region's population can affect its fortunes in two ways. The first is nearly tautological: large economies require large numbers of workers. The second is that production cost savings associated with agglomeration economies are hypothesized to be positively

[5] This leads us to repeat a metaphor for the causes of regional economic growth that we heard in interviews for a related research project. David Morganthaler, a Cleveland-based venture capitalist, likened the development path of a region to a horse race. He said that the race to economic success depends on the horses that are being ridden (the industries that are located in the region) and the skill of the jockey riding the horse (the skill of management). You can lose the race for economic growth with a good horse but a bad jockey—bad management in a good industry. It is difficult to win the race with a slow horse no matter how skilled the jockey. And the race is most easily won by regions with fast horses being ridden by skilled jockeys. In other words, if a region has a portfolio dominated by slow-growing industries that are in a pitched battle to eek out marginal gains in market share, no matter how skilled the management, growth will be slow. In another interview, Detroit was described as having a bad jockey riding a slow horse. Regions can win with slow growing industries and skilled management only if the management in competing companies located elsewhere makes strategic mistakes and the local companies gain in market share.

associated with the population size of metropolitan areas. A metropolitan area with a large population will provide cost savings for economic activity as a result of large and diverse labor markets, support services, and consumer demand. Increases in metropolitan size have been related to increased productivity and higher average wages (Beeson, 1992; Glaeser, Kolko and Saiz, 2001). While much of the research uses changes in population size as the independent variable, we use a 1990 level measure expecting that larger populations would be positively associated with employment and GMP growth. We note that Glaeser and Shapiro (2001) found no statistically significant relationship between initial population and economic growth at the MSA level. The natural log of the population of the metropolitan area was used for all of the models.[6]

The other aspect of urban structure that we examine is the economic age of the metropolitan area, which is a proxy for a series of historical determinants. The economic age of a metropolitan area is directly tied to the spatial structure of the area's economy and the form of its transportation and communication infrastructure. Cincinnati's form and structure reflect its historical roots as a pre-railroad riverfront town. The form of Kansas City, the home of America's first shopping mall, reflects its growth during the transition from the street car railway to the automobile. Phoenix looks different again, as it developed during the age when car- and truck-based transportation and distribution dominated.

Metropolitan regions that have evolved out of older cities have greater building density, narrower streets, and highways that are retrofitted into an existing streetscape rather than a streetscape that is built to match the pattern of highways. They are more likely to have aging

[6] The models were also run using the square of the natural logarithm of the MSA population in addition to the natural logarithm in an attempt to capture any non-linearities that may exist in the relationship between this independent variable and the dependent variables. However, this specification did not improve the fit of the models and the results are not reported.

infrastructure and be less friendly to modern means of transportation. Age also determines the characteristics of the housing stock. Newer metropolitan areas have newer housing stock that better meets the consumption desires of families today. Economic age may tie Birmingham, Alabama and New Orleans more closely to the older industrial cities of the restructuring economies of the Eastern Great Lakes States than to their geographic neighbors Jacksonville, Florida or Houston, Texas.

We operationalize the concept of MSA economic age as the age of the oldest city in the MSA. Age is calculated as the number of years, as of 2000, since the city first passed the 50,000 mark in population in a decennial Census. We expect economic age to be negatively related to our two measures of economic performance.

We also note that economic age may be captured in the regional dummy variables. MSA age is significantly and positively correlated with the New England and Middle Atlantic divisions, at 0.26 and 0.33, respectively, which is not surprising given the history of urban development throughout the United States. The only other correlation of 0.20 or greater is a negative correlation of -0.21 with the Mountain division.[7]

Connectivity to National and Global Economies

While old regions may have inferior connectivity by roads than newer regions that were designed for automobiles rather than streetcars and trains, connectivity to the global economy is now accomplished through air travel. Brueckner (2003) found that every 10% gain in airport traffic is related to a 1% gain in service employment. A preliminary study by Green (2007) found that boardings, originations, and hub status predict an increase in economic activity. We measure

[7] Definitions of the Census divisions used for regions are contained in Appendix Table A2.

this connectivity of both people and goods in relative terms by calculating the number of scheduled airline flights per 1,000 of population in the MSA in the first quarter of 1991.[8] Based on prior studies, we expect airline flights to be positively associated with employment growth, as well as GMP growth.

Demographic Structure

The primary impact of demographic structure on metropolitan economic performance is its relationship to the labor force. Demographics shapes the supply side of the labor market. Is a large supply of workers available? What are the characteristics and quality of that supply? What share of the population is of legal working age? An important secondary impact of demographics on the performance of regional economies is the public fiscal drag generated by the mismatch between residents' contributions to the local tax base and their demand for services.

We include variables that measure the portion of the population that is not of traditional working age as of 1990. We call this portion the dependent population because most members of this group depend directly or indirectly on the wages of others to live. We split the dependent population into two subgroups: the percent of the population that is age 17 and under, and the percent of the population that is age 65 and older.[9] We treat these groups separately, because their labor force participation rates have been changing over time, particularly among the older group, but the rates remain significantly lower than those of the prime working age cohort. We

[8] This variable includes scheduled passenger flights and cargo flights, such as UPS and FedEx. For a narrative account of the impact that an air cargo hub can have on a region's economy, read John McPhee's story, "On the Sort," in his book *Uncommon Carriers* (2006). The story focuses on the UPS air cargo sorting hub in Louisville, KY.

[9] We note that the percent of the population age 17 and under in 1990 includes workers entering the labor market between 1990 and 2000.

expect both of these variables to be negatively associated with economic growth since these two populations tend to increase social burdens through higher use of services such as public schools and health care services without adding to the tax base.

Another demographic variable that addresses these two measures of economic growth that are the dependent variables is the percent of the population that was Black in 1990. The historic legacy of discrimination and a strong correlation between percent black and the poverty status of the population (see, e.g., Glaeser and Shapiro, 2001) have resulted in an association in metropolitan regions between a large percentage of Black residents and underperformance in the economy. Educational achievement rates for Blacks have been behind those of whites over the time period of our work. Furthermore, the rates of return for education for Blacks, especially for those educated in large central city public school systems, have declined relative to whites (Smith and Welch, 1989). This variable may reflect that the quality of education at schools that the average Black student attends is not as good as the quality of education in schools that white students attend; thus a Black with a high school education may have gained less knowledge resulting in lower returns than a white with a high school education. This leads us to expect a negative relationship between this variable and the dependent variables.[10]

Labor Market Conditions

Two facets of the labor market are consistently found to be major factors in businesses' locational decisions: availability of skilled workers and labor cost (Cohen, 2000; O'Sullivan,

[10] We did not include an immigrant variable in our models, because the distribution of immigrants across cities is highly concentrated in a small number of cities (Singer, 2004). Furthermore, we expect that immigrant flows follow labor demand. The percent of recent immigrants in 1990 may also have an impact on the economy through increased population and low wages, which would be captured in our population, dependent population, and average wages measures. Including the percent of in-migrants from abroad between 1985 and 1990 did not change the significance of the variables in the models and was not itself significant.

2003). The importance of the educational attainment of a region's residents for economic well-being is widely accepted. The work of Glaeser and others has consistently found that human capital is positively related to economic growth; a greater initial stock of human capital propels future positive economic performance. Another link between human capital and economic growth may be through the former's effect on the amenity value of a region; places with more educated people are considered better places to live, attracting people and firms (Shapiro, 2005).

A skilled population, measured by educational attainment, is consistently found to be a significant driver of positive economic outcomes (see, e.g., Glaeser & Saiz, 2004). However, formal education is not the only route to sustained higher incomes; training and spillovers also positively increase productivity. Marcotte (2006) found that taking courses at a community college has a positive effect on earnings, even if the students did not obtain a credential, such as a certificate or associate's degree.[11] This can be important for economic growth and development, because, as Marcotte and his colleagues note, the residents most likely to attend community college are those who are at risk of being left behind as we continue developing a knowledge economy, including people already in the labor force who need to develop new skills (Marcotte et al. 2005). Marcotte's findings suggest that the labor market values some aspect of higher education, or the motivation of those who pursue it, in addition to the labor market signaling effect of a college degree. We measure two levels of educational attainment: the percent of the population with a bachelor degree and the percent of the population with some

[11] See also Weissbourd and Berry (2004) who found that in 39 of the top 100 cities, the number of adults with some college and no degree was greater than the number with college degrees (p. 30). Weissbourd and Berry examined the relationship between education and income, using high school degrees, college degrees, associate degrees, and some college but no degree. Interestingly, they found a positive relationship between high school degree and change in city per capita income but a negative relationship between some college and change in income when controlling for the other levels of education. Glaeser, Scheinkman, and Shleifer (1995) found that the percent of the population with high school degrees and some college is more important than the percent of college graduates for city population growth.

college education.[12] Consistent with the prior studies, we expect both of these variables to be significantly and positively related to both employment and GMP growth.

The second important aspect of the labor market is labor cost. Labor cost affects an area's comparative advantage. Relatively high wages in a metropolitan area have been found to reduce employment over time (Henderson, Kuncoro, and Turner, 1995). We expect higher average wages in 1990 to be negatively related to employment and GMP growth.

Innovation

In connection with the rise of what Glaeser termed the "skilled city" (Glaeser and Saiz, 2004), innovation is increasingly considered to be an important driver of economic growth. Positive impacts have been found between science and research and development activities and economic development (Felsenstein, 1996; Hill and Lendel, 2007). These results suggest that the presence of research universities will aid economic growth. As discussed above, the importance of universities in providing educated workers is well established. However, research institutions offer substantially more than that. Higher educational institutions can be thought of as multi-product firms, with each product making a unique contribution to the city and regional economy (Goldstein and Renault, 2004; Initiative for a Competitive Inner City, 2002).

Research universities generate place-specific economic impacts by providing educational services with an associated supply chain. Universities can have profound regional labor market impacts by providing scarce technical talent. Universities that are aligned with their regional economic base can also improve productivity by the transfer of tacit knowledge through their labs and their graduates. Research universities can also turn knowledge creation into a

[12] The two educational attainment variables are significantly correlated with a correlation coefficient of 0.22.

traditional, exportable good. Finally, they also may succeed at the low-probability event of inventing a technology that fundamentally changes the economic structure of the region itself. But we must constrain our expectations, because the epoch-making inventions of the integrated circuit and the combustion engine took place outside of the academic setting.

The presence of universities has been found to be positively related to per capita income growth (Pack, 2002). This association rests on two pillars. First, we expect the flow of money to research universities and the products they produce to have a positive impact on economic performance. Second, major research universities have been demonstrated to attract private research and development as well as facilities, such as occurred in Research Triangle Park and near Stanford University (Pugh-O'Mara, 2005).

We measure this type of innovation by using a variable that combines the number of universities with high research activities and very high research activities in a metropolitan area in 1990, as defined by the Carnegie college and university classification system.[13]

Regions

We include the typical regional dummies in the model, using the nine Census Bureau divisions as the regions.[14] Including regional dummy variables offers an econometric advantage; they control for potential spatial autocorrelation. They also provide a control for other possible omitted variables that may vary by region.

However, in this study, we seek to better understand what lies behind the broad regional controls incorporated in the regional dummy variables. These dummy variables control for

[13] The models originally used a variable that combined universities with very high research activity, high research activity, and research/doctoral institutions. However, that variable was insignificant in the models and was too broad to capture the element of innovation.

[14] See Table A2 in the Appendix for the definitions of the Census Bureau divisions.

unspecified differences in regional economic structure and performance. In these situations the dummy variables are measures of our ignorance, even though we readily acknowledge that regional differences in economic performance exist. We would like to give more economic meaning to the concept of region.

Therefore, we include three structural variables, which we believe may be important factors in economic performance but which also are likely correlated with region: environmental amenities (climate), the existence of state right-to-work laws, and the economic age of the metropolitan area (which was discussed above). We suspect that in regional economic models that do not include these variables, the regional dummies may be incorporating their effects and that at least some of what is attributed to region may actually be accounted for by these theoretically relevant variables. In other words, the conventional models are misspecified.

Climate-Related Amenities

Economic growth has been found to be associated with desirable climate, low crime rates, and other amenities (Gabriel, Mattey, and Wascher, 1999). Like higher education, desirable climate (often defined as dry and temperate) consistently has been found to be significantly and positively associated with population and wage growth at both the city and metropolitan level (Glaeser and Shapiro, 2001).[15] Colder weather is associated with lower growth in wages. As indicated earlier, this relationship is frequently hidden in the regional dummy variables in models that include region but not climate. We expect temperature to be positively associated with positive economic outcomes. Temperature has been measured in numerous ways, including heating degree days and cooling degree days (Green, 2007), and average January temperature

[15] We believe other unmeasured amenities may be important as well, such as access to water, mountains, and cultural institutions, but are less likely to vary by region.

and average July temperature (Glaeser and Shapiro, 2001). We use average July temperature.[16] Average July temperature is strongly correlated with the West South Central census division, with a correlation of 0.46 and p-value of <.0001. It is also significantly and positively correlated with the Mountain division, at 0.22. Average July temperature is negatively correlated with the Pacific and East North Central divisions, with values of 0.22 and 0.29, respectively.

State Business Environment

In state capitals across the nation, policy makers and legislators express a great deal of concern about what the state business climate is and how the state's tax and regulatory policies affect business investment. Study after study tries to develop an all encompassing index to measure state business environment. However, this concept is difficult to measure because of the many facets of a state's business environment and the range of demands placed on a state by different industries. Like temperature, the effects of business environment, unless explicitly included in the model, are likely to be hidden in the regional dummy variables since it co-varies with region.

We use a single variable that employers may associate with perceived business friendliness: right-to-work laws.[17] Right-to-work laws are state laws that prohibit union shops. Union shops, legal in 28 states, require that if employees at a firm are unionized, all employees at that firm must belong to the union. In 22 states, however, employees are not required to join a

[16] The relationship between average July temperature and the dependent variables in the models has been treated as linear, although we recognize its form is undoubtedly not linear. We ran regressions using both the average July temperature and the square of average July temperature, but this added nothing to the model, so it was eliminated.

[17] Right-to-work was coded based on the State in which the central city of the MSA was located, which may result in a failure to accurately capture the effect of right-to-work laws for those metropolitan areas that are bifurcated between two states, one with and one without such laws, such as Fargo, ND.

union even if other employees at that firm have unionized. These employees have the "right to work." They may choose to belong to the union, but are not required to.[18]

Right-to-work states are neither located exclusively south of the Mason-Dixon Line, nor exclusively in warm weather locations (see Figure 1).[19] We believe that this variable influences economic growth in its own right, because employers with locational choices will invest in places with lower threat of union organization, and they may see the existence of right-to-work legislation as an indicator of a generalized business friendly political climate.[20]

[Insert Figure 1 about here]

Right-to-work status was positively correlated with the South Atlantic (0.36) and West South Central (0.37) divisions, and negatively correlated with New England (-0.20), Middle Atlantic (-0.26), Pacific (-0.36) and East North Central (-0.46).

We recognize that right-to-work laws are highly controversial; yet research suggests that right-to-work laws are a reasonable method of reflecting states' business environment. For example, Holmes (1998) proposes that enactment of a right-to-work law reflects a state's pro-business policies, citing a consulting firm's study in which those states that had high rankings on 15 "pro-business" characteristics of state policy (of which right-to-work was only one element,

[18] We use right-to-work rather than unionization for two reasons. First, it better reflects the business climate aspect in which we are interested. Second, the impact of private sector development on unionization is highly related to industrial structure.

[19] Right-to-work and average July temperature are correlated, with a correlation coefficient of 0.53, p-value <.0001. For each of the nine census divisions, the percentage of states that are right-to-work are as follows: New England 0%, Middle Atlantic 0%, East North Central 0%, West North Central 71%, South Atlantic 56%, East South Central 75%, West South Central 75%, Mountain 62%, and Pacific 0%.

[20] The hypotheses as to why companies that are making investment decisions would want to avoid unions include a desire for more flexible workplaces, avoidance of the cost of dealing with an intermediary organization between management and labor, and avoidance of a union pay differential (if it exists in an industry), but they are beyond the scope of this article.

and all were equally weighted) all had right-to-work laws. Grimes and Ray (1988) found a positive relationship between employment growth between 1950 and 1985 and right-to-work status. The growth rate in those states with right-to-work laws was consistently above the national level. Grimes and Ray explicitly note that the differences between right-to-work states and those without such laws may reflect social, political and economic differences.[21]

Tannenwald (1997) examined studies of right-to-work laws, finding that they had a positive and statistically significant association with economic activity, but raised concerns of endogeneity and other problems with studies that used the variable. Holmes (1998) sought to address the identification problem by examining manufacturing growth in counties across state borders between states with and without right-to-work laws. He found that crossing the border from an "anti-business" to a "pro-business" state, as indicated by passage of a right-to-work law, was associated with a greater increase in the share in manufacturing and a higher growth rate in manufacturing. Results were similar when he considered share of employment in large establishments rather than in manufacturing, although the differences across borders were insignificant when considering large establishments in industries other than manufacturing.

Bartik (1985) found that unionization levels had a negative effect on employment and the existence of right-to-work laws had a positive effect on manufacturing plants' location decisions, which suggests that metropolitan areas in states with right-to-work laws are more attractive to manufacturers, and perhaps to other businesses.

Right-to-work laws may be a proxy for other economic factor costs and business risk factors. We examined the relationship between right-to-work laws and July temperature in prior specifications of the models to determine if they were co-linear. The right-to-work variable and

[21] We capture some of the economic aspects through the location quotient variables and average wages; however, omitted variables may be related to both right-to-work status and growth.

average July temperature had a statistically significant correlation of 0.53. Despite this moderately high correlation statistic, both variables were significant in various specifications of the regression models.

Based on our specification of state business environment, we identify two possible relationships. The first is that business investment is deterred by the absence of right-to-work legislation, in and of itself. The absence of such laws increases the probability that the work force may become organized, resulting in contract-enforced work rules that can erode operational flexibility, or that the firm would have to offer a wage premium to deter organization. The absence of right-to-work legislation also may be interpreted by firms as an increased likelihood that the workforce is less flexible and more prone to a confrontational labor-management work environment. The second possibility is that the presence or enactment of right-to-work legislation is a proxy for a more general positive business-friendly political climate in the state that transcends the issue of union organization.

Our first expectation is that the presence of right-to-work laws will be positively associated with employment growth as footloose firms have the opportunity to choose among locations and will select that location that provides them with the greatest workforce flexibility. Our second expectation is that right-to-work laws will be associated with higher growth rates in GMP.

Regression Results

As we have noted, conventional models include region but, with the exception of industrial structure, frequently do not include other variables that vary by region. Thus, "region" incorporates a series of omitted variables that have theoretical meaning and are likely to be

important determinants of regional economic performance. We include in our model three such variables, climate (a measure of environmental amenities), economic age, and the existence of right-to-work laws.

We want to better understand region by adding to the model these frequently omitted variables that also co-vary, at least to some extent, with region. Our expectations are that 1) these variables will be significant, 2) they will reduce the significance of region, but 3) region will retain some significance because other unidentified, and often idiosyncratic, variables omitted from the model vary with region. The regional dummy variables are also required to control for regional autocorrelation.

There are thus three possible model specifications:

Model A: The model includes region but not climate, economic age, or right-to-work (the conventional model).

Model B: The model includes region and climate, economic age, and right-to-work.

Model C: The model includes climate, economic age, and right-to-work, but not region.

The most critical comparison is between Models A and B with the expectations as set forth above. If our expectations are correct, Model B will have a higher adjusted R-square value than either of the other two models and will be significantly different from them. Model C is a test to determine whether the addition of climate, economic age, and right-to-work laws completely account for the effect of region; if this is the case there should be essentially no difference between Model B (in which region loses all significance) and Model C.

In fact, we found that for both dependent variables, change in GMP and employment, Model B, which added the three variables to the conventional model, had a higher adjusted R-square than Model A, which included regions, but not climate, economic age, or business

environment. The GMP model had the greatest improvement, increasing from 0.395 to 0.466, while the employment model increased from 0.562 to 0.608. Additionally, when the three variables were added to the models, most of the conventional variables retained significance (other than the regional dummy variables), remaining consistent in direction and magnitude.[22]

Comparing Models B and C tests the hypothesis that the three variables account completely for the effect of region. This hypothesis is rejected. First, the adjusted R-square values are lower for Model C than Model B for both of the dependent variables. Second, to determine if the model without the regional dummies fully captured what is typically captured by regional controls, we conducted an F-test of joint significance.[23] The F-statistics (3, 198) were 8.81 for the GMP model and 9.09 for the employment model, indicating that amenities, economic age and state business climate are not fully capturing what is represented by the regional dummy variables. Yet, reliance solely on a model with regional controls but without the additional three variables is clearly misspecified, because it fails to capture important policy influences. A review of the two specifications indicates that we have made progress in understanding what lies behind regional controls.

Our article presents the results from Model B (the model that includes the regional dummies and the climate, economic age, and right-to-work variables), except when we explore the dynamics of what region may represent, particularly with respect to the right-to-work variable, where we compare Models B and C. Results from the other two models also are presented in Tables 1 and 2.

[22] The exception was location quotient for FIRE in the change in employment models, in which FIRE had a p-value of .04 in Model A but only .06 in Model B.

[23] This test compares the residual sum of squares of the unrestricted models (a model with the regional dummies) to the residual sum of squares of the restricted models (a model without the regional dummies).

Using the variables discussed above as independent variables, we conducted regression analysis on two models of regional economic outcomes: change in GMP from 1990 to 2000 and change in MSA employment from 1990 to 2000. Our findings are presented below.[24]

The models account for much of the variation in the dependent variables, with adjusted R^2 values of 0.466 for GMP growth (see Table 1) and 0.608 for metropolitan employment growth (see Table 2).

[Insert Tables 1 and 2 about here]

Economic Structure

Of the four variables in the model reflecting economic structure, only the location quotient for manufacturing and economic diversity, were significant at a p-value of 0.05. A metropolitan area's location quotient in manufacturing was positively related to both GMP growth and employment growth, with coefficients of 23.3 and 4.6, respectively. For example, an increase of 0.01 in an MSA's 1990 manufacturing location quotient is associated with a 0.046 percentage point increase in employment between 1990 and 2000.[25] This result was surprising in light of our expectation that metropolitan areas dominated by manufacturing employment were likely to be at severe risk for relative economic decline. However, it was consistent with Weissbourd and Berry (2004), who found that the share of 1990 metropolitan area employment in manufacturing was significantly and positively related to average wage per job growth between 1990 and 2000. They suggested that the diverse range of activities grouped within the manufacturing sector, including microchips and biotechnology, may account for such findings. Alternatively, it may be that most of the expected decline occurred from the late 1970s through 1990 and that areas with

[24] Descriptive statistics for each of the variables are contained in Appendix Table A3.
[25] The manufacturing location quotients ranged from 0.21 to 2.16, with a mean of 0.94.

a high manufacturing location quotient in 1990 were those that were left with, or had developed, high productivity manufacturing activity. It may also reflect that the time period of our study coincided with the explosive growth of the telecommunications industry and the revival of domestic automotive assembly (due to SUV and truck sales in the mid-1990s).

A metropolitan area's location quotient in FIRE was positively related to change in GMP, with a coefficient of 12.18 at a p-value of 0.06 (i.e., an increase of 0.01 in an MSA's location quotient for FIRE in 1990 was associated with an increase of 0.128 percentage points in GMP between 1990 and 2000).

Economic diversity was positive and significant for employment growth, with a coefficient of 88.5. For example, an increase of 0.01 in an MSA's economic diversity index value is associated with a 0.885 percentage point increase in employment between 1990 and 2000.

State capital was not significant. The latter finding is particularly interesting. The examples of Columbus, St. Paul, and Indianapolis might suggest that state capitals were immune to recession and had a favorable economic structure for job growth, but, of course, these examples are balanced by those of Trenton, Albany, Harrisburg, and Hartford. Our results indicate that state capital status did not affect metropolitan area economic performance when controlling for other aspects of economic structure.

Urban Structure

Urban structure is an important aspect of growth in GMP and metropolitan employment. Population size in 1990, reflecting the agglomeration economy advantages of large areas, was significant as a driver of growth for both GMP and employment. A region's place in the urban

hierarchy appeared to positively affect its economic performance during the 1990s. These results suggest that agglomeration benefits are important to a metropolitan area's productivity.

An MSA's economic age was negatively and significantly related to change in employment and GMP, as expected, with coefficients of -0.10 and -0.14, respectively.

Connectivity

Connectivity as expressed through airport departures per capita was positively and significantly associated with changes in employment at the .05 level; global air connections are important to employment growth.[26] This finding replicates the results of Green (2007), which found that airplane boardings and originations positively affected both population and employment growth.[27]

Demographic Structure

Demographic structure in terms of age did not affect economic performance. The percentage of the population age 65 and older and age 17 and under in 1990 (what we have termed the "dependent population") was not significantly associated with either of our economic outcomes. However, racial demographics did matter: the percentage of Black residents in 1990 was significantly and negatively associated with an increase in GMP and employment, as expected.

Labor Market Conditions

Both elements of human capital, skills and labor cost, were significant and in the expected directions for both models.

[26] Connectivity was significant for GMP when regions were omitted, suggesting the models contain multi-collinearity.

[27] In Green (2007), cargo was not significant. Our variable captures both cargo and passenger departures.

The percentage of the population with at least a bachelor degree is predictive of growth in GMP and employment, with a regression coefficient of 0.71 for employment growth and 1.53 for GMP growth. However, the percent of the population that had attained some college but not a bachelor degree was not significant for either outcome. This finding is opposite our expectations based on Marcotte's work, which found that post-secondary education was valuable, even if it did not culminate in a degree.

The statistical relationships between average wage per job in 1990 and the two economic performance variables that we modeled were consistent with our expectations. Those places that had high average wages in 1990 experienced lower rates of employment growth and GMP growth.

Innovation

We expected that innovation, as measured by the presence of very active research universities in the economy, would be positively related to both outcome measures. The results were not statistically significant in either model. This suggests either that innovation is not associated with urban economic performance or, more likely in view of other research and theory, that our proxy was either too crude or too blunt as a measure of innovation. However, the result is somewhat consistent with the finding that patents per capita was a weak measure of the impact of schooling on growth (Weissbourd and Berry, 2004).

The theoretical case for the critical role of innovation in stimulating economic development is too compelling to declare the hypothesis to be incorrect based solely on these findings. It may be that measuring innovation based on the presence or absence of large research institutions (a method conventionally employed) does not truly capture the concept of innovation

and that future research needs to specify a better way of capturing the true measure of innovation. It is also possible that, when placed in a carefully specified model such as ours, the presumed impact of innovation may be less than prior research has suggested.

An additional concern with the use of research institutions as a proxy for innovation is that the product set of universities is complicated. Their economic impact extends far beyond research innovation. Three issues need to be remembered when considering this variable. First, universities in-and-of themselves are economically important to regions, and this was not addressed in our models. Second, innovation means much more than the presence or absence of a university. Third, the idiosyncratic interactions between a university and its economic base are probably where economically meaningful innovation is taking place (Hill and Lendel, 2007; Safford, 2005). Modeling the complex web of interactions between higher education institutions and the development of their regional economies remains a significant challenge.

Understanding the Regional Dummies

One of the goals of this research was to better understand what is captured by the regional dummies so commonly used. We considered three possible variables: climate, economic age, and state business environment, looking at Model B (when regions and the three variables were included in the model) and Model C (when the three variables "replaced" regions). The results are similar between Models B and C; yet the adjusted R^2 value decreases from 0.466 to 0.418 for employment growth and from 0.608 to 0.571 for GMP growth when the regions are excluded. Additionally, the regions that are significant in Model A (when the three variables are excluded) are no longer significant in Model B. These results indicate that the three added variables do capture some of the variance that is typically absorbed by the regional dummy variables.

When regions are included in the models (Model B) average July temperature is significant only for change in GMP, with a coefficient of 0.83. Similar results hold when regions are excluded from the model.

The economic age of a region was negatively related to change in GMP and change in employment for both Model B and C. The greatest negative impact was on the growth rate of GMP (a coefficient of -0.14). This is consistent with our expectation that metropolitan regions with older cities are negatively impacted by their older infrastructure and sclerotic institutional arrangements and thus have lower growth rates in GMP and employment.

We also examined whether a state's business climate influences regional economic performance. When regions were included in the model, the existence of right-to-work laws in a state in which a metropolitan area is located was significantly and positively associated with GMP, with a coefficient of 11.8, and with employment, with a coefficient of 4.1. These relationships were significant despite the high collinearity between region and right-to-work; 6 of the 9 regions had bivariate correlations with the right-to-work variable of 0.2 or higher.[28]

Conclusions

Many of our findings confirm those of prior research. Educational attainment, as reflected by the percent of the population with bachelor degrees, is a major determinant of the economic success of regions. Agglomeration benefits are important to economic productivity. High average wages in the initial year retard growth in the next period. We also found, contrary to prior

[28] When regions were not included in the model, right-to-work laws were significantly and positively associated with both outcomes, GMP and employment growth, with coefficients of 8.08 and 5.42, respectively. The variance inflation factors for the regions range from 2.51 to 5.61 for Model B, suggesting multi-collinearity among the regions and other variables that is not fully captured in the bivariate correlations. It appears that MSA age, population, and regions have a linear combination, which indicates additional research is needed to fully understand the relationships among the variables.

findings, that a high location quotient in manufacturing in 1990 was *positively* associated with economic growth, a result we attribute to the fact that most of the shakeout of the manufacturing sector due to globalization had already occurred by 1990 and the rebound in domestic automobile manufacturing during the 1990s, suggesting that regions with high manufacturing location quotients in 1990 were those that were globally competitive.

With these results, we also begin to understand what the Census regional dummies have proxied. Three variables that were significant and economically meaningful in our models, amenities, economic age, and business environment, captured aspects of behavior that appear to be hidden by broad geographical dummies.

Glaeser and his colleagues introduced temperature as a way of distinguishing an important amenity that at the margins is seen as desirable by the population. The results of our regressions confirm the fact that the workforce, and possibly business investment, is engaged in heat-seeking behavior.

A contribution of this article is that right-to-work legislation, either in its own right or as a proxy for a friendly business climate, has meaningful economic outcomes. We found that right-to-work legislation was associated with a faster rate of growth in gross metropolitan product. This result supports the findings of prior research that found that right-to-work laws are a factor in business location decisions and provide an advantage for attracting business investment to a metropolitan area in a state with right-to-work laws. Alternatively, they support the position that right-to-work laws are a proxy for a business friendly environment. This analysis does not enable us to evaluate which is the more accurate explanation. Future research could consider other variables related to business climate to understand what can be attributed to right-to-work status or to currently omitted variables.

The broad Census dummies may also disguise an important component of urban structure: the economic age of the dominant central city. Economic age dictates the vintage of infrastructure and optimized mode of transportation. It also indicates political behaviors and institutional arrangements. We hypothesize that economic age also is correlated with the positions of the region's products on the product life cycle. Old cities have old products with slow rates of growth. There are old cities in the South – Birmingham and New Orleans - and they behave as robustly as Detroit and Cleveland. On the other hand, cities of much younger economic age -- Phoenix, Dallas, Miami, and San Jose -- have infrastructures built for truck and car and also have industries which are at earlier stages of the life cycle.

Many of the drivers of metropolitan economies that we have identified are, albeit perhaps not in the short run, susceptible to change, including public policy induced change. An important implication of our findings is that older metropolitan areas have at their disposal the ability to grow and attract talent, encourage more flexible, business-friendly work environments, improve their economic connectivity, and concentrate on developing their competitive specializations.

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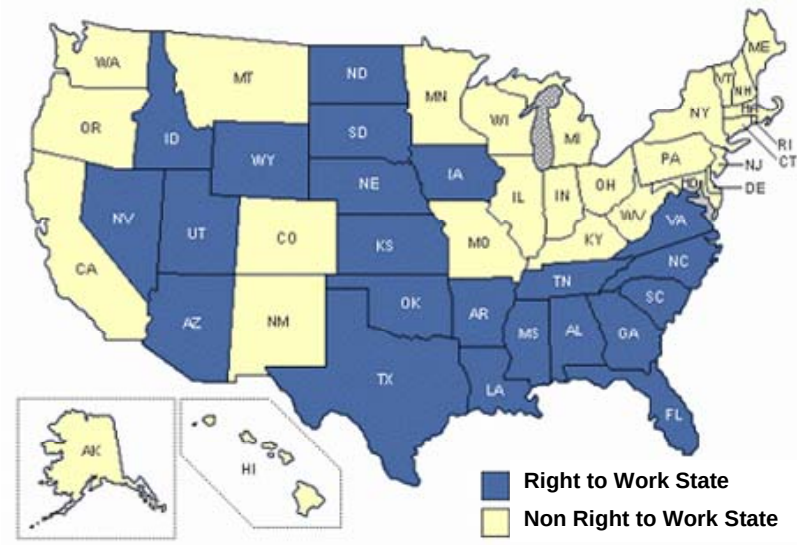
Figure 1: Right-to-Work States



Source: http://www.nrtw.org/rtws.htm
Note: Oklahoma enacted right-to-work legislation in 2001; so while it is identified in the map as a right-to-work state, it was not a right-to-work state during the time period covered in this study.

Table 1: Regression Results for Change in GMP, 1990-2000

		MODEL A		MODEL B		MODEL C	
		Adj R^2 =0.3950		Adj R^2 =0.4659		Adj R^2 = 0.4181	
		Parameter Estimate	P value (2-tailed)	Parameter Estimate	P value (2-tailed)	Parameter Estimate	P value (2-tailed)
	Intercept	-77.13	0.4104	-206.25	0.0302	-185.90	0.0333
Economic Structure	Location quotient for manufacturing	**23.33***	**<.0001**	**23.32***	**<.0001**	**28.55***	**<.0001**
	Location quotient for FIRE	**13.91***	**0.0442**	12.18	0.0614	11.86	0.0659
	Economic diversity	73.73	0.5027	89.61	0.3883	60.49	0.5415
	State capital dummy variable	1.69	0.674	1.36	0.7215	4.58	0.2419
Urban Structure	Natural log of MSA population	**7.05***	**0.0013**	**9.98***	**<.0001**	**9.55***	**<.0001**
	Age of oldest city in MSA, as of 2000			**-0.14***	**0.014**	**-0.17***	**0.001**
Connectivity	No. of scheduled airport departures	0.21	0.3298	0.28	0.1684	**0.50***	**0.0163**
Demographic Structure	Age 17 and under (percent)	0.50	0.5127	0.30	0.6798	0.23	0.7463
	Age 65 and over (percent)	-0.29	0.6873	-0.41	0.5535	-0.18	0.8021
	Black non-Hispanic residents (percent)	**-0.56***	**0.003**	**-0.62***	**0.0008**	**-0.58***	**0.0004**
Labor Market Conditions	At least some college (percent)	0.43	0.2868	0.23	0.5539	0.59	0.0984
	Bachelors degree (percent)	**1.53***	**0.0006**	**1.53***	**0.0004**	**1.56***	**0.0002**
	Average wage per job 1990, MSA	**-0.0038***	**<.0001**	**-0.00293***	**<.0001**	**-0.00324***	**<.0001**
Innovation	Very high and high activity research institutions	-1.24	0.3892	-1.41	0.2979	-0.64	0.6473
Environmental Climate	Average July temperature			**0.83***	**0.0042**	**0.86***	**0.0022**
Business Climate	Right-to-work state dummy variable			**11.80***	**0.0113**	**8.08***	**0.0254**
Regional Dummies**	New England	-17.39	0.0702	-1.14	0.9045		
	Middle Atlantic	**-17.99***	**0.0284**	-1.66	0.8413		
	East North Central	-6.38	0.3559	7.74	0.2855		
	West North Central	-12.23	0.0988	-5.88	0.4099		
	South Atlantic	5.09	0.4049	2.74	0.6362		
	West South Central	-3.25	0.6157	-8.41	0.1767		
	Mountain	**17.29***	**0.0382**	14.36	0.0689		
	Pacific	-10.68	0.1727	-1.28	0.8751		

* and bold indicate significance at the p<.05 level, two-tailed.

** Reference is East South Central

Table 2: Regression Results for Change in Employment, 1990-2000

		MODEL A		MODEL B		MODEL C	
		Adj R^2 = 0.5624		Adj R^2 = 0.6076		Adj R^2 = 0.5709	
		Parameter Estimate	P value (2-tailed)	Parameter Estimate	P value (2-tailed)	Parameter Estimate	P value (2-tailed)
	Intercept	-74.24	0.0635	-105.85	0.0097	-92.84	0.0135
Economic Structure	Location quotient for manufacturing	**5.13***	**0.0179**	**4.62***	**0.0304**	**6.52***	**0.0024**
	Location quotient for FIRE	0.66	0.8217	0.40	0.8863	0.45	0.8713
	Economic diversity	88.90	0.0585	**88.47***	**0.0479**	72.82	0.0881
	State capital dummy variable	0.49	0.7737	0.99	0.5473	1.92	0.2544
Urban Structure	Natural log of MSA population	**2.38***	**0.0104**	**4.76***	**<.0001**	**3.77***	**0.0003**
	Age of oldest city in MSA, as of 2000			**-0.10***	**<.0001**	**-0.09***	**0.0001**
Connectivity	No. of scheduled airport departures	**0.20***	**0.0298**	**0.24***	**0.0083**	**0.32***	**0.0004**
Demographic Structure	Age 17 and under (percent)	0.31	0.3447	0.30	0.3348	0.35	0.2629
	Age 65 and over (percent)	-0.24	0.4332	-0.28	0.3458	-0.21	0.4921
	Black non-Hispanic residents (percent)	**-0.27***	**0.0007**	**-0.26***	**0.0011**	**-0.27***	**0.0001**
Labor Market Conditions	At least some college (percent)	0.29	0.0912	0.17	0.3112	0.25	0.1054
	Bachelors degree (percent)	**0.80***	**<.0001**	**0.71***	**0.0001**	**0.78***	**<.0001**
	Average wage per job 1990, MSA	**-0.00216***	**<.0001**	**-0.00188***	**<.0001**	**-0.0021***	**<.0001**
Innovation	Very high and high activity research institutions	-0.71	0.249	-0.71	0.2259	-0.27	0.6572
Environmental Climate	Average July temperature			0.05	0.7078	0.13	0.2682
Business Climate	Right-to-work state dummy variable			**4.11***	**0.0398**	**5.42***	**0.0005**
Regional Dummies**	New England	**-11.20***	**0.0064**	-4.95	0.2263		
	Middle Atlantic	**-9.14***	**0.0091**	-3.06	0.3889		
	East North Central	-4.09	0.1651	0.61	0.8443		
	West North Central	-3.66	0.2454	-0.52	0.8637		
	South Atlantic	1.13	0.6641	-0.24	0.9222		
	West South Central	-1.10	0.6894	-2.01	0.4496		
	Mountain	6.28	0.0765	5.97	0.0778		
	Pacific	**-7.72***	**0.0211**	-6.00	0.087		

* and bold indicate significance at the p<.05 level, two-tailed.

** Reference is East South Central

Appendix

Table A1: Variables and their Definitions

	Variable	Definition	Source
Dependent Variables	Change in MSA employment	Percent change in employment by place of work, 1990-2000, MSA	State of the Cities Data Systems, Census Data 1990 and 2000
	Change in GMP	Change in gross metropolitan product, 1990-2000	Economy.com
Independent variables			
Economic Structure	Location quotient for manufacturing	Ratio of MSA manufacturing share to national manufacturing share (see formula below), 1990	State of the Cities Data Systems – Census 1990 Data for the MSA jobs by place of work data; Census Data 1990 for the national employment data
	Location quotient for FIRE	Ratio of MSA FIRE share to national FIRE share, 1990	State of the Cities Data Systems – Census 1990 Data for the MSA jobs by place of work data; Census Data 1990 for the national employment data
	Economic diversity	Index of the MSA's diversity among industries, 1990 (see formula below)	Calculated using State of the Cities Data Systems – Census 1990 jobs by place of work data
	State capital	State capital dummy variable	
Urban Structure	Population	Natural log of MSA population, 1990	Calculated using State of the Cities Data Systems – Census 1990 population data
	Economic age	Number of years in 2000 since the oldest city in MSA passed 50,000 in population in a decennial Census	Historical Census data
Connectivity	Airport departures	Number of scheduled airport departures in first quarter of 1991 per 1,000 population in MSA	Bureau of Transportation Statistics, Regional Air Carrier Summary Data
Demographic Structure	Percent of population age 17 and under	Percent of the population that was age 17 or under in 1990, MSA	State of the Cities Data Systems, Census Data, 1990
	Percent of population age 65 and over	Percent of the population that was age 65 or over in 1990, MSA	State of the Cities Data Systems, Census Data, 1990
	Black non-Hispanic residents	Percent of the population that was Black (non-Hispanic) in 1990, MSA	State of the Cities Data Systems, Census Data 1990
Labor Market Conditions	At least some college	Percent of the population that had some college but had not attained a bachelor degree in 1990, MSA	State of the Cities Data Systems, Census Data 1990
	Bachelors degree	Percent of the population that were college graduates, including those with advanced degrees, in 1990, MSA	State of the Cities Data Systems, Census Data 1990
	Average wage	Average wage per job 1990, MSA	Bureau of Economic Analysis
Innovation	Research institutions	The number of institutions in the MSA categorized in 1990 as either very high research activity or high research activity	Carnegie Classifications of institutions of higher learning
Environmental Climate	July temperature	Average July temperature, 1990	countrystudies.us http://countrystudies.us/united-states/ weather/
Business Climate	Right-to-work state	Right-to-work state dummy variable	National Right-to-Work Legal Defense Foundation
Regions	Regions	Regional dummy variables	Census Regions, U.S. Census Bureau

Location quotient = [(MSA manufacturing jobs / MSA total jobs) / (national manufacturing jobs / national total jobs)]
Or in other words, ratio of the MSA share of jobs that are in manufacturing to the national share of jobs in manufacturing

Diversity index = $1 - \Sigma\ (n/N)^2$

where n = number of jobs in a particular industry sector and N = number of jobs in all sectors
Or in other words, 1 – the sum of the squares of all the industry sector shares in the MSA.

Table A2: Definition of Census Regions

Census Division	States
New England	Maine, New Hampshire, Vermont, Connecticut, Massachusetts, Rhode Island
Middle Atlantic	New Jersey, New York, Pennsylvania
East North Central	Indiana, Illinois, Michigan, Ohio, Wisconsin
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
East South Central	Alabama, Kentucky, Mississippi, Tennessee
West South Central	Arkansas, Louisiana, Oklahoma, Texas
Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
Pacific	Alaska, California, Hawaii, Oregon, Washington

Table A3: Descriptive Statistics of the Variables

	Variable	Mean	Standard Deviation	Minimum	Maximum
Dependent Variables	Change in Employment, 1990-2000	15.62	12.07	-6.71	73.08
	Change in GMP, 1990-2000	72.98	24.12	8.80	164.19
Economic Structure	Location quotient for manufacturing	0.94	0.38	0.21	2.16
	Location quotient for FIRE	0.91	0.27	0.49	2.42
	Economic diversity	0.85	0.02	0.74	0.88
	State capital dummy variable			0	1
Urban Structure	Natural log of MSA population	12.92	1.05	11.20	16.64
	Age of oldest city in MSA, as of 2000	67.68	41.05	10	200
Connectivity	No. of scheduled airport departures	5.77	6.98	0	43.34
Demographic Structure	Age 17 and under (percent)	26.10	3.12	17.23	37.77
	Age 65 and over (percent)	12.13	3.05	3.81	30.40
	Black non-Hispanic residents (percent)	10.46	10.16	0.05	44.73
Labor Market Conditions	At least some college (percent)	26.08	4.61	14.90	39.60
	Bachelors degree (percent)	20.24	6.08	10.80	44.00
	Average wage per job	21408.50	2949.82	14830.00	33796.00
Innovation	Very high and high activity research institutions	0.70	1.33	0	12
Environmental Climate	Average July temperature	87.08	6.10	65	106
Business Climate	Right-to-work state dummy variable			0	1
Regional Dummies	New England			0	1
	Middle Atlantic			0	1
	East North Central			0	1
	West North Central			0	1
	South Atlantic			0	1
	East South Central			0	1
	West South Central			0	1
	Mountain			0	1
	Pacific			0	1