The Second MetroHartford Regional Performance Benchmark

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Executive Summary

The MetroHartford Growth Council has again contracted with the Connecticut Center for Economic Analysis (CCEA) to produce a second benchmark of greater Hartford's regional performance. As in the first benchmark, attached as Appendix 1, we compare MetroHartford with 55 other Metropolitan Statistical Areas that we judged to be similar to MertroHartford.

Benchmarks have relevance to policy formation and institutional change only if they are replicated. If the metric is meaningful, that is, it characterizes regional performance reasonably well, then it can be used to assess the impacts of policy and other endogenous changes, as well as exogenous shocks (national or international recessions or booms) on the region. Untangling causes and effects of changes in benchmark results may therefore not be easy. Our task here is simpler: replicate the first benchmark and compare results without untangling the complicated web of causes and effects.

In the first analysis we identified 39 variables and four categories in a focus group of economists, educators, and civic group leaders (see The First Annual MetroHartford Benchmark, January 12, 1999 in Appendix 1). We have maintained those four categories or concepts for grouping variables characterizing regional performance. They are: Business Climate, Quality of Life, Human Capital, and Infrastructure. We have added six new variables to better assess regional performance and recalculated the first benchmark at two different dates using a different methodology. Thus we refer to the first benchmark and two iterations of the second benchmark. The comparison below refers to the two iterations of the second benchmark using data from different eras. The full report compares the first and second benchmark results. The literature review surveys recent benchmarking papers and describes the relevance of these categories as measures of regional performance.

Comparing MetroHartford's performance from the first period to the second using current methods, we see that it slipped from 12th to 22nd in the Business Climate category, is relatively unchanged in the Quality of Life category (19th to 23rd), and shows a significant improvement in the Human Capital category (40th to 18th). There is some slippage in the Infrastructure category as well (9th to 21st). The overall rank for MetroHartford improves from 23rd to 22nd between the first and second iteration. This is primarily attributable to the ten variables that changed from the first to the second. These are demographic variables and are probably not good representatives for regional performance changes per se. Moreover, MetroHartford may even have improved more than indicated over time, but some of the 55 other MSAs improved more than MetroHartford. For example, we know that other regions recovered sooner than MetroHartford from the 1991/1992 recession. Connecticut has only recently recovered the jobs it had in 1989. MetroHartford probably has not. Policies and institutional changes effected years ago have their impacts felt only recently. That is to say that MetroHartford has not yet felt the impact of policies such as the tax credit for brownfield development, or the impacts of Adriaen's Landing and other construction projects and their resulting economic growth and fiscal enrichment. The lack of such realized changes in MetroHartford and their evidence in other MSAs partly accounts for its relative slippage in three out of four categories.

We focus on the seven MSAs selected for detailed policy analysis compared to MetroHartford: Austin, TX; Harrisburg, PA; Albany, NY; Providence, RI; Des Moines, IA; and, Raleigh-Durham, NC, and Columbus, OH (please refer to our report, 'A Tale of Eight Metros: Comparative Policy Analysis of MetroHartford and Similar MSAs', November 3, 1999). We selected these metros because they are similar in population size and other salient characteristics to each other (state capitols, close to rivers, cultural and educational assets).

TABLE 4: Relative Ranks of Comparison Metros

BUSINESS CLIMATE		QUALITY OF LIFE		HUMAN CAPITAL		INFRASTRUCTURE		OVERALL	
1994	**1996**	**1994**	**1996**	**1994**	**1996**	**1994**	**1996**	**1994**	**1996**
Raleigh-Durham(1)	Austin(1)	Austin(4)	Des Moines (1)	Austin(1)	Raleigh-Durham(1)	Raleigh-Durham(2)	Raleigh-Durham(5)	Raleigh-Durham(1)	Raleigh-Durham(1)
Des Moines(4)	Raleigh-Durham(2)	Des Moines(5)	Austin (2)	Raleigh-Durham(2)	Austin(2)	Hartford (9)	Columbus (15)	Austin(2)	Austin(2)
Hartford (12)	Des Moines(10)	Harrisburg (9)	Harrisburg(9)	Des Moines(3)	Columbus (3)	Albany(19)	Hartford(21)	Des Moines(3)	Des Moines(6)
Providence (18)	Hartford (22)	Hartford (19)	Raleigh-Durham(11)	Columbus (4)	Des Moines (4)	Des Moines(27)	Albany(26)	Columbus (10)	Columbus(10)
Austin(21)	Providence(24)	Raleigh-Durham(20)	Albany(16)	Harrisburg (17)	Hartford(18)	Harrisburg (30)	Austin(30)	Harrisburg (14)	Hartford(22)
Harrisburg (23)	Columbus (26)	Columbus (23)	Columbus(21)	Albany (18)	Albany(21)	Columbus (32)	Providence (38)	Hartford (23)	Harrisburg(27)
Columbus (25)	Harrisburg(30)	Albany(27)	Hartford(23)	Hartford (40)	Harrisburg (27)	Providence (34)	Harrisburg (41)	Albany (27)	Albany(31)
Albany (50)	Albany (48)	Providence (30)	Providence(28)	Providence (41)	Providence (41)	Austin(37)	Des Moines(45)	Providence (36)	Providence(37)

Table 4 above shows the relative ranks of the eight metros in both benchmark studies. The ranks arise from a composite rank for each category and overall ranks based on average scores (see Tables 5 and 6 below). The important observation from this portrayal is that Austin, Raleigh-Durham and Des Moines rank consistently higher than Hartford, Albany and Providence. Albany and Providence appear lower ranked than Hartford in several categories across both benchmarks. The detailed comparison of these metros suggests the many development, structural, political and jurisdictional differences among them that account in part for their relative ranking.

MetroHartford has apparently fallen behind some of its competitors over the last few years according to the metric established to assess its performance. This is accountable by its later recovery from the early 1990s recession, its paucity of development projects relative to other areas (see the comparative cities report cited below) in the middle 1990s, and, the lag of the effects of (local) policy and institutional changes. It is essential that local changes be recorded and described such that their effects can be tracked via the benchmark process. There are lags as well in the effects of economic development, policy and institutional changes as they manifest in the benchmark variables we assemble (some variables are annual, others biannual, quadrennial, and some, decennial).

Future work will employ more sophisticated time series analysis (dynamic factor analysis) to create more objective variable weights and have greater temporal stability.

Literature Review

I. Introduction

Measuring the performance of metropolitan areas in the U.S. has been an important topic for state and local governments, policy makers, business firms, and individuals in recent years. One of the major goals of state and local governments is to develop their cities and towns in a way that makes them attractive not only to individuals but also to business firms. Few cities or towns can thrive without business activity to increase employment, income tax revenues, and the overall welfare of its residents. Because business firms are central players in the development of a city or town, policy makers can design policies that attract business firms to locate in the area by enhancing factors such as business climate, quality of life, infrastructure, and the availability and quality of human capital.

Most often, the decision of individuals and firms to locate in a particular area may largely depend upon existing information regarding that particular region or location. There are several sources by which individuals and business firms can access relevant information about a town or city. Some of the popular sources of information are rankings of towns, cities and Metropolitan Statistical Areas (MSAs) in the U.S. published by business institutions and popular media. These comparisons rank towns and cities in the U.S. annually on the basis of some key socio-economic factors such as crime, housing, education, employment, air quality, economy, leisure activities and the arts. This type of ranking of town and cities, however, may not accurately reflect the true business and living climates of the towns and cities under consideration. The reason is that when ranking towns and cities these studies construct an overall index created by assigning different weights to different factors depending upon the perceived significance of each factor to the investigator. There is no general consensus or set of rules that precisely postulates what factors should be taken into account and how much weight should be given to each factor. As a result, the conclusions of these studies are often different, even contradictory. For example, the results from a study of a town or city focusing on individual preferences may be completely different from a similar study focusing on the preferences of business firms. For the former, pleasant weather, excellent schools and colleges, proficient hospital care and low living costs are some of the most important

factors; for the latter, low corporate taxes, highly developed and well-maintained infrastructure, high quality human capital, and sophisticated communication networks are crucial.

Another drawback of these studies is that some of the factors included in the studies are static and thus can not explain trends and potential changes in the factors. For example, policy variables such as sales tax, property tax, public spending on education and infrastructure are endogenous factors that state and local governments control. These kinds of policy variables can easily change over time and are likely to affect other factors as well. A state or local government with a positive attitude toward business could imply liberal sales and property tax policy in the future. This may in turn lead to a more favorable business climate for firms and a higher quality of life for residents. As a result, given the potential changes in state and local government policies, today's lowest rated town may not necessarily remain so in a few years and vice versa. This means that ranking MSAs based solely on static quantities fails to predict meaningfully how changes in the policies of a state or local government might significantly affect the existing business climate, quality of life and other factors in a particular MSA over a period of time. In such circumstances, it is critical for business firms to exercise good judgment about the potential changes in the business environment due to changes in the policies of state and local governments before they make a final decision on where to invest. Similarly, the role of state and local governments becomes equally important in attracting more business firms by reevaluating existing policies and designing more favorable ones.

Few studies have attempted to focus specifically on examining the performance of cities or MSAs over a period of time. A study measuring relative performance of MSAs over a period of time using appropriate statistical tools may therefore provide more reliable and accurate information for business firms and individuals. In addition, understanding the changes in economic performance of an MSA over time can help policy makers shape future infrastructure investment and social and economic development policy. This literature review investigates earlier studies evaluating and measuring the performance of MSAs in the U.S. during the past few years in an attempt to provide a background for

consistently and accurately evaluating MSAs relative to one another and themselves over time.

II. Literature Review

Discussion about which cities in the U.S. have performed relatively well and whether city residents have benefited is limited. In addition, each study uses different data and criteria to analyze cities and so there are as many different results as there are studies. In general, however, one can view the performance of a city in terms of improvement in a variety of economic, social and physical conditions such as increased business investment, physical redevelopment, reduction in crime and infant mortality rates, and increases in educational achievement and human capital.

It is important for policy makers to examine which MSAs are growing fastest and which are experiencing slower growth and investigate the reasons for differing growth rates among them. An index of economic performance can be a useful tool to measure the relative performance of cities. Coomes and Olson (1990) attempt to develop a methodology to measure the economic performance of metropolitan areas in the United States. Their motivation for constructing an economic performance index is to measure economic performance in a timely basis and examine the value of jobs lost or created in the MSA during a specific time period. A good proxy for the economic performance of cities is the personal income data produced by the Bureau of Economic Analysis (BEA). However, this data is only available with a two-year lag. To overcome this and be able to measure the recent economic performance of cities the authors construct an economic performance index that combines the timeliness of the job data with the completeness of wage and income data to provide a measure of recent economic growth in urban areas. The earnings data mainly consists of wages and salaries, while income data consists of income other than wages and salaries, e.g., rent and profit. The index is then constructed by weighting total jobs in each industry in a city using monthly Bureau of Labor Statistics (BLS) data of the latest available estimates of average annual earnings for that industry in that city (using historical BEA data). In other words, the earnings-weighted job data construct an economic performance index to compare economic growth among

metropolitan areas. Coomes and Olson use 1990 as a base year, rather than current earnings weights, to construct their economic performance index, which reflects real earnings growth. The methodology to construct the economic price index is similar to that used to construct the U.S. Consumer Price Index, or CPI. The index constructed for metropolitan area *j* in time period *t* is:

$$EPI_{jt} = \frac{\sum_{i=1}^{n} E_{iB}.J_{it}}{\sum_{i=1}^{n} E_{iB}.J_{iB}} * 100,$$

where J_{it} and J_{iB} are the number of jobs in industry *i* in the period *t* and base period *B* respectively. Similarly, E_{iB} represents the average earnings or wages in metropolitan area industry *i* (i =1,2,...n) in the base period. To lessen the impact of seasonality and problems arising from occasional outliers, the authors chose to use average metropolitan area earnings by industry over the most recent three years as the weights, E_{iB} (Coomes and Olson 1990).

Coomes and Olson (1990) then compare the economic performance index with other measures of economic growth. They find that the ranking of cities based on an economic performance index (earning income growth) and personal income growth are quite different in high cost of living areas. For example, Boston ranked 7th in terms of personal income growth and 60th in terms of earnings growth. Similarly, Hartford ranked 17th in terms of personal income growth and 65th in terms of earnings growth.

The authors also point out the geographic incompatibility between the BLS and BEA data set in the six New England states in which MSAs are not limited to one state. For example, the Boston CMSA (Consolidated Metropolitan Statistical Area) is composed of six PMSAs (Primary Metropolitan Statistical Area), of which the Nashua PMSA belongs to New Hampshire. PMSAs consist of a large urbanized county or cluster of counties that demonstrate strong internal economic and social links in addition to close ties to other portions of the larger area. The CMSA is as a larger area that consists of several PMSAs. Monthly BLS job data for the PMSAs aggregates to arrive at Boston CMSA totals. However, the BEA annual earnings data for the Boston NECMA (New England

Consolidated Metropolitan Area) refer to the sum over five Massachusetts counties. To solve this problem, the authors drop the Nashua PMSA job data from the calculation of job growth in the NECMA.

In another study, Duncomber and Wong (1997) attempt to measure the trend of economic performance of Onondaga County, New York, and compare the county's performance to other metropolitan areas and regions in New York State and several fast growing MSAs in the South. They do not construct any kind of measurement index; rather, they simply look at the trend in some key economic indicators of Onondaga County and compare these indicators to other regions in New York. The key economic indicators used in their study include income, employment, earnings and wages. More specifically, they look at the source of income growth, the composition of employment growth, changes in employment structure and structural changes in earnings. They also measure the competitiveness of local industries by using a location quotient that compares the relative size of an industry in a local area to that industry's share of national employment. This is a measure of industry mix and captures an element of regional economic stability.

Other studies attempt to test the outcomes of earlier studies that measured the performance of MSAs. Wolman, Ford, and Hill (1994) evaluate some earlier studies regarding the performance of MSAs between 1980 and 1990 and question the story of so-called "successful cities" in the U.S. They focus on the economic wellbeing of some cities that have undergone urban revitalization. By developing their own urban distress index using the unemployment rate, poverty rate, median household income, percentage change in per capita income and percentage change in population, they compare the economic wellbeing of the residents of the target cities. They make comparisons between twelve 'successfully revitalized cities' and the 38 other 'unsuccessful cities'. They find the 'unsuccessful' cities on some of the indicators actually outperformed 'successfully' revitalized cities. The 'unsuccessful' cities did better in terms of the unemployment rate and greater improvement in median income than the 'successful' cities.

Wolman, Ford and Hill (1994) also construct an overall index of economic well being as a summary measure of the change in resident economic wellbeing from 1980 to 1990. The index is constructed by summing the standard scores of the five indicators (percentage change in each of the following: unemployment rate, labor force participation rate, poverty rate, median household income and per capita income). They also find that the 'unsuccessful' cities outperformed the 'most successfully revitalized' cities on all of the five indicators of resident wellbeing.

They also suggest possible future research by examining the factors that account for the performance of those distressed cities that actually *improved* the economic wellbeing of their residents. Two important questions that arise in their study are what factors accounted for superior city performance and to what extent can that performance be attributed to policy choices made by these cities, rather than to regional and national economic factors. They also suggest that by using the same data set, it is possible to examine the relative performance of central cities and their metropolitan areas.

There are a few other studies that attempt to identify the specific factors that largely determine the growth and performance of MSAs. One study by Gittell (1992) examines the effect of public, private, and community based local economic development initiatives on the local economic performance of four medium sized, declining cities in the northeast United States: Lowell and New Bedford, MA, Jamestown, NY, and McKeesport, PA. Using shift-share analysis, which distinguishes between national and regional effects on local growth, this study measures the difference in local economic performance as measured by employment change, and also compares the city's performance relative to the state's. The study finds that Lowell, compared to New Bedford, achieved significant employment growth in the late 1970s and early 1980s even after considering industry mix, production costs, and other factors. Similarly, Jamestown, compared to McKeesport, experienced significant economic vitality in the 1970s that can not be fully explained by regional economic change, industry mix and factor costs. These findings suggest that the late 1970s and early 1980s in Lowell and New Bedford and the 1970s in Jamestown and McKeesport might be particularly useful

time periods to look beyond shift-share and other traditional regional development factors, and to focus instead on the potential role of local development initiatives in these cities.

A study by Cadwallader (1991) analyzes the factors determining metropolitan growth and decline in the U.S. He attempts to explain the variation in growth rates among cities by focusing on the role of migration. He uses discriminant analysis, which identifies the major variables that differentiate between growing and declining urban areas. Similarly, by using a simultaneous equation model, he examines the interrelationships between migration rates for cities and other variables such as income, unemployment, taxes, public spending, housing costs, crime rate and climatic attractiveness, which are all proxies for quality of life. He finds a substantial difference between growing and declining cities in manufacturing employment, with declining cities being more heavily oriented towards manufacturing activity. His study finds that housing costs and various kinds of local taxes are uniformly higher for the declining cities. In contrast, he finds similarities in the two groups of cities in terms of local government expenditures, with growing cities having slightly higher rates for the first period, but slightly lower rates for the second period. Cadwallader argues that manufacturing activity and taxes contribute most to the discriminating function, while spending on education makes a somewhat less important contribution to the discriminating process. Similarly, using simultaneous equation models, he finds a negative relation between property taxes and net migration, but a positive relation between educational spending and housing values.

The evaluation of particular MSAs by incorporating both economic and non-economic factors is likely to draw an overall picture of the MSA. However, it is hard to make any kind of judgment on a location decision for business firms or individuals without specifically looking into the most critical factors that describe their preferences. From the point of view of a business firm, business climate, infrastructure and human capital are the major factors that influence its location decision, while from an individual point of view, quality of life is the most important factor. A focus group of economists arrived at the conclusion that these four major categories, (business climate, human capital,

quality of life and infrastructure) taken together, can be considered to encompass the main factors that largely influence the location decisions of both enterprises and individuals. There are some studies that attempt to evaluate MSAs on the basis of each of these factors separately. The following section will briefly review these factors and explore the earlier studies that mainly focus upon these factors.

Business Climate

Business climate is one of the most important factors that determine the location of business enterprises. What constitutes a favorable business climate is not entirely clear, but it is usually associated with suitability of investment, low state and local taxes, amenable right to work laws, little union activity and a cooperative governmental structure (Plaut and Pluta, 1983). Because the objective of firms is to maximize profit with minimum risk, selection of a location with a favorable business climate is of central importance.

Business climate can be best reflected by factors such as cost of doing business, access to markets, and corporate and property tax rates. Other factors listed by some business magazines that may also represent business climate include government attitude toward business, business performance, (as measured by company failure rates and payment delinquencies), economic growth (employment growth and growth in the average wage per job), risk (the chances of business failure over the next 18 months, the amount of time in business, history of principals, and record of paying suppliers) and affordability (increases in the cost of living index, as well as growth in wages).

On the basis of some key factors that represent business climate, some business magazines (e.g., Financial World, Fortune, Site Selection, and Entrepreneur) produce rankings of metropolitan areas in the U.S. The rankings in Financial World are based on four common yardsticks: major services, financial strength, tax status and operating tools. The Fortune magazine rankings have been the most popular among business firms and are widely used. They are based on a survey of more than 1000 U.S. business executives

on business costs, availability and skills of workers, cost of workers, social conflicts, transportation and other factors in different metropolitan areas of the U.S.

Because most of these studies have their own methodology and criteria to produce rankings, they are not directly comparable to each other. Some studies are based only on hard statistics, while others are based on subjective input such as survey responses. Some studies use a combination of both. Furthermore, these studies differ significantly from each other in terms of the economic and social factors being measured. As a result, it is not an easy task to judge which of these studies is the most reliable or suitable to a location decision.

Among other studies, Grant Thornton (1986) produces rankings of manufacturing climates of the forty-eight contiguous states in the U.S. Grant Thornton's ranking system is somewhat different from the other ranking systems. In his study, a state is considered to be "manufacturing intensive" if it has contributed an average of more than 2 percent of the value of manufacturing shipments in the country over the last four years or has had an average of 16.5% or more of its work force engaged in manufacturing over the last four years (this percentage is the four-year national average, according to Bureau of Labor Statistics data). However, some researchers on a number of grounds have criticized the Grant Thronton rankings.

Lane, Glennon, and McCabe (1989) analyze the volatility of the Grant Thornton rankings and the relationship between states' rankings and gross state product. They use cluster analysis to determine the underlying similarity of states and to determine whether the factors used by Grant Thornton provide insight into the best and worst performing states. By sucessively regressing percentage change in output of manufacturing industries, percentage change in GSP, and GSP level on a ranking of states by business climate produced by Grant Thornton, they find virtually no relationship between ranking of states by business climate and actual health of the manufacturing sector measured by output data available from BEA. They suggest that the actual growth rates of states as a measure of business climate makes more sense than some artificial construction.

Other than ranking MSAs or states by business climate, there are some studies that attempt to link the business climate with state industrial growth in the U.S. as well. A study by Plaut and Pluta (1983) tests the relationship between a wide range of both non-economic and economic factors including business climate and multiple measures of industrial growth. Using principal components analysis and a multiple regression model on pooled data for forty-eight contiguous states, they test the effects of four groups of variables (accessibility to markets, cost and availability of factors of production, climate and environment, and business climate and state and local taxes and expenditures) on three separate measures of industrial growth. Among other findings, their study shows that business climate, tax, and expenditure variables, as a group, were significantly related to state employment and capital stock growth. Similarly, poor business climate and high tax rates both appear to have a negative effect on employment growth.

Quality of Life

Quality of life is one of the most critical, and also one of the most nebulous, factors in the location decision for individuals. For business firms this factor is equally significant if not dominant when making location decisions. While the quality of life can be defined in several ways, it mainly implies the wellbeing of people as determined by health, welfare, freedom of choice, availability of food, clothing and shelter, educational facilities, security and income.

The issue of quality of life has been adequately analyzed in the literature. Developing a methodology to measure quality of life, however, has not been easy. The major problem for researchers in constructing a quality of life index has been developing a method for weighting different amenities. Some researchers produce quality of life indexes by weighting amenities in an atheoretic manner (Liu, 1976), and some develop a bundle of wages, rents, and amenities (Rosen, 1979).

Blomquist, Berger, and Hoehn (1988) construct a quality of life index by incorporating wages and rent effects. They allow for amenity variation both within and across urban areas. They argue that agglomeration effects due to productivity effects of city size provide a key linkage between firms of given urban areas. They estimate hedonic rent and wage equations using 1980 U.S. Bureau of Census data matched with amenity data on climatic, environmental, and urban conditions. Using a hedonic model, they estimate implicit amenity prices and weigh them in a quality of life index that is computed for 253 urban counties within 185 MSAs in the U.S. The hedonic model disaggregates the prices of the goods into more basic units (the characteristics) and provides estimates of prices for the characteristics.

A study by Kahn (1995) develops a new method for ranking city by quality of life. Using a revealed preference approach, he finds that Los Angeles and San Francisco had higher quality of life than Chicago and Houston in both 1980 and 1990 and that the quality of life in New York City fell during the 1980s.

Human Capital

While business climate and quality of life remain important factors that affect both business firm's and individual's choice of location, availability of human capital in a particular location is another factor that significantly affects the location decisions of business firms. Without skilled human capital, other physical and financial capital becomes less productive. In recognition of the fact that the availability of human capital can therefore be considered an important aspect of business climate, there are several studies that primarily focus on human capital and its impact on the growth and performance of MSAs in the U.S.

In a 1988 paper, Lucas rightly argues that economic growth depends crucially on the ability to absorb existing knowledge and create new knowledge, both of which are directly related to the existing stock of human capital and both of which may be more costly the more geographically distant the source of human capital. Cities in which firms can communicate more cheaply with people whose job it is to absorb, create, transmit,

and implement knowledge - that is, cities with greater concentrations of highly educated individuals - should become relatively more productive and, hence, attract population at a faster rate. Access to educated individuals is particularly important in a world of technical change, much of which has been biased in favor of individuals with higher levels of skill. In addition, cities with higher concentrations of educated individuals should also generate more localized spillovers.

In various studies, human capital is usually measured in terms of some measure of educational level. For example, the percentage of the population who have graduated from high school, the percentage of the population who have graduated from college, the mean or median years of total education, or a combination of these are generally used as a measure of human capital. As noted by Simon (1998), however, no studies dealing with human capital and the economic performance of MSAs have attempted to adjust these scales for the quality of education received. This may be an important factor in accurately measuring human capital in an area.

Most of the studies done related to human capital primarily focus on the impact of human capital on the growth and development of MSAs. However, almost no study has attempted to measure or rank the performance of MSAs solely on the basis of human capital.

In a recent study, Simon (1998) attempts to test empirically the relationship between human capital and metropolitan employment growth in MSAs in the U.S. Using data on all U.S. MSAs for the period of 1940-86, he finds a robust positive relationship between average level of human capital and employment growth. In the same paper, Simon also examines the spillover effects of human capital between cities within MSAs. He finds that there exists a definite positive relationship between human capital elsewhere in an MSA and employment growth within a city of an MSA. However, he also finds that the relationship is limited – human capital existing within the city causes higher economic growth in the city than human capital from other areas within the MSA. Hence, the spillover effects exist, but the benefits tend to be spatially specific.

Infrastructure

The last important category in measuring the status and relative performance of MSAs in the U.S. over the past few years is infrastructure. Sufficient investment in infrastructure is widely recognized as necessary to economic development and an important indicator of economic growth. In recognition of this, many studies have examined the link between investment in infrastructure and economic performance. No studies have attempted to rank MSAs based on infrastructure alone, however. The literature examining the various components of infrastructure and the effects of infrastructure investment on economic performance provides some useful information and conclusions nevertheless. As expected, the conclusions vary because the exact components of infrastructure studied and the relative importance assigned to them varies from study to study.

The term infrastructure generally refers to the underlying network supporting the activities of the city or MSA being studied. As noted by Cain (1997), older studies of infrastructure focused mainly on transportation (railroads, roads, canals and highways) and sanitation (both water supply and sewage removal) in measuring infrastructure. More recently, however, non-transportation or sanitation factors such as the availability of education, health facilities, energy, and communications systems have been added into the infrastructure equation. All of these factors are considered to have both direct and indirect effects on economic performance. Infrastructure can affect production as well as the productivity of labor and private capital directly, or can have an indirect effect by attracting labor and private capital from other areas (Bell et al, 1997).

Although the literature examining infrastructure varies with respect to its focus and the data and approach used, most studies of infrastructure and its effects on economic progress show a positive relationship between the two. A study by Aschauer (1989) examines the individual effects of investing in infrastructure, labor, and private capital on economic performance. Using an aggregate production function and time series data for the U.S. from 1949-85, he concludes that investment in infrastructure has not only a positive effect on economic performance, but a greater effect than that of investing in

either labor or private capital. In the same paper, Aschauer also looks into the relative effects of the various components of infrastructure. In this area he concludes that investment into 'core' infrastructure such as transportation, energy, water and sewage systems has a greater positive effect on economic performance than investment into other components of infrastructure such as hospitals and buildings.

Numerous other studies find relationships between specific individual components of infrastructure and the relative 'attractiveness' of areas in terms of location decisions, though none specifically rank cities or MSAs according to these components. For example, in a state-level study Fox and Murray (1990) conclude that the availability of interstate highways is a major factor in determining where firms locate, while Fox, Herzog and Schlottman (1989) find that the quality of infrastructure services positively affects residential migration to an area.

III. Conclusion

Measuring the performance of metropolitan areas in the U.S. has been and continues to be an important issue for state and local governments, policymakers, firms and individuals alike. Several studies have attempted to rank MSAs relative to one another on the basis of one to many different factors. However, the factors considered to be important vary from one study to the next and as a result no consistent set of criteria to be considered has emerged. In addition, few studies have attempted to measure the relative performance of MSAs over time. The presence of these limitations in the current research provides a promising direction for further research. This literature review has attempted to provide a background useful for designing a methodology to measure the status and relative performance of MSAs in the U.S. over time by focusing on four major categories that affect regional economic performance and hence influence firm and individual decisions to locate in an area. These categories are business climate, quality of life, human capital and infrastructure. Each one is an important part of a consistent, comprehensive system for analyzing MSAs relative to one another and to themselves

over time. By carefully considering the important components and relative importance of each of these factors, a consistent and successful measure of MSAs relative to one another and to themselves over time may emerge. This review has attempted to provide the background necessary for such an endeavor.

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Second Millennium Benchmark for MetroHartford

Introduction

The MetroHartford Growth Council has contracted with the Connecticut Center for Economic Analysis (CCEA) to produce a second benchmark of greater Hartford's regional performance. Our geography of interest is the Hartford Metropolitan Statistical Area and our timeframe is 1999 or the most recently available data. As in the first benchmark, attached as Appendix 1, we compare MetroHartford with 55 other MSAs that we judged to be similar to MertroHartford on a population basis (500,000 to 1,500,000 people), and in spatial and economic structure.

Benchmarks have relevance to policy formation only if they are replicated. If the metric is meaningful, that is, it characterizes regional performance reasonably well, then it can be used to assess the impacts of policy and other endogenous changes, as well as exogenous shocks (national or international recessions or booms) on the region. Untangling causes and effects of changes in benchmark results may therefore not be easy. Our task is simpler: replicate the first benchmark and compare results without untangling the complicated web of causes and effects.

In doing so, we noticed that slight changes in a few variables altered the (static factor analysis) results of the first benchmark significantly. Comparability across time therefore becomes untenable with the first approach. We needed a different approach that would ensure comparability across time to have a useful metric. A traditional approach is to use linear combinations of variables that characterize regional performance. These combinations may have equally weighted variables or subjectively weighted variables. The advantage of this approach is stability (comparability) across time. The disadvantage is that a weighting scheme introduces bias, ostensibly absent in the statistical factor (latent variable) analysis used in the first benchmark. Given these tradeoffs and the simplicity of linear combinations (latent variables always introduce interpretational problems), we chose linear combinations as our primary methodology. We therefore had

to redo the first benchmark using linear combinations. Given this opportunity, we added six new variables to the mix (see Methodology below) to enhance our characterization of regional performance. The difference between the two benchmarks is the dates of the variables.

Methodology

As mentioned, our methodology in the first benchmark was factor analysis, a statistical technique that uncovers latent variables around which several observed variables cluster in relation to their statistical correlation. The latent variables or factors can be interpreted as concepts or characteristics of an abstract phenomenon such as regional performance or manufacturing competitiveness. In the first analysis we identified 39 variables and four categories in a focus group of economists, educators, and civic group leaders (see The First Annual MetroHartford Benchmark, January 12, 1999 in Appendix 1). We have maintained those four categories or concepts for grouping variables characterizing regional performance. They are: Business Climate, Quality of Life, Human Capital, and Infrastructure. Business Climate includes such variables as per capita housing starts; real income growth per capita; government, manufacturing and white collar shares of employment; corporate tax burden; output per capita; employment growth in manufacturing, construction and white collar sectors; and, the bankruptcy rate. Human Capital includes such variables as total population; its growth rate; the dependent population ratio (under 12 and over 65); labor force participation rate; unemployment rate; percent foreign born; percent with high school diploma or GED; and, percent with college degree. Quality of Life includes such variables as percent population in poverty; percent female-headed households; air quality index; death rate; birth rate; heating and cooling degree days; housing affordability index; violent and property crime rates; and, the single family home price growth rate. Infrastructure includes such variables as FAA airport classification; hospital beds per capita; land areas; number of interstate highways; physicians per capita; population density; and, patents per capita. Appendix 2 contains a complete list of the 45 current variables in each category. The earlier factor analysis produced three meaningful factors or categories we called: Economic Vitality, Quality of

Life, and Socio-Economic Productivity. We felt comfortable with these as reasonable approximations to our original group of four categories until we replicated the benchmark using later data. Only a few variables changed and these only slightly, but the impact on the factor analysis was significant. These perturbations elicited different factors and correlations (weights) than in the first analysis and rendered comparability impossible. We decided therefore to use linear combinations of variables artificially grouped into our four original categories. We would use equal weights, subjective weights and weights suggested by the factor analysis (discretion was used in assigning these) to generate rankings by category and overall for the earlier dated variables and for the most recently available (1999) data set [not all variables are available at the same date].

As the term implies, equal weighting applies a weight of 1/n (n=number of variables) applied to each variable in calculating their scores. The process works as follows: in each category, each variable for the 56 MSAs is assumed to come from a normal distribution for which we calculate the sample mean and variance; and, the cumulative probability (score) for each variable for each MSA in each category is calculated. We average (or total) the scores for the variables in each category and their score in each category ranks each MSA. We sum category scores and produce overall ranks. For the weighted cases, we apply the weights to the total scores (cumulative probabilities) of the variables and the weighted average scores rank the MSAs.

For the subjective weights, we calculated the agreement of the ten respondents to the weighting exercise (the survey form is in Appendix 2). Using Kendall's measure of concordance (with no ties), the test statistic is 3.52 ($P<0.0002$). Therefore, we reject the null hypothesis of no agreement among the respondents. We looked at measures of agreement among the three ranking schemes. According to Table 1, there is substantial pairwise agreement between the methods and overall for both data sets (Phase 1 is the earlier data set).

Table 1

Measures of Agreement Overall Rankings			
	Equal vs Factor	**Equal vs Subjective**	**Factor vs Subjective**
	Phase I Data		
Spearman's Rho	0.8551	0.8928	0.9662
Kendall's Tau	0.6935	0.7312	0.8558
Coefficient of Concordance		0.9365	
	Phase II Data		
Pearson Correlation	0.9599	0.9651	0.9726
Rank Correlation	0.8390	0.8623	0.8701
Coefficient of Concordance		0.9772	

Results

The rankings across the three linear weighting methods are in substantial agreement. Therefore, weighting does not appreciably alter the relative positions of MSAs. There are significant differences between the linear methods and factor analysis. Table 2 (next page) shows the most recent results from the three linear methods with selected category ranks from the original factor analysis. The overall linear ranks are compared with the (previously) published factor analysis overall ranks. Note that the factor analysis yielded three meaningful categories (five were significant, but two of them were much less significant, difficult to interpret and were dropped): Socio-Economic Productivity, Quality of Life, and Economic Vitality. The selected category comparisons approximately match Socio-Economic Productivity with the current Human Capital category and Economic Vitality with Business Climate (the Quality of Life categories are assumed equivalent). These match-ups are certainly not rigorous. Note also this comparison uses the later data set for the linear cases, whereas the factor analysis used the earlier data set and 39 variables.

Using Phase 2 Data

Table 2

Central City(-ies)/County(-ies), State(s) (P)MSA	Business Climate ranking			Selected MSA Published Ranks (Economic Vitality)	Quality of Life ranking			Selected MSA Published Ranks (Quality of Life)	Human Capital ranking			Selected MSA Published Ranks (Socio-Economic Productivity)	Infrastructure ranking			Overall Rank			Published Factor Analysis
	Equal Weight	Subjective Weight	F/A Weight	⇦	Equal Weight	Subjective Weight	F/A Weight	⇦	Equal Weight	Subjective Weight	F/A Weight	⇦	Equal Weight	Subjective Weight	F/A Weight	Equal Weight	Subjective Weight	F/A Weight	
Albany-Schenectady-Troy, NY MSA	51	48	45	44	12	12	26	8	22	19	17	50	26	27	30	31	34	34	38
Albuquerque, NM MSA	41	36	32		46	51	35		20	15	13		28	26	31	39	32	29	20
Allentown-Bethlehem-Easton, PA MSA	37	31	38		31	29	45		43	45	45		50	48	44	43	42	46	37
Austin-San Marcos, TX MSA	1	1	1	2	2	2	1	5	2	2	2	17	33	31	26	2	2	2	1
Bakersfield, CA MSA	50	53	51		50	49	27		54	54	55		55	56	56	56	56	53	54
Baton Rouge, LA MSA	44	44	43	34	45	50	38	49	38	32	25	15	54	50	50	47	46	40	40
Birmingham, AL MSA	23	30	23		56	54	56		34	35	31		17	20	21	36	38	41	31
Buffalo-Niagara Falls, NY MSA	52	51	52		48	47	54		49	48	49		12	11	10	44	47	49	27
Charlotte-Gastonia-Rock Hill, NC-SC MSA	6	4	7		34	41	30		9	11	10		13	9	11	8	9	11	17
Chattanooga, TN-GA MSA	40	39	40		53	53	55		50	50	48		52	54	54	51	50	51	36
Cincinnati, OH-KY-IN PMSA	21	15	25		38	35	42		25	31	30		3	2	2	14	12	20	24
Columbus, OH MSA	25	33	19	30	21	27	18		3	3	3		16	17	15	10	11	7	11
Dayton-Springfield, OH MSA	35	38	41		11	17	15		40	40	38		14	15	16	23	31	28	41
Des Moines, IA MSA	10	12	11	9	1	1	3	1	4	4	4	28	45	43	47	9	8	4	3
El Paso, TX MSA	43	50	49		40	40	12		55	55	54		34	33	27	50	52	47	52
Fresno, CA MSA	56	56	56		54	55	39		48	49	53		49	51	49	54	54	54	56
Grand Rapids-Muskegon-Holland, MI MSA	36	34	37		5	4	4		15	17	23		44	38	40	24	20	19	19
Greensboro--Winston-Salem--High Point, NC MSA	16	11	20		32	36	32		21	29	22		23	29	24	22	26	26	6
Greenville-Spartanburg-Anderson, SC MSA	30	28	36		28	31	23		31	39	32		36	35	36	35	35	37	23
Harrisburg-Lebanon-Carlisle, PA MSA	26	29	31	37	9	8	17	9	24	28	27	7	38	39	43	28	27	31	8
Hartford, CT MSA	22	21	22	54	20	22	37	4	17	26	16	39	22	19	18	20	22	23	39
Indianapolis, IN MSA	38	35	26		16	14	16		7	8	11		1	1	1	4	5	6	16
Jacksonville, FL MSA	13	17	10		23	24	20		32	30	37		15	16	17	19	18	18	16
Kansas City, MO-KS MSA	18	7	17		25	26	25		6	5	7		2	4	4	5	3	10	13
Knoxville, TN MSA	48	45	50	13	47	46	47	36	41	41	33	26	31	32	34	45	44	43	18
Las Vegas, NV-AZ MSA	5	2	4		42	45	31		12	22	28		32	25	28	21	15	17	5
Little Rock-North Little Rock, AR MSA	31	18	27		39	39	34		37	33	35		27	36	39	37	33	35	14
Louisville, KY-IN MSA	29	23	30		41	32	44		28	36	34		19	21	20	29	30	36	25
Memphis, TN-AR-MS MSA	27	24	28		55	56	53		46	43	44		9	10	13	40	36	39	35
Milwaukee-Waukesha, WI PMSA	12	8	21		44	44	43		13	16	19		11	12	8	16	14	21	33
Mobile, AL MSA	32	20	34		51	43	49		52	51	50		46	45	51	49	48	50	45
Nashville, TN MSA	19	10	8		29	25	24		8	10	6		6	7	7	7	7	9	15
New Orleans, LA MSA	39	37	42		52	52	52		44	46	43		10	14	12	38	41	42	53
Norfolk-Virginia Beach-Newport News, VA-NC MSA	42	41	39		13	19	10		23	24	14		37	46	38	32	39	22	46
Oklahoma City, OK MSA	34	40	33	38	15	10	11	40	26	25	24	8	8	8	9	15	19	16	28
Omaha, NE-IA MSA	3	5	6		6	5	5		11	6	8		42	47	45	11	10	8	10
Orlando, FL MSA	7	9	5		8	11	13		5	7	12		18	13	14	6	6	5	7
Providence-Fall River-Warwick, RI MSA	24	25	29	51	26	23	36	25	36	44	39	30	39	42	32	33	40	38	47
Raleigh-Durham-Chapel Hill, NC MSA	2	3	2	4	10	18	8	13	1	1	1	18	7	5	5	1	1	1	4
Richmond-Petersburg, VA MSA	14	26	14	39	27	33	33	29	10	9	5	29	20	22	22	13	17	13	32
Rochester, NY MSA	46	43	47		17	15	21		19	18	20		24	23	23	30	29	32	40
Sacramento, CA PMSA	20	27	12		19	21	19		14	14	15		21	18	19	17	16	14	42
Salt Lake City-Ogden, UT MSA	8	14	13		3	6	2		16	13	21		4	3	3	3	4	3	2
San Antonio, TX MSA	17	32	15	27	14	13	7	47	35	37	41	33	5	6	6	12	23	15	44
Sarasota-Bradenton, FL MSA	4	6	3		30	34	48		39	34	42		35	28	29	26	25	27	12
Scranton--Wilkes-Barre--Hazleton, PA MSA	53	52	54		33	28	46		51	52	51		43	49	48	52	51	55	51
Springfield, MA MSA	54	49	46		43	48	50		47	47	47		41	34	35	48	49	48	48
Stockton-Lodi, CA MSA	45	46	48		37	42	29		56	56	56		56	55	55	55	55	52	55
Syracuse, NY MSA	55	55	53		18	9	22		42	38	40		47	44	46	46	45	45	50
Toledo, OH MSA	33	42	44		35	30	40		45	42	46		30	37	37	42	43	44	21
Trenton, NJ PMSA	28	22	16	55	24	20	41	6	30	23	18	48	40	40	41	34	28	30	49
Tucson, AZ MSA	47	47	35		36	37	28		27	21	26		25	24	25	41	37	33	26
Tulsa, OK MSA	11	16	18		22	16	14		33	27	36		29	30	33	25	21	25	22
Wichita, KS MSA	15	19	24		7	7	6		29	20	29		51	52	52	27	24	24	9
Wilmington-Newark, DE-MD PMSA	9	13	9	47	4	3	9	11	18	12	9	38	48	41	42	18	13	12	34
Youngstown-Warren, OH MSA	49	54	55	29	49	38	51	44	53	53	52	35	53	53	53	53	53	56	43

CCEA

The most significant observation to glean from Table 2 is that 19 of the 56 MSAs had lower rankings (some significant) under factor analysis than with linear combinations of variables, whereas 17 of the 56 MSAs had higher ranking (some significant) under factor analysis than with the linear approach. Twenty MSAs have approximately the same rank under all four schemes.

While certainly debatable, the results of the linear approach seem to be in large agreement with the panel's judgement. As one example, in the Business Climate category, the Hartford MSA ranks 22, 21 and 22 for the equal-, subjective- and factor analysis-weighted cases respectively. In its approximate categorical neighbor in the earlier factor analysis, Economic Vitality, the Hartford MSA ranks 54. For Quality of Life the linear method yields ranks of 20, 22 and 37, while factor analysis yields a rank of 4. In the Human Capital category, the ranks for the Hartford MSA for equal-, subjective- and factor analysis-weighted cases are 17, 26, and 16. The original factor analysis yielded a rank of 39 in its allied category Socio-economic Productivity. The overall rank for the Hartford MSA is 20, 22, and 23 for the linear approach, while it is 39 for the earlier factor analysis method. While we would like to believe, for example, that the Quality of Life in the Hartford MSA is quite high, we have trouble accepting its rank of 4 in the factor analysis. Similarly, in examining the overall ranks, we feel more comfortable with Hartford's mid 20s rank with the linear approach than with its 39th position out of 56 in the earlier factor analysis. Such is our overall impression with the MSAs whose ranks changed (up or down) significantly from factor analysis to the linear method. That is not to say that our earlier factor analysis result is meaningless: 20 out of the 56 MSAs were essentially unchanged, so there is evidence to accept the earlier result as reasonable. Its problem as stated is replicability.

Issues

Table 2 contains the essential results of the benchmark using the most recently available data (approximately from 1990 through 1998) at the time of data gathering (early 2000).

Table 3 contains the same structure but presents results using data from the earlier study (approximately 1990-1994). There are several immediate concerns:

1) Many variables do not change every year (e.g., Census data, land area);
2) If the benchmark is replicated at intervals less than those at which a broad spectrum of variables change, the results, ostensibly measuring regional performance, will not capture meaningful changes;
3) Changes in policy take years to reflect in variables associated with regional performance, and, several essential variables are available only with significant lags;
4) Changes in local variables may be the result of federal policy changes and global economic changes;
5) The nation is moving away from the SIC taxonomy to the NAICS method of classifying firms. There will at some point be a break in the comparability of past benchmarks.

The obvious recommendation is to replicate the benchmark every two or three years. Census and other federal agencies are constructing parallel time series (SIC and NAICS) back to 1992 so that the last concern becomes problematic only for dynamic factor analysis for which we ideally need 15-20 years of time series, cross-sectional data.

These concerns notwithstanding, Tables 2 and 3 show the changes in rankings for the earlier and more recent data sets. We focus on the seven MSAs selected for detailed policy analysis compared to MetroHartford: Austin, TX; Harrisburg, PA; Albany, NY; Providence, RI; Des Moines, IA; and, Raleigh-Durham, NC, and Columbus, OH (please refer to our report, 'A Tale of Eight Metros: Comparative Policy Analysis of MetroHartford and Similar MSAs', November 3, 1999). We selected these metros because they are similar in population size and characteristics to each other (state capitols, close to rivers, cultural and educational assets).

Table 3

Using Phase 1 data

Central City(-ies)/County(-ies), State(s) (P)MSA	Business Climate Ranking			Business Climate Composite Ranking	Quality of Life Ranking			Quality of Life Composite Ranking	Human Capital Ranking			Human Capital Composite Ranking	Infrastructure Ranking			Infrastructure Composite Ranking	Overall Rank			Overall Composite Rank	Published Factor Analysis
	Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		
Albany-Schenectady-Troy, NY MSA	50	51	46	50	27	17	40	27	19	18	17	18	19	17	24	19	30	25	30	27	38
Albuquerque, NM MSA	33	38	21	28	32	47	17	34	20	15	20	20	16	15	10	14	22	23	13	24	20
Allentown-Bethlehem-Easton, PA MSA	41	40	43	41	31	18	44	31	46	47	45	47	32	31	27	31	42	42	44	44	37
Austin-San Marcos, TX MSA	23	27	6	21	3	7	2	4	1	1	1	1	42	32	38	37	3	3	2	2	1
Bakersfield, CA MSA	56	56	56	56	46	51	23	46	54	54	54	54	54	55	56	54	55	56	55	56	54
Baton Rouge, LA MSA	29	31	33	30	33	45	35	40	40	33	29	37	41	38	40	41	39	39	37	40	40
Birmingham, AL MSA	27	23	31	26	55	55	56	55	43	43	41	43	9	20	20	16	41	41	45	43	31
Buffalo-Niagara Falls, NY MSA	47	44	48	48	45	38	52	48	44	45	47	45	27	21	21	24	48	45	48	47	27
Charlotte-Gastonia-Rock Hill, NC-SC MSA	10	10	8	9	44	41	38	45	11	13	11	11	30	24	30	29	15	13	17	15	17
Chattanooga, TN-GA MSA	34	30	35	32	54	46	54	54	52	52	50	52	36	45	41	40	53	51	51	53	36
Cincinnati, OH-KY-IN PMSA	11	9	17	11	38	34	39	35	25	29	25	26	15	6	11	12	17	17	28	20	24
Columbus, OH MSA	25	28	22	25	24	26	19	23	5	4	4	4	31	29	34	32	11	10	7	10	11
Dayton-Springfield, OH MSA	35	32	40	36	13	16	12	13	42	42	39	42	14	11	13	13	27	29	32	30	41
Des Moines, IA MSA	5	4	7	4	5	2	5	5	3	3	3	3	25	27	26	27	2	2	3	3	3
El Paso, TX MSA	43	45	52	45	12	32	8	12	55	55	55	55	39	35	33	35	49	53	47	48	52
Fresno, CA MSA	52	54	53	53	47	53	25	47	49	50	53	50	53	52	54	53	54	54	53	54	56
Grand Rapids-Muskegon-Holland, MI MSA	14	15	23	15	2	1	4	2	14	17	18	14	56	54	55	56	18	18	14	11	19
Greensboro--Winston-Salem--High Point, NC MSA	7	7	13	8	37	31	33	33	16	24	19	19	48	51	51	50	24	24	25	21	6
Greenville-Spartanburg-Anderson, SC MSA	4	5	18	7	51	44	43	50	29	37	26	33	51	49	50	51	37	36	39	35	23
Harrisburg-Lebanon-Carlisle, PA MSA	22	24	20	23	9	5	18	9	15	19	15	17	29	33	31	30	13	15	15	14	8
Hartford, CT MSA	12	16	10	12	14	21	30	19	38	38	42	40	11	10	6	9	16	22	26	23	39
Indianapolis, IN MSA	16	18	11	16	20	11	20	18	12	11	13	12	2	2	4	3	7	7	9	8	16
Jacksonville, FL MSA	38	41	27	35	41	39	45	41	30	30	36	32	24	22	25	23	36	34	38	38	16
Kansas City, MO-KS MSA	17	13	12	14	28	20	31	26	6	5	6	6	6	9	15	7	6	5	8	7	13
Knoxville, TN MSA	42	42	45	43	52	50	51	51	31	32	27	31	33	37	35	33	46	44	43	46	18
Las Vegas, NV-AZ MSA	3	2	3	3	48	42	32	44	27	31	38	29	50	47	48	48	33	28	23	25	5
Little Rock-North Little Rock, AR MSA	28	25	26	27	49	48	46	49	22	22	21	21	18	30	22	21	28	30	27	29	14
Louisville, KY-IN MSA	20	14	28	20	43	36	41	42	34	36	33	34	23	26	28	26	31	31	35	34	25
Memphis, TN-AR-MS MSA	24	22	25	24	56	56	55	56	47	46	46	46	8	13	14	10	45	46	46	45	35
Milwaukee-Waukesha, WI PMSA	8	11	14	10	34	35	28	32	9	9	9	9	22	14	16	18	9	9	10	9	33
Mobile, AL MSA	31	33	32	29	53	52	50	52	51	51	51	51	35	42	39	39	50	52	49	50	45
Nashville, TN MSA	39	36	19	33	42	40	42	43	10	10	10	10	1	3	3	1	10	14	12	12	15
New Orleans, LA MSA	32	37	44	38	50	54	53	53	50	49	49	49	12	16	19	15	44	48	50	49	53
Norfolk-Virginia Beach-Newport News, VA-NC MSA	49	49	47	51	8	15	9	8	36	34	37	36	52	53	52	52	47	47	36	39	46
Oklahoma City, OK MSA	37	35	34	37	21	22	21	22	24	25	23	23	5	8	9	6	19	21	21	22	28
Omaha, NE-IA MSA	6	6	5	5	4	4	3	3	8	6	5	7	34	44	36	38	5	6	5	5	10
Orlando, FL MSA	9	8	4	6	10	14	15	11	4	8	8	5	47	40	45	46	8	8	6	6	7
Providence-Fall River-Warwick, RI MSA	13	20	24	18	30	30	37	30	39	39	43	41	37	39	32	34	32	35	40	36	46
Raleigh-Durham-Chapel Hill, NC MSA	1	1	1	1	25	25	11	20	2	2	2	2	3	1	1	2	1	1	1	1	4
Richmond-Petersburg, VA MSA	15	17	9	13	26	24	26	24	17	16	14	15	21	25	29	25	14	16	11	16	48
Rochester, NY MSA	40	39	41	40	15	8	27	15	13	12	12	13	43	36	42	42	25	19	24	19	40
Sacramento, CA PMSA	48	53	37	46	17	29	10	17	21	20	28	22	46	41	46	45	38	38	31	37	42
Salt Lake City-Ogden, UT MSA	18	21	16	19	1	3	1	1	7	7	7	8	10	4	5	8	4	4	4	4	2
San Antonio, TX MSA	45	47	39	44	7	23	7	7	32	40	40	38	7	7	8	5	23	37	22	28	44
Sarasota-Bradenton, FL MSA	2	3	2	2	35	33	49	37	23	23	32	25	26	19	12	20	12	12	18	13	12
Scranton--Wilkes-Barre--Hazleton, PA MSA	55	52	55	54	23	13	36	25	48	48	48	48	45	48	47	47	51	49	52	51	51
Springfield, MA MSA	53	50	50	52	19	37	34	28	45	44	44	44	13	12	7	11	40	43	41	41	48
Stockton-Lodi, CA MSA	54	55	54	55	36	49	24	36	56	56	56	56	55	56	53	55	56	55	56	55	55
Syracuse, NY MSA	46	46	51	49	22	12	29	21	37	35	34	35	44	43	44	44	43	40	42	42	50
Toledo, OH MSA	26	26	42	31	11	9	16	10	41	41	35	39	20	28	23	22	26	33	34	31	21
Trenton, NJ PMSA	44	43	30	42	39	28	48	39	35	27	24	28	4	5	2	4	35	26	29	32	49
Tucson, AZ MSA	51	48	36	47	29	43	22	29	18	14	16	16	17	18	17	17	29	27	19	26	26
Tulsa, OK MSA	36	29	38	34	16	19	13	16	33	28	30	30	38	34	37	36	34	32	33	33	22
Wichita, KS MSA	21	19	29	22	6	6	6	6	28	26	31	27	40	46	43	43	21	20	20	18	9
Wilmington-Newark, DE-MD PMSA	19	12	15	17	18	10	14	14	26	21	22	24	28	23	18	28	20	11	16	17	34
Youngstown-Warren, OH MSA	30	34	49	39	40	27	47	38	53	53	52	53	49	50	49	49	52	50	54	52	43

TABLE 4: Relative Ranks of Comparison Metros

BUSINESS CLIMATE		QUALITY OF LIFE		HUMAN CAPITAL		INFRASTRUCTURE		OVERALL	
1994	**1996**	**1994**	**1996**	**1994**	**1996**	**1994**	**1996**	**1994**	**1996**
Raleigh-Durham(1)	Austin(1)	Austin(4)	Des Moines (1)	Austin(1)	Raleigh-Durham(1)	Raleigh-Durham(2)	Raleigh-Durham(5)	Raleigh-Durham(1)	Raleigh-Durham(1)
Des Moines(4)	Raleigh-Durham(2)	Des Moines(5)	Austin (2)	Raleigh-Durham(2)	Austin(2)	Hartford (9)	Columbus (15)	Austin(2)	Austin(2)
Hartford (12)	Des Moines(10)	Harrisburg (9)	Harrisburg(9)	Des Moines(3)	Columbus (3)	Albany(19)	Hartford(21)	Des Moines(3)	Des Moines(6)
Providence (18)	Hartford (22)	Hartford (19)	Raleigh-Durham(11)	Columbus (4)	Des Moines (4)	Des Moines(27)	Albany(26)	Columbus (10)	Columbus(10)
Austin(21)	Providence(24)	Raleigh-Durham(20)	Albany(16)	Harrisburg (17)	Hartford(18)	Harrisburg (30)	Austin(30)	Harrisburg (14)	Hartford(22)
Harrisburg (23)	Columbus (26)	Columbus (23)	Columbus(21)	Albany (18)	Albany(21)	Columbus (32)	Providence (38)	Hartford (23)	Harrisburg(27)
Columbus (25)	Harrisburg(30)	Albany(27)	Hartford(23)	Hartford (40)	Harrisburg (27)	Providence (34)	Harrisburg (41)	Albany (27)	Albany(31)
Albany (50)	Albany (48)	Providence (30)	Providence(28)	Providence (41)	Providence (41)	Austin(37)	Des Moines(45)	Providence (36)	Providence(37)

Table 4 above shows the relative ranks of the eight metros in both linear benchmark studies. The ranks arise from a composite rank for each category and overall ranks based on average scores (see Tables 5 and 6). The important observation from this portrayal is that Austin, Raleigh-Durham and Des Moines consistently rank higher than Hartford, Albany and Providence. Albany and Providence appear lower ranked than Hartford in several categories across both benchmarks.

Comparing MetroHartford's performance from the first period to the second using the linear methods and Tables 5 and 6, we see that it slipped from 12th to 22nd in the Business Climate category, is relatively unchanged in the Quality of Life category (19th to 23rd), and shows a significant improvement in the Human Capital category (40th to 18th). There seems to be some slippage in the Infrastructure category as well (9th to 21st). The overall rank for MetroHartford improves from 23rd to 22nd between the first and second benchmarks using linear methods. This is primarily attributable to the ten variables that changed from the first benchmark to the second. These are demographic variables and are probably not good representatives for regional performance changes per se. Moreover, MetroHartford may even have improved more than indicated over time, but some of the 55 other MSAs improved more than MetroHartford. For example, we know that other regions recovered sooner than MetroHartford from the 1991/1992 recession. Connecticut has just now recovered the jobs it had in 1989. MetroHartford probably has not. Policies and institutional changes effected years ago have their impacts felt only recently. That is to say that MetroHartford has not yet felt the impact of policies such as the tax credit for brownfield development, or the impacts of Adriaen's Landing and other construction projects and their resulting economic growth and fiscal enrichment. The lack of such realized changes in MetroHartford and their evidence in other MSAs partly accounts for its relative slippage.

Table 5

Using Phase 2 Data

Central City(-ies)/County(-ies), State(s) (P)MSA	Business Climate ranking			Business Climate Composite Ranking	Quality of Life ranking			Quality of Life Composite Ranking	Human Capital ranking			Human Capital Composite Ranking	Infrastructure ranking			Infrastructure Composite Ranking	Overall Rank			Overall Composite Rank	Published Factor Analysis
	Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		
Albany-Schenectady-Troy, NY MSA	51	48	45	48	12	12	26	16	22	19	17	21	26	27	30	26	31	34	34	31	38
Albuquerque, NM MSA	41	36	32	36	46	51	35	45	20	15	13	16	28	26	31	27	39	32	29	34	20
Allentown-Bethlehem-Easton, PA MSA	37	31	38	35	31	29	45	35	43	45	45	44	50	48	44	48	43	42	46	44	37
Austin-San Marcos, TX MSA	1	1	1	1	2	2	1	2	2	2	2	2	33	31	26	30	2	2	2	2	1
Bakersfield, CA MSA	50	53	51	51	50	49	27	44	54	54	55	54	55	56	56	55	56	56	53	56	54
Baton Rouge, LA MSA	44	44	43	43	45	50	38	46	38	32	25	33	54	50	50	51	47	46	40	45	40
Birmingham, AL MSA	23	30	23	23	56	54	56	56	34	35	31	34	17	20	21	18	36	38	41	38	31
Buffalo-Niagara Falls, NY MSA	52	51	52	52	48	47	54	51	49	48	49	49	12	11	10	13	44	47	49	47	27
Charlotte-Gastonia-Rock Hill, NC-SC MSA	6	4	7	6	34	41	30	32	9	11	10	11	13	9	11	12	8	9	11	11	17
Chattanooga, TN-GA MSA	40	39	40	41	53	53	55	54	50	50	48	50	52	54	54	53	51	50	51	52	36
Cincinnati, OH-KY-IN PMSA	21	15	25	19	38	35	42	40	25	31	30	29	3	2	2	3	14	12	20	14	24
Columbus, OH MSA	25	33	19	26	21	27	18	21	3	3	3	3	16	17	15	15	10	11	7	10	11
Dayton-Springfield, OH MSA	35	38	41	38	11	17	15	14	40	40	38	39	14	15	16	14	23	31	28	28	41
Des Moines, IA MSA	10	12	11	10	1	1	3	1	4	4	4	4	45	43	47	45	9	8	4	6	3
El Paso, TX MSA	43	50	49	47	40	40	12	30	55	55	54	55	34	33	27	32	50	52	47	50	52
Fresno, CA MSA	56	56	56	56	54	55	39	52	48	49	53	48	49	51	49	50	54	54	54	55	56
Grand Rapids-Muskegon-Holland, MI MSA	36	34	37	34	5	4	4	4	15	17	23	17	44	38	40	40	24	20	19	20	19
Greensboro--Winston-Salem--High Point, NC MSA	16	11	20	16	32	36	32	31	21	29	22	23	23	29	24	24	22	26	26	26	6
Greenville-Spartanburg-Anderson, SC MSA	30	28	36	32	28	31	23	27	31	39	32	36	36	35	36	36	35	35	37	36	23
Harrisburg-Lebanon-Carlisle, PA MSA	26	29	31	30	9	8	17	9	24	28	27	27	38	39	43	41	28	27	31	27	8
Hartford, CT MSA	22	21	22	22	20	22	37	23	17	26	16	18	22	19	18	21	20	22	23	22	39
Indianapolis, IN MSA	38	35	26	33	16	14	16	15	7	8	11	8	1	1	1	1	4	5	6	3	16
Jacksonville, FL MSA	13	17	10	13	23	24	20	22	32	30	37	32	15	16	17	16	19	18	18	21	16
Kansas City, MO-KS MSA	18	7	17	15	25	26	25	24	6	5	7	5	2	4	4	2	5	3	10	5	13
Knoxville, TN MSA	48	45	50	49	47	46	47	48	41	41	33	40	31	32	34	31	45	44	43	46	18
Las Vegas, NV-AZ MSA	5	2	4	3	42	45	31	42	12	22	28	19	32	25	28	28	21	15	17	16	5
Little Rock-North Little Rock, AR MSA	31	18	27	27	39	39	34	39	37	33	35	35	27	36	39	34	37	33	35	35	14
Louisville, KY-IN MSA	29	23	30	29	41	32	44	41	28	36	34	31	19	21	20	19	29	30	36	33	25
Memphis, TN-AR-MS MSA	27	24	28	28	55	56	53	55	46	43	44	43	9	10	13	9	40	36	39	40	35
Milwaukee-Waukesha, WI PMSA	12	8	21	11	44	44	43	43	13	16	19	15	11	12	8	11	16	14	21	18	33
Mobile, AL MSA	32	20	34	31	51	43	49	50	52	51	50	51	46	45	51	49	49	48	50	48	45
Nashville, TN MSA	19	10	8	12	29	25	24	26	8	10	6	9	6	7	7	7	7	7	9	9	15
New Orleans, LA MSA	39	37	42	39	52	52	52	53	44	46	43	46	10	14	12	10	38	41	42	41	53
Norfolk-Virginia Beach-Newport News, VA-NC MSA	42	41	39	42	13	19	10	13	23	24	14	22	37	46	38	42	32	39	22	30	46
Oklahoma City, OK MSA	34	40	33	37	15	10	11	12	26	25	24	24	8	8	9	8	15	19	16	19	28
Omaha, NE-IA MSA	3	5	6	5	6	5	5	6	11	6	8	10	42	47	45	44	11	10	8	8	10
Orlando, FL MSA	7	9	5	7	8	11	13	8	5	7	12	7	18	13	14	17	6	6	5	7	7
Providence-Fall River-Warwick, RI MSA	24	25	29	24	26	23	36	28	36	44	39	41	39	42	32	38	33	40	38	37	47
Raleigh-Durham-Chapel Hill, NC MSA	2	3	2	2	10	18	8	11	1	1	1	1	7	5	5	5	1	1	1	1	4
Richmond-Petersburg, VA MSA	14	26	14	17	27	33	33	29	10	9	5	6	20	22	22	22	13	17	13	13	32
Rochester, NY MSA	46	43	47	45	17	15	21	18	19	18	20	20	24	23	23	23	30	29	32	29	40
Sacramento, CA PMSA	20	27	12	20	19	21	19	20	14	14	15	13	21	18	19	20	17	16	14	17	42
Salt Lake City-Ogden, UT MSA	8	14	13	9	3	6	2	3	16	13	21	14	4	3	3	4	3	4	3	4	2
San Antonio, TX MSA	17	32	15	21	14	13	7	10	35	37	41	37	5	6	6	6	12	23	15	15	44
Sarasota-Bradenton, FL MSA	4	6	3	4	30	34	48	37	39	34	42	38	35	28	29	33	26	25	27	24	12
Scranton--Wilkes-Barre--Hazleton, PA MSA	53	52	54	54	33	28	46	36	51	52	51	52	43	49	48	46	52	51	55	51	51
Springfield, MA MSA	54	49	46	50	43	48	50	47	47	47	47	47	41	34	35	37	48	49	48	49	48
Stockton-Lodi, CA MSA	45	46	48	46	37	42	29	38	56	56	56	56	56	55	55	56	55	55	52	53	55
Syracuse, NY MSA	55	55	53	55	18	9	22	17	42	38	40	42	47	44	46	47	46	45	45	42	50
Toledo, OH MSA	33	42	44	40	35	30	40	34	45	42	46	45	30	37	37	35	42	43	44	43	21
Trenton, NJ PMSA	28	22	16	25	24	20	41	25	30	23	18	25	40	40	41	39	34	28	30	32	49
Tucson, AZ MSA	47	47	35	44	36	37	28	33	27	21	26	26	25	24	25	25	41	37	33	39	26
Tulsa, OK MSA	11	16	18	14	22	16	14	19	33	27	36	30	29	30	33	29	25	21	25	25	22
Wichita, KS MSA	15	19	24	18	7	7	6	7	29	20	29	28	51	52	52	52	27	24	24	23	9
Wilmington-Newark, DE-MD PMSA	9	13	9	8	4	3	9	5	18	12	9	12	48	41	42	43	18	13	12	12	34
Youngstown-Warren, OH MSA	49	54	55	53	49	38	51	49	53	53	52	53	53	53	53	54	53	53	56	54	43

Table 6

Using Phase 1 data

Central City(-ies)/County(-ies), State(s) (P)MSA	Business Climate Ranking			Business Climate Composite Ranking	Quality of Life Ranking			Quality of Life Composite Ranking	Human Capital Ranking			Human Capital Composite Ranking	Infrastructure Ranking			Infrastructure Composite Ranking	Overall Rank			Overall Composite Rank	Published Factor Analysis
	Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		Equal Weight	Subjective Weight	F/A Weight		
Albany-Schenectady-Troy, NY MSA	50	51	46	50	27	17	40	27	19	18	17	18	19	17	24	19	30	25	30	27	38
Albuquerque, NM MSA	33	38	21	28	32	47	17	34	20	15	20	20	16	15	10	14	22	23	13	24	20
Allentown-Bethlehem-Easton, PA MSA	41	40	43	41	31	18	44	31	46	47	45	47	32	31	27	31	42	42	44	44	37
Austin-San Marcos, TX MSA	23	27	6	21	3	7	2	4	1	1	1	1	42	32	38	37	3	3	2	2	1
Bakersfield, CA MSA	56	56	56	56	46	51	23	46	54	54	54	54	54	55	56	54	55	56	55	56	54
Baton Rouge, LA MSA	29	31	33	30	33	45	35	40	40	33	29	37	41	38	40	41	39	39	37	40	40
Birmingham, AL MSA	27	23	31	26	55	55	56	55	43	43	41	43	9	20	20	16	41	41	45	43	31
Buffalo-Niagara Falls, NY MSA	47	44	48	48	45	38	52	48	44	45	47	45	27	21	21	24	48	45	48	47	27
Charlotte-Gastonia-Rock Hill, NC-SC MSA	10	10	8	9	44	41	38	45	11	13	11	11	30	24	30	29	15	13	17	15	17
Chattanooga, TN-GA MSA	34	30	35	32	54	46	54	54	52	52	50	52	36	45	41	40	53	51	51	53	36
Cincinnati, OH-KY-IN PMSA	11	9	17	11	38	34	39	35	25	29	25	26	15	6	11	12	17	17	28	20	24
Columbus, OH MSA	25	28	22	25	24	26	19	23	5	4	4	4	31	29	34	32	11	10	7	10	11
Dayton-Springfield, OH MSA	35	32	40	36	13	16	12	13	42	42	39	42	14	11	13	13	27	29	32	30	41
Des Moines, IA MSA	5	4	7	4	5	2	5	5	3	3	3	3	25	27	26	27	2	2	3	3	3
El Paso, TX MSA	43	45	52	45	12	32	8	12	55	55	55	55	39	35	33	35	49	53	47	48	52
Fresno, CA MSA	52	54	53	53	47	53	25	47	49	50	53	50	53	52	54	53	54	54	53	54	56
Grand Rapids-Muskegon-Holland, MI MSA	14	15	23	15	2	1	4	2	14	17	18	14	56	54	55	56	18	18	14	11	19
Greensboro--Winston-Salem--High Point, NC MSA	7	7	13	8	37	31	33	33	16	24	19	19	48	51	51	50	24	24	25	21	6
Greenville-Spartanburg-Anderson, SC MSA	4	5	18	7	51	44	43	50	29	37	26	33	51	49	50	51	37	36	39	35	23
Harrisburg-Lebanon-Carlisle, PA MSA	22	24	20	23	9	5	18	9	15	19	15	17	29	33	31	30	13	15	15	14	8
Hartford, CT MSA	12	16	10	12	14	21	30	19	38	38	42	40	11	10	6	9	16	22	26	23	39
Indianapolis, IN MSA	16	18	11	16	20	11	20	18	12	11	13	12	2	2	4	3	7	7	9	8	16
Jacksonville, FL MSA	38	41	27	35	41	39	45	41	30	30	36	32	24	22	25	23	36	34	38	38	16
Kansas City, MO-KS MSA	17	13	12	14	28	20	31	26	6	5	6	6	6	9	15	7	6	5	8	7	13
Knoxville, TN MSA	42	42	45	43	52	50	51	51	31	32	27	31	33	37	35	33	46	44	43	46	18
Las Vegas, NV-AZ MSA	3	2	3	3	48	42	32	44	27	31	38	29	50	47	48	48	33	28	23	25	5
Little Rock-North Little Rock, AR MSA	28	25	26	27	49	48	46	49	22	22	21	21	18	30	22	21	28	30	27	29	14
Louisville, KY-IN MSA	20	14	28	20	43	36	41	42	34	36	33	34	23	26	28	26	31	31	35	34	25
Memphis, TN-AR-MS MSA	24	22	25	24	56	56	55	56	47	46	46	46	8	13	14	10	45	46	46	45	35
Milwaukee-Waukesha, WI PMSA	8	11	14	10	34	35	28	32	9	9	9	9	22	14	16	18	9	9	10	9	33
Mobile, AL MSA	31	33	32	29	53	52	50	52	51	51	51	51	35	42	39	39	50	52	49	50	45
Nashville, TN MSA	39	36	19	33	42	40	42	43	10	10	10	10	1	3	3	1	10	14	12	12	15
New Orleans, LA MSA	32	37	44	38	50	54	53	53	50	49	49	49	12	16	19	15	44	48	50	49	53
Norfolk-Virginia Beach-Newport News, VA-NC MSA	49	49	47	51	8	15	9	8	36	34	37	36	52	53	52	52	47	47	36	39	46
Oklahoma City, OK MSA	37	35	34	37	21	22	21	22	24	25	23	23	5	8	9	6	19	21	21	22	28
Omaha, NE-IA MSA	6	6	5	5	4	4	3	3	8	6	5	7	34	44	36	38	5	6	5	5	10
Orlando, FL MSA	9	8	4	6	10	14	15	11	4	8	8	5	47	40	45	46	8	8	6	6	7
Providence-Fall River-Warwick, RI MSA	13	20	24	18	30	30	37	30	39	39	43	41	37	39	32	34	32	35	40	36	46
Raleigh-Durham-Chapel Hill, NC MSA	1	1	1	1	25	25	11	20	2	2	2	2	3	1	1	2	1	1	1	1	4
Richmond-Petersburg, VA MSA	15	17	9	13	26	24	26	24	17	16	14	15	21	25	29	25	14	16	11	16	48
Rochester, NY MSA	40	39	41	40	15	8	27	15	13	12	12	13	43	36	42	42	25	19	24	19	40
Sacramento, CA PMSA	48	53	37	46	17	29	10	17	21	20	28	22	46	41	46	45	38	38	31	37	42
Salt Lake City-Ogden, UT MSA	18	21	16	19	1	3	1	1	7	7	7	8	10	4	5	8	4	4	4	4	2
San Antonio, TX MSA	45	47	39	44	7	23	7	7	32	40	40	38	7	7	8	5	23	37	22	28	44
Sarasota-Bradenton, FL MSA	2	3	2	2	35	33	49	37	23	23	32	25	26	19	12	20	12	12	18	13	12
Scranton--Wilkes-Barre--Hazleton, PA MSA	55	52	55	54	23	13	36	25	48	48	48	48	45	48	47	47	51	49	52	51	51
Springfield, MA MSA	53	50	50	52	19	37	34	28	45	44	44	44	13	12	7	11	40	43	41	41	48
Stockton-Lodi, CA MSA	54	55	54	55	36	49	24	36	56	56	56	56	55	56	53	55	56	55	56	55	55
Syracuse, NY MSA	46	46	51	49	22	12	29	21	37	35	34	35	44	43	44	44	43	40	42	42	50
Toledo, OH MSA	26	26	42	31	11	9	16	10	41	41	35	39	20	28	23	22	26	33	34	31	21
Trenton, NJ PMSA	44	43	30	42	39	28	48	39	35	27	24	28	4	5	2	4	35	26	29	32	49
Tucson, AZ MSA	51	48	36	47	29	43	22	29	18	14	16	16	17	18	17	17	29	27	19	26	26
Tulsa, OK MSA	36	29	38	34	16	19	13	16	33	28	30	30	38	34	37	36	34	32	33	33	22
Wichita, KS MSA	21	19	29	22	6	6	6	6	28	26	31	27	40	46	43	43	21	20	20	18	9
Wilmington-Newark, DE-MD PMSA	19	12	15	17	18	10	14	14	26	21	22	24	28	23	18	28	20	11	16	17	34
Youngstown-Warren, OH MSA	30	34	49	39	40	27	47	38	53	53	52	53	49	50	49	49	52	50	54	52	43

Conclusion

MetroHartford has apparently fallen behind some of its competitors over the last few years according to the metric established to assess its performance. This is accountable by its later recovery from the early 90s recession, its paucity of development projects relative to other areas (see the comparative cities report cited above) in the middle 90s, and, the lag of the effects of (local) policy and institutional changes. It is essential that local changes be recorded and described such that they can be tracked via the benchmark process. There are lags as well in the effects of economic development, policy and institutional changes as they manifest in the benchmark variables we assemble (some variables are annual, others biannual, quadrennial, and some, decennial).

Future Work

The linear methods employed here are not as good as they get. There is much benchmark work proceeding using dynamic factor analysis (BEA is researching these methods for various indicators). This time series technique offers the ostensibly unbiased approach of statistical correlation (weighting) and stability over time because changes in variables are conditioned on their history. We are researching dynamic factor analysis as a viable alternative to the linear methods and expect to produce the next benchmark using both.

Appendix 1:

First Annual Report: The MetroHartford Benchmarking Project

FIRST ANNUAL REPORT
—
THE METROHARTFORD BENCHMARKING PROJECT©

by

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EXECUTIVE SUMMARY

This report from the Connecticut Metropolitan Studies Initiative of the Connecticut Center for Economic Analyisis, University of Connecticut presents a series of indices and rankings comparing the MetroHartford metropolitan area with 56 similar metropolitan areas throughout the United States. We emphasize that the analysis is based upon the Metropolitan Statistical Area (MSA) as the unit of analysis because the MSA is a federal standard for the comparison of urban areas.

The indices and rankings are designed to serve as benchmarks for the MetroHartford Millennium Project in three ways: 1) to evaluate the efficacy of current policy by comparing changes in MetroHartford's ranking over time, 2) to explain MetroHartford's current competitive standing by comparing MetroHartford's ranking to competitors, and 3) to identify effective economic development policies by examining the policies of the top-ranked metropolitan areas.

The analysis identified three factors - Economic Vitality, Quality of Life, Socio-Economic Productivity - and a Summary Index which describe the performance of metropolitan areas.

None of the top six metropolitan areas are in the Rust Belt.

Among the nineteen Rust Belt metropolitan areas, twelve, including MetroHartford, are in the bottom half.

MetroHartford Ranks 54th out of 56 comparable metropolitan areas in terms of Economic Vitality.

MetroHartford Ranks 4th out of 56 comparable metropolitan areas in terms of Quality of Life.

MetroHartford Ranks 39th out of 56 comparable metropolitan areas in terms of Socio-Economic Productivity.

MetroHartford Ranks 39th out of 56 comparable metropolitan areas in terms of the Summary Index.

The results do not indicate causal relationships, rather they indicate correlations. The results thus suggest and support certain policy initiatives where MetroHartford is ranked relatively low. For example, across all MSA's Economic Vitality is inversely related to corporate income tax burden, and positively related to manufacturing employment growth, and Quality of Life is inversely related to

violent crime, and positively related to educational attainment.

To improve the current analysis, we should extend the benchmark from the early 1980s to the present to place current efforts in their historic context. The exercise described here should be replicated annually as new data become available and as the Project begins to bear fruit. Future work should have separate components, which focus on just the metropolitan areas of New England, and, because metropolitan area variables mask the characteristics of cities and towns, we should replicate this analysis for the core cities, and their components, of the New England region. There are other variables to add that may improve the focus for policy, and, we should include all 360 MSA's to improve the resolution of MetroHartford's position nationally.

INTRODUCTION

This report from the Connecticut Metropolitan Studies Initiative of the Connecticut Center for Economic Analysis, University of Connecticut presents a series of indices and rankings comparing the MetroHartford metropolitan area to similar metropolitan areas throughout the United States. These indices and rankings are designed to serve as benchmarks for the MetroHartford economic development community in three ways: 1) to evaluate the efficacy of current policy by comparing changes in MetroHartford's ranking over time, 2) to explain MetroHartford's current competitive standing by comparing MetroHartford's ranking to competitors, and 3) to identify effective economic development policies by focusing on the policies of the top-ranked metropolitan areas.

DATA AND METHODS

The objective of the analysis is to create a small number of indices, which reflect the multiple ways in which metropolitan areas differ from each other. This objective was articulated through extensive meetings with the Economic Advisory Board of the MetroHartford Millennium Project.[1] The advisory board first identified that the units of analysis should be metropolitan statistical areas (MSA). MSAs consist of large core cities together with adjacent communities that have a high degree of economic and social integration with that core. The MSA classification is a statistical standard, developed for use by Federal agencies in the production, analysis, and publication of data on urban areas. The Economic Advisory Board then identified a set of

[1]Jeffrey Blodgett, Connecticut Economic Resource Center; Fred Carstensen, University of Connecticut/CCEA; Thomas Cooke, University of Connecticut/CMSI/CCEA; Stan McMillen, University of Connecticut/CCEA; Michael Levin, Connecticut Light & Power; William Lott, University of Connecticut/CCEA; James Moor, The Hartford Financial Services Group; John

metropolitan areas comparable to MetroHartford in terms of spatial structure, population, economic structure, and region:

- ❖ The first screen excluded all Primary Statistical Metropolitan Areas (PMSAs) (these are metropolitan areas that are part of larger urban agglomerations);
- ❖ The second screen excluded all metropolitan areas with a population less than 500,000 or greater than 1,500,000;
- ❖ The third screen added back several PMSAs between 500,000 and 1,500,000, which are comparable to MetroHartford but were not selected in the first two screens: Trenton, NJ; New Haven, CT; Milwaukee, WI; Sacramento, CA; Cincinnati, OH;
- ❖ The final screen added MSAs and PMSAs either less than 500,000 or greater than 1,500,000 that were judged important for comparison: Bridgeport, CT; Norfolk, VA; Kansas City, MO.

Table 1 lists each of these metropolitan areas and their 1996 population.

To identify indices for ranking these metropolitan areas the Economic Advisory Board identified four broad criteria to guide data collection: 1) Business Climate, 2) Human Capital, 3) Quality of Life, and 4) Infrastructure. For each of these criteria, the Economic Advisory Board identified a set of variables considered to reflect various dimensions of the four criteria. Table 2 lists these criteria and the selected variables. The selection of these variables was further based on the following criteria:

- ♦ The data must be available for all of the selected metropolitan areas;[2]
- ♦ Newer data is preferred over older data;
- ♦ Updates should be available frequently;
- ♦ Projected data should be excluded;
- ♦ Data reported at the metropolitan level is preferred over city, county, or state data;
- ♦ Included data are supported by economic or sociological theory.

Shemo, Connecticut Capitol Region Growth Council.

[2]There were a few cases in which data for specific variables were missing for specific metropolitan areas. Various methods were used to impute the missing data. In the case of Bridgeport and New Haven, the large amount of missing data meant that they were ultimately excluded from the study even though they were selected to be part of the study. This occurred because much of the US Census data for Bridgeport and New Haven are rolled together with data for the New York Consolidated Metropolitan Statistical Area.

The construction of any ranking system confronts the issue of how to combine these variables to create useful measures.[3] Our approach is to use factor analysis. Factor analysis is a traditional multivariate statistical method for reducing a large number of correlated variables to a small number of independent indices (or factors).[4] The resulting analysis of the selected data identified three factors - Economic Vitality, Quality of Life, Socio-Economic Productivity.[5] These three factors were also used to construct a Summary Index.

RESULTS

Table 3 lists each of the three factors extracted from the data and those variables which are most highly correlated with each factor. Table 4 lists the index scores for each factor in two ways: 1) as a ranking, and 2) as a probability level. Table 4 is sorted according to a Summary Index which is a function of the three factors (see below).

Economic Vitality. The first factor - Economic Vitality - is most highly correlated with growth in key industries, growth in income, growth in population, number of housing starts, and corporate tax

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[3]Guterbock, T.M. 1997. Why Money Magazine's "Best Places" keep changing. *Public Opinion Quarterly*, 61:339-351;

Nissan, E. 1994. A composite index for statistical inference for ranking metropolitan areas. *Growth and Change*, 25(4):411-427;

Shresha, H., and C. McCue. 1998. *Measuring Performance of Metropolitan Areas in the US: A Literature Survey*. Storrs, CT: Center for Economic Analysis, University of Connecticut.

[4]Technically, we use a scree plot from principal factor analysis to extract 5 factors from the data. We then use unweighted least squares factor analysis with a varimax rotation. The 2 smallest factors were not meaningful, thus leaving 3 factors.

[5]The three factors explain 71% of the variation in the variables across the included metropolitan areas.

burdens. Metropolitan areas with a high Economic Vitality score are metropolitan areas with vibrant, expanding economies, good business climates, and high rates of immigration from other parts of the country. As expected given the economic troubles of the early 1990s, relative to the other metropolitan areas in the study, MetroHartford ranks 54th out of 56 which places it in the 4th percentile. In other words, only 4% of metropolitan areas can be expected to score lower in terms of Economic Vitality than MetroHartford.

Quality of Life. The second factor - Quality of Life - is most highly correlated with income levels, poverty rates, crime rates, climate, family structure, and educational attainment. Metropolitan areas with a high Quality of Life score have high incomes, low poverty, low crime, temperate climates, and high education levels. Indeed, such a description aptly applies to MetroHartford. Relative to the other metropolitan areas in the study, MetroHartford ranks 4th out of 56 which places it in the 93rd percentile. In other words, fully 93% of metropolitan areas can be expected to fare worse in terms of Quality of Life than MetroHartford.

Socio-Economic Productivity. The third factor - Socio-Economic Productivity - is most highly correlated with economic output per capita, personal bankruptcy rates, unemployment rates, quality of physical infrastructure, educational attainment, and, social dependence. Metropolitan areas with a high Socio-Economic Productivity score are those in which the economic and social infrastructure results in high rates of economic activity and productive industries. Relative to the other metropolitan areas in the study, MetroHartford ranks 39th out of 56, which places it in the 38th percentile. In other words, only 38% of metropolitan areas can be expected to fare worse in terms of Socio-Economic Productivity.

Summary Index. The three individual indices are combined into a Summary Index by weighting the three factor scores by the percent of the total variance attributed to that factor. Thus, the summary factor scores give an overall rank and percentile score which largely reflects Economic Vitality (37% of the total), followed by Quality of Life (36% of the total), and Socio-Economic Productivity (27% of the total). As expected given the range of scores on the three individual indices, MetroHartford is in the middle of the pack. Overall, MetroHartford ranks 39th out of 56, which places it in the 41st percentile.

Regional Patterns. The Summary Index indicates six metropolitan areas which rank significantly higher than the remaining metropolitan areas (Austin, TX; Salt Lake City, UT; Des Moines, IA; Raleigh, NC; Las Vegas, NV; Greensboro, NC). None of these metropolitan areas are within the Rust Belt (Rust Belt metropolitan areas are underlined in Table 4). Economic Vitality and Quality of Life are significantly higher in this group. Among the nineteen Rust Belt metropolitan areas, twelve, including Hartford, are in the bottom half of the sample with respect to the Summary Index.

Comparison with Other New England Metropolitan Areas. Only two other New England metropolitan areas were included in the analysis: Providence, RI and Springfield, MA. Overall, Providence and Springfield fare significantly worse than MetroHartford. Both Providence and Springfield are similar to MetroHartford in terms of Economic Vitality (51st, 52nd, and 54th respectively) and Socio-Economic Productivity (30th, 42nd, and 39th respectively), but MetroHartford is much better off in terms of Quality of Life (25th, 20th, and 4th respectively). The higher Quality of Life boosts MetroHartford's Summary Index to 39th, in comparison to Providence

(47th) and Springfield (48th).

CONCLUSIONS

This analysis provides the MetroHartford Millennium Management Committee with a broad set of indices upon which to evaluate past and future economic development policy. In particular, MetroHartford's high Quality of Life is overshadowed by its low Economic Vitality and marginal Socio-Economic Productivity.

There are several ways that these results can be used. First, the results can be used to explain MetroHartford's current standing by comparing MetroHartford's ranking to competitors. Second, the results can be used to identify effective economic development policies by examining the policies of the top-ranked metropolitan areas. A third use for the results is to evaluate the efficacy of current policy by comparing changes in MetroHartford's ranking over time. The current results do not now allow such an analysis because they are limited to data from the early- to mid-1990s, but this will be addressed in subsequent work (see below). Fourth, while the results do not indicate causal relationships - rather they indicate correlations - the results suggest and support certain policy initiatives where MetroHartford is ranked relatively low. For example, across all MSA's Economic Vitality is inversely related to corporate income tax burden, and positively related to manufacturing employment growth, and Quality of Life is inversely related to violent crime, and positively related to educational attainment.

FUTURE WORK

To make the benchmark project truly valuable, however, it must be sustained and enriched. What we now have is a single snapshot of MetroHartford's competitive position. But we do not

know how MetroHartford's performance has evolved over time, nor how it compared with other regions five, ten or fifteen years ago. To improve the current analysis we should extend the benchmark from the early 1980s to the present to place current efforts in their historic context. And even though we have considered over 100 data series in building the analysis, there are other relevant series that need to be evaluated, there are important variables (e.g., the availability of local venture capital) which have not yet been included because usable data is not directly available and must be constructed or inferred from other data series. There are important regions with which we should compare MetroHartford (principally similar MSA's in the Northeast), but for which appropriate data was not available. The exercise described here should be replicated annually as new data become available and as the Project begins to bear fruit. Because metropolitan variables mask the characteristics of cities and towns, we should replicate this analysis for the core cities, and their components, of the New England region.

Table 1. Metropolitan Areas Population (1996).			
Metropolitan area	**Pop. (000s)**	**Metropolitan area**	**Pop. (000s)**
Albany-Schenectady-Troy, NY	878	Memphis, TN-AR-MS	1,078
Albuquerque, NM	670	Milwaukee-Waukesha , WI	1,457
Allentown-Bethlehem-Easton, PA	614	Mobile, AL	518
Austin-San Marcos, TX	1,041	Nashville, TN	1,117
Bakersfield, CA	622	New Orleans, LA	1,312
Baton Rouge, LA	567	Norfolk-Virginia Beach, VA	1,540
Birmingham, AL	894	Oklahoma City, OK	1,026
Buffalo-Niagara Falls, NY	1,175	Omaha, NE-IA	681
Charlotte-Gastonia-Rock Hill, NC-SC	1,321	Orlando, FL	1,417
Chattanooga, TN-GA	446	Providence-Fall River, RI-MA	1,124
Cincinnati , OH-KY-IN	1,597	Raleigh-Durham-Chapel Hill, NC	1,025
Columbus, OH	1,447	Richmond-Petersburg, VA	935
Dayton-Springfield, OH	950	Rochester, NY	1,088
Des Moines, IA	427	Sacramento , CA	1,482
El Paso, TX	684	Salt Lake City-Ogden, UT	1,217
Fresno, CA	861	San Antonio, TX	1,490
Grand Rapids-Muskegon-Holland, MI	1,015	Sarasota-Bradenton, FL	528
Greensboro--Winston-Salem, NC	1,141	Scranton—Wilkes Barre—Hazelton, PA	628
Greenville-Spartanburg-Anderson, SC	896	Springfield, MA	576
Harrisburg-Lebanon-Carlisle, PA	614	Stockton-Lodi, CA	533
MetroHartford, CT	**1,144**	Syracuse, NY	745
Indianapolis, IN	1,492	Toledo, OH	611
Jacksonville, FL	1,008	Trenton , NJ	330
Kansas City, MO-KS	1,690	Tucson, AZ	767
Knoxville, TN	649	Tulsa, OK	756
Las Vegas, NV-AZ	1,201	Wichita, KS	512
Little Rock-North Little Rock, AR	548	Wilmington-Newark , DE-MD	550
Louisville, KY-IN	991	Youngstown-Warren, OH	598

Table 2. Criteria and Variables.	
Business Climate	**Quality of Life**
Government Share of Employment, 1996	% of Population below Poverty, 1993
Manufacturing Share of Employment, 1996	% of Families headed by Females, 1990
White Collar Share of Employment, 1996	Air Quality Index, 1997
State Corporate Income Tax Burden, 1993	Average Travel Time to Work, 1990
Bankruptcy Rate, 1995	Crude Death Rate, 1992-94
Economic Output per Capita, 1992	Crude Birth Rate, 1992-94
Construction Employment Growth, 1990-96	Heating and Cooling Degree Days,1997
Manufacturing Employment Growth, 1990-96	Housing Affordability Index, 1998
White Collar Employment Growth, 1990-96	Violent Crime Rate, 1997
Real Income per Capita, 1997	Motor Vehicle Death Rate, 1992
Real Income Growth per Capita, 1990-97	Single Family Home Price Growth, 1997
Housing Starts per Capita, 1997	
	Infrastructure
Human Capital	# of Hospital Beds per Capita, 1997
Total Population, 1997	FAA Airport Class (4=large, 1=no hub), 1997
Population Growth Rate, 1990-1997	Land Area, 1990
Dependent Population Ratio, 1996	Number of Interstate Highways, 1997
Economic Activity Rate, 1996	Patents & Innovations Per Capita, 1996
Labor Force Participation Rate, 1996	Physicians per Capita, 1993
Unemployment Rate, 1996	Population Density, 1990/1997
% Foreign Born, 1990	
% with Diploma or GED, 1990	
% with College Degree, 1990	

Table 3. Indices and Significant Variables.					
Economic Vitality		**Quality of Life**		**Socio-Economic Productivity**	
Variable	**Correlation**	**Variable**	**Correlation**	**Variable**	**Correlation**
Population Growth Rate	0.89	Poverty Rate	-0.83	% Foreign Born	-0.69
Housing Starts per Capita	0.88	% with Diploma or GED	0.75	Unemployment Rate	-0.67
White Collar Employment Growth	0.79	% Female Headed Families	-0.69	Economic Output per Capita	0.67
Manufacturing Employment Growth	0.79	Motor Vehicle Death Rate	-0.62	Dependent Population Ratio	-0.65
Construction Employment Growth	0.67	Real Income per Capita	0.61	Economic Activity Rate	0.59
Land Area	0.62	Violent Crime Rate	-0.61	Bankruptcy Rate	-0.57
Corporate Income Tax Burden	-0.55	% with College Degree	0.59	Number of Interstate Highways	0.52
Population Density	-0.49	Economic Activity Rate	0.58	Land Area	-0.42
Air Quality Index	0.44	Heating and Cooling Degree Days	0.58	Air Quality Index	-0.37
Motor Vehicle Death Rate	0.41	Patents per Capita	0.55	Single Family Home Price Growth	0.30
Explained Variation					
26%		25%		19%	

Table 4. Index Scores and Rankings Sorted by Summary Index.

MSA	Summary Index		Economic Vitality		Quality of Life		Socio-Economic Productivity	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Austin-San Marcos, TX	1	94	2	99	5	92	17	75
Salt Lake City-Ogden, UT	2	89	5	89	2	96	20	73
Des Moines, IA	3	86	9	83	1	96	28	61
Raleigh-Durham-Chapel Hill, NC	4	84	4	92	13	79	18	74
Las Vegas, NV-AZ	5	83	1	100	16	72	56	0
Greensboro--Winston-Salem, NC	6	82	6	88	23	60	3	92
Orlando, FL	7	72	3	95	24	58	41	36
Harrisburg-Lebanon-Carlisle, PA	8	71	37	40	9	85	7	84
Wichita, KS	9	68	12	79	17	71	34	47
Omaha, NE-IA	10	68	41	28	7	88	6	84
Columbus, OH	11	66	30	48	12	81	24	65
Sarasota-Bradenton, FL	12	64	7	88	19	67	45	20
Kansas City, MO-KS	13	63	31	48	22	65	14	78
Little Rock-North Little Rock, AR	14	61	14	72	37	39	19	74
Nashville, TN	15	61	15	71	39	37	16	76
Indianapolis, IN	16	60	35	44	27	53	5	84
Charlotte-Gastonia-Rock Hill, NC-SC	17	59	24	55	42	29	2	92
Knoxville, TN	18	59	13	72	36	40	26	63
Grand Rapids, MI	19	58	36	43	15	75	31	53
Albuquerque, NM	20	57	11	79	26	54	44	27
Toledo, OH	21	57	33	45	31	48	10	81
Tulsa, OK	22	57	16	69	38	38	25	63
Greenville-Spartanburg-Anderson, SC	23	55	18	62	46	17	4	91
Cincinnati, OH-KY-IN	24	53	32	46	35	45	21	72
Louisville, KY-IN	25	53	26	52	41	30	11	81
Tucson, AZ	26	53	8	85	32	47	47	14
Buffalo-Niagara Falls, NY	27	52	21	58	34	47	32	50
Oklahoma City, OK	28	51	38	38	40	37	8	84

Table 4
continued

MSA	Summary Index		Economic Vitality		Quality of Life		Socio-Economic Productivity	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Jacksonville, FL	29	50	10	80	43	25	36	41
Rochester, NY	30	49	50	8	3	95	37	40
Birmingham, AL	31	49	17	68	45	20	22	66
Richmond-Petersburg, VA	32	48	39	36	29	51	29	60
Milwaukee-Waukesha, WI	33	48	46	21	18	67	27	62
Wilmington-Newark, DE-MD	34	47	47	19	11	83	38	39
Memphis, TN-AR-MS	35	46	19	60	52	5	1	94
Chattanooga, TN-GA	36	45	25	52	48	14	9	82
Allentown-Bethlehem-Easton, PA	37	45	45	23	10	84	46	20
Albany-Schenectady-Troy, NY	38	42	44	23	8	87	50	11
MetroHartford, CT	**39**	**41**	**54**	**3**	**4**	**93**	**39**	**38**
Baton Rouge, LA	40	39	34	45	49	13	15	76
Dayton-Springfield, OH	41	39	49	8	28	51	13	80
Sacramento, CA	42	37	23	55	21	65	54	3
Youngstown-Warren, OH	43	37	29	49	44	23	35	42
San Antonio, TX	44	36	27	52	47	15	33	50
Mobile, AL	45	35	20	58	53	3	12	80
Norfolk-Virginia Beach-Newport News, VA	46	34	42	25	30	50	43	29
Providence-Fall River-Warwick, RI-MA	47	33	51	7	25	56	30	57
Springfield, MA	48	30	52	7	20	65	42	33
Trenton, NJ	49	30	55	3	6	91	48	13
Syracuse, NY	50	29	56	3	14	77	40	36
Scranton--Wilkes-Barre--Hazleton, PA	51	22	48	12	33	47	49	12
El Paso, TX	52	13	22	56	54	3	52	3
New Orleans, LA	53	12	53	5	55	3	23	66
Bakersfield, CA	54	12	28	50	50	9	55	0
Stockton-Lodi, CA	55	11	43	24	51	6	51	6
Fresno, CA	56	9	40	33	56	3	53	3

Appendix 2:
Four Categories and Variables: Subjective Weighting Exercise

Millennium Benchmark Study

In the following table you will find the 45 variables used to calculate the index in this study. In the first blank column, please rank these variables in a way that the most important variable to you is number 1, IRRESPECTIVE OF ITS CATEGORY. Then in the score column, please assign scores to these variables, where the most important variable gets the highest score. For scoring, you have 100 points to distribute among the variables in each category. You may use tick marks for each point you give to one variable, and the total score has to add up to 100 for each category. You may give the same score to different variables. The result establishes subjective weights for the variables in the analysis.

Category	VARIABLES	RANK	SCORE
Infrastructure	100 points		
1	City Land Area (sq. miles)		
2	FAA Airport Classification[6]		
3	Hospital Beds per 1000 pop.		
4	No. of Interstate Highways		
5	Metropolitan Land Area (MSA sq. miles)		
6	Patents per 1000 nonfarm businesses		
7	Physicians per 1000 pop.		
8	Population Density		
Total			100
Business Climate	100 points		
1	Bankruptcy Rate		
2	Construction Employment Growth		
3	Government Share of Employment		
4	Housing Start Rate		
5	Manufacturing Employment Growth		
6	Real Gross State Product Per Capita		
7	Real Personal Income Growth Per Capita		
8	Real Personal Income Per Capita		

[6] FAA's classification for the metro area: large=4, medium=3, small=2, and none=1.

9	State Corporate Income Tax Burden		
10	White Collar Employment Growth		
11	White Collar Share of Employment		
12	Manufacturing Share of Employment		
Total			100

Quality of Life	100 Points	**RANK**	**SCORE**
1	Heating & Cooling Degree Days		
2	Housing Affordability Index		
3	Birth Rate		
4	Infant Mortality rate		
5	Average Daily Commute (round trip)		
6	Death Rate		
7	Voter Turnout (1996 presidential)		
8	Motor Vehicle Death Rate		
9	Particulate Matter		
10	% of Female Headed Households		
11	% of Population Below Poverty		
12	Violent + Property Crimes per 1000 pop		
13	Transfer Payments Per Capita		
14	Single Family Home Price Growth		
Total			100
Human Capital	100 Points		
1	% of Population With Secondary Education		
2	Adolescent Birth Rate		
3	% of Population in 25 to 44 Cohort		
4	Population Growth		
5	1998 Population Level		

6	Dependent Population Ratio (pop<16+pop>65/total pop)		
7	Economically Active Population (16<=pop<65/total pop)		
8	% of Population With Bachelors Degree		
9	Unemployment Rate		
10	Labor Force Participation Rate		
11	% of Foreign Born Population		
Total			100

Now that you have scored the variables within each category, please score the categories. You have 100 points to assign among the four categories.

Category	**Rank**	**Points**
Infrastructure		
Business Climate		
Quality of Life		
Human Capital		
Total		100