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The Role of the Housing Supply and the Regulatory Environment in Economic Growth of Micropolitan Statistical Areas

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Abstract: The purpose of this study is to identify and measure the impact of various factors that affect the economic performance of micropolitan statistical areas in the U.S. Specifically, it is hypothesized that micropolitan area economic growth is highly related to locational amenities, primarily the housing supply and the regulatory environment. The Glaeser and Tobio (2008) growth model is used to obtain estimates for the amenity growth effect, productivity growth effect, and the housing supply growth effect for a cross-section of micropolitan statistical areas for the 1990-2010 period. A proxy variable for the regulatory environment is also developed. The findings indicate that a flexible housing supply and regulatory environment are significant determinants of the growth of micropolitan areas during the period under study.

1. Introduction

Historically, regional growth and migration are driven by productivity. However, amenities have gradually become more important as incomes have increased (Graves, 1983). Big cities have more urban amenities than small cities and towns, since urban amenities are usually scale-dependent. Skilled and educated people are more likely to move to cities with plentiful urban amenities, and as a result big cities are likely to have a larger share of their labor force that is skilled and educated (Adamson et al., 2004).

Rural economic development often focuses on the brain drain that takes place when young people move away from rural areas (Isserman et al., 2009). Moreover, the growth in jobs and incomes in rural areas have lagged behind, partly because of lack of economic opportunities in traditional rural industries (McGranahan and Beale, 2002).

Beginning in the 1970s, empirical studies have shown an increase in migration to non-metropolitan areas (Wardwell and Brown, 1980). Improvements in the transportation infrastructure, environmental awareness, urban disamenities, and increasing affluence are some of the catalysts for this change (Chi and Marcouiller, 2011). As such, natural amenities have become more important in the utility function of households, resulting in non-metropolitan high amenity areas becoming more attractive for migration.

This trend in non-metropolitan county/city growth has prompted a new classification of urban areas called "micropolitan statistical area," which is based on the concept of urban clusters. Micropolitan statistical areas, first defined by the Office of Management and Budget (OMB) in 2000, are counties "having at least one urban cluster of at least 10,000 but less than 50,000 population." Under the standards, the county (or counties) in which at least 50 percent of the population resides within an urban area of 10,000 or

more is (are) identified as a "central county" (counties).[1] Additional "outlying counties" are added to the central county in the micropolitan area if "at least 25 percent of their employed residents commutes to the core county to work or 25 percent of their work force lives in the core county" (Isserman, 2007). As of 2012, there were 536 micropolitan statistical areas (Cortes et al., 2015), and the number has been increasing since 1990 (Table 1).

Table 1. Population and per capita income characteristics of 536 micropolitan areas

	Population			Income		
Year	Low	High	Mean	Low	High	Mean
1990	9,339	19,4215	44,437	5,458	29,862	14,986
2000	12,088	20,8230	48,383	9,922	53,720	23,077
2012	13,200	21,7390	50,777	19,866	11,6978	36,152

Note: Authors calculations using census information from the American Fact Finder and Micropolitan Statistical Area Census Briefs (www.census.gov/population/www/cen2000/briefs/phc-t29/index.html).

The purpose of this study is to identify and measure the impact of various factors that affect the economic performance of micropolitan statistical areas in the U.S. The main finding strongly supports the hypothesis that micropolitan economic growth is highly related to locational amenities, specifically housing supply and the regulatory environment. The next section discusses relevant past studies. This is followed by the theoretical framework, an analysis of results, and other statistical tests. Finally, a summary of the results and certain conclusions are provided.

2. Literature review

Tiebout (1956) is one of the first economists to relate migration to quality of life when he said that people vote with their feet. Since then, numerous studies using hedonic pricing models have found that natural amenities affect migration through quality of life. For example, Renas and Kumar (1978 and 1983), Cebula and Alexander (2006), and Foley and Angjellari-Dajci (2015) all find that warmer climates affect net in-migration for states. Partridge et al. (2010), McGranahan (2008), Rickman and Rickman (2011), Gunderson and Ng (2005), and Deller et al. (2001) show that natural amenities affect migration to rural areas. Other studies have found that amenities are important in regional growth (Chen and Rosenthal, 2008; Foley and Angjellari-Dajci, 2015; Gabriel and Rosenthal, 2004; Clark et al., 2003; Gyourko and Tracy, 1991; Roback, 1982).

Some studies conclude that regional economic development should focus primarily on amenities because jobs follow people more than people follow jobs (Vias, 1999; Mulligan and Vias, 2006). Other research finds that population growth and economic growth in some regions are caused by rising productivity (Caselli and Coleman, 2001). Thus, it is important to understand economic development in order to identify and recommend appropriate economic policy and strategy. However, the problem with economic development is that there is no single definition which describes it (Partridge and Rickman, 2003). The U.S. Economic Development Administration defines economic development as the fundamental enhancement of productive capacity. However, another institution, the Southern Growth Policy Board, defines economic development as the fundamental enhancement in quality of life, including economic well-being.

Isserman et al. (2009) argue that economic growth and prosperity are not the same, although growth is often confused with prosperity and is a focus of local economic development initiatives. In a study of noncore rural counties, prosperous rural counties are defined as those that meet the quality of life threshold; in order to meet the threshold, a county has to do better than the national average with respect to the housing problem rate, the high school dropout rate, the poverty rate, and the unemployment rate. Therefore, it is important that economic development focus on these areas. The study determines that the 289 prosperous counties in 2000 have higher private sector jobs per capita and higher per capita market incomes. Interestingly, the study also finds a negative correlation between prosperity and migration, and that amenities and per capita income are not important for prosperity.

Davidsson and Rickman (2011) find that a number of micropolitan areas high in amenities have robust in-migration while other micropolitan areas with

[1] www.census.gov/population/www/metroareas/aboutmetro.html

high productivity have robust in-migration. Loveridge et al. (2007) argue that, in order to obtain a deeper understanding of economic phenomena, it is vital that economic researchers study outliers (i.e., areas with unexplained growth). They state that if a geographic area is advancing more rapidly than other places with similar economic, social, and geographic variables, then it is useful to know why. So far the economic literature has focused mostly on the general determinants of the growth of micropolitan areas, i.e., the average micropolitan area's growth rate. In order to analyze why places with similar levels of economic, social, and geographic variables have different growth rates, this study focuses on outliers of economic growth, specifically micropolitan areas with unexplained economic growth. Regional growth varies widely, and this understanding is important in order to determine policies conducive for promoting regional economic growth.

There is extensive literature analyzing the relationship between economic growth and various indexes of economic freedom. Indexes of economic freedom previously studied have included those developed by the Heritage Foundation (Heckelman, 2000) and the Fraser Institute (Dawson, 2006; Belasen and Hafer, 2013), as well as measures of regulatory quality or environment created by the World Bank Institute, the Mercatus Center's Freedom in the 50 States, and the Wharton Survey on Residential Land Use Regulation Index (Gyourko et al., 2008). These indexes differ in terms of their components or subindexes. For example, the Fraser Institute's Economic Freedom of North America has three indicators of government regulation while the Heritage Foundation index consists of ten sub-indexes. As Heckelman (2000) points out, "economic freedom is a highly subjective term" and any overall "measure depends critically on the weighting of the subcomponents used" (p. 72). Nonetheless, the freedom indexes have been used in cross-country studies and also applied to disaggregated geographic levels such as U.S. states (Belasen and Hafer, 2013; Bennett and Vedder, 2013; Garrett and Rhine, 2011), metropolitan areas (Stansel, 2013), and local communities (Gyourko et al., 2008).

Past studies generally find a positive effect of overall economic freedom on economic growth and performance. In an early study, Heckelman (2000) demonstrates that not all kinds of economic freedom lead to growth. Using Granger causality tests, Heckelman (2000) examines the individual bivariate relationships between each of the ten components of the Heritage Foundation freedom index and the GDP growth rates for 94 countries for 1994-1997. He finds that specific freedom components in the areas of monetary policy, capital flows and foreign investment, wage and price controls, property rights, and regulations Granger-cause economic growth rate; on the other hand, there is some evidence that growth precedes the government-intervention-in-the-economy component. Employing the Fraser Institute's Economic Freedom of the World (EFW) index, Dawson (2006) segregates regulation from the overall EFW index to analyze the differential impact of regulation (versus economic freedom) on the GDP growth rates of a sample of 64 countries for the 1980-2000 period. After controlling for changes in economic freedom, Dawson (2006) finds that regulation has statistically significant and negative effects on economic growth via the total factor productivity channel (direct effect) and the investment channel (indirect effect).

In the present study, the issue of regulatory environment is particularly important. Instead of employing an overall index of economic freedom, it focuses on a specific component of the regulatory environment – the local housing market. This is similar to Gyourko et al. (2008), who develop an index of local land use regulation and find that the regulatory environment differs spatially across states and metropolitan areas, with the most regulated areas located in the Northeast and the least regulated areas in the South and Midwest. Another interesting finding is the negative relationship between population density and land use regulation, particularly: "…many very low-density towns have some of the most strictly regulated environments suggests that land scarcity is not the primary motivation in many cases" (Gyourko et al., 2008, p. 695). Rather than employing a comprehensive index similar to Gyourko and others, this study employs the ratio of the growth of median gross rent to housing supply growth as the key regulatory variable of interest.

3. Theoretical framework and data

The Hat Diagonal Matrix and the method of k-means clustering are used to identify micropolitan areas with outlier independent variables. Once the outliers are identified and removed, the sources of growth are then identified and analyzed using the Glaeser and Tobio (2008) growth model. The model shows that the overall growth of regions can be explained by three effects: the amenity growth effect, the productivity growth effect, and the housing supply growth effect. The model's results are carefully analyzed in order to find the factors that explain the

performance of 511 micropolitan statistical areas with unexplained growth in the 1990s and 2000s.

Rents are seldom included in regional migration studies (Mueser and Graves, 1995). However, Cebula (1979), Renas (1980), Renas and Kumar (1978, 1982), and Foley and Angjellari-Dajci (2015) analyze the impact of regional cost of living on migration and report that higher housing prices discourage net in-migration. There is also research which supports the hypothesis that rent and a flexible housing supply are as important for regional growth as amenities and productivity (Glaeser et al., 2006). The Glaeser and Tobio (2008) model enables the researcher to focus on the importance of housing markets in economic growth. The model is developed and derived from the production function, the inverse labor demand function, the value function, and the housing supply function. It takes derivatives and equilibrium conditions, uses the natural logs, and then solves simultaneously for the three-equation equilibrium system consisting of population, wages, and housing prices:

$$\log N = K_N + \left\{ \frac{(\delta + \alpha - \delta\alpha) Log(A) + (1-\gamma)(\delta Log(\phi) + \alpha(\delta - 1)\log(L)}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} \tag{1}$$

$$\log W = K_W + \left\{ \frac{(\delta - 1)\alpha Log(A) - (1-\beta-\gamma)(\delta Log(\phi) + \alpha(\delta - 1)\log(L)}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} \tag{2}$$

$$\log Ph = K_P + \left\{ \frac{(\delta - 1) Log(A) + \beta Log(\phi) - (1-\beta-\gamma)\log(L)}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} \tag{3}$$

Next, the model makes the system dynamic by substituting in equations governing the innovations in the growth of labor, wages, and housing prices (shocks in amenity, productivity, and housing supply).

$$\log\left\{\frac{N_{t+1}}{N_t}\right\} = K_N + \left\{ \frac{(\delta + \alpha - \delta\alpha)\lambda_A S + (1-\gamma)\delta\lambda_\phi S + (1-\gamma)\alpha(\delta - 1)\lambda_L S}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} + \mu_N \tag{4}$$

$$\log\left\{\frac{W_{t+1}}{W_t}\right\} = K_W + \left\{ \frac{(\delta - 1)\alpha\lambda_A S + (1-\beta-\gamma)\delta\lambda_\phi S + (1-\beta-\gamma)\alpha(\delta - 1)\lambda_L S}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} + \mu_W \tag{5}$$

$$\log\left\{\frac{Ph_{t+1}}{Ph_t}\right\} = K_{Ph} + \left\{ \frac{(\delta - 1)\lambda_A S + (\delta - 1)\beta\lambda_\phi S - (\delta - 1)(1-\beta-\gamma)\lambda_L S}{(\delta(1-\beta-\gamma) + \alpha\beta(\delta - 1))} \right\} + \mu_{Ph} \tag{6}$$

Finally, it solves the system and calls these innovations the productivity, amenity, and the housing supply growth effects (λ_A, $\lambda\varphi$, and λ_L), which are measured by the regression coefficients b_N, b_W, and b_{Ph}.

$$\lambda_A = (1-\beta-\gamma)b_N + (1-\gamma)b_W \tag{7}$$

$$\lambda_\phi = \alpha b_{Ph} - b_W \tag{8}$$

$$\lambda_L = b_N + b_W - \left(\frac{\delta b_{Ph}}{\delta - 1}\right) \tag{9}$$

where b_N, b_W, and b_{Ph} are regression coefficients estimated by the population, wages, and rent regressions used to calculate the amenity, productivity, and housing supply effects; α is the budget share of housing; γ is the share of mobile capital inputs; β is the share of labor inputs; and δ is the elasticity of the housing supply.

Following economic literature (Glaeser and Tobio, 2008; Rickman and Rickman, 2011; Davidsson and Rickman, 2011), the Glaeser and Tobio (200*) growth model is employed to obtain estimates for the amenity growth effect, productivity growth effect, and the housing supply growth effect for micropolitan statistical areas nationwide. The U.S. Census Bureau does not report rent or housing prices for micropolitan areas in the 2010 census, and thus the various growth effects can only be estimated for the

1990-2000 period.[2] As a result, the 1990-2000 period is the base period in the study, and the performance of micropolitan areas with flexible housing markets in the 1990-2000 period is analyzed for the 1990-2010 period.

The study estimates the following model, where all the independent demographic and income variables are 1990 cross-sectional census data except for the fiscal variables, which are from the 1992 economic census:

$$\%\text{Population Growth}_{1990-2000} = b_0 + b_1 Amenity + b_2 CensusDivision + b_3 Demographic + b_4 Education + b_5 FiscalPolicy + b_6 Economic + b_7 Urbanization + b_8 ControlVariables \quad (10)$$

The median gross rent is a weighted average of the median gross monthly rent for rental housing (complete count) and imputed rent for owner-occupied housing (complete count), with the shares of renter and owner-occupied houses as weights. The median imputed rent for owner-occupied housing is calculated by converting the median value of owner-occupied housing (complete count) using a discount rate of 7.85% (Peiser and Smith, 1985; Blomquist et al., 1988; Gabriel et al., 2003). The median gross rent does not control for differences in housing quality between regions. Average wages are calculated by dividing private non-farm payroll by private non-farm employment.

The amenity variables include January and July temperatures, humidity, water area, and topography. The demographic variables include births per 1000 population, percent married households, percent African, Hispanic, and Asian-Americans, and percent of people in the 25-49, 50-64, and 65-plus age groups. The educational variables include the percent of people with high school, "Bachelor's, Master's or Professional" degrees, and the presence of a land-grant university to assess the education and accumulated knowledge in the area. The fiscal and other policy variables include county and state property and sales taxes, county and state government spending on highway and safety, county spending on education, state spending on health and hospitals, state personal and corporation income taxes, and presence of a right to work law. All the state tax and spending variables are divided by the respective state personal income, and all the county tax and spending variables are divided by the respective county personal income in order to assess the effective burden of the policies and to assure comparability between the different micropolitan areas. The economic variables include the percent of jobs in farming, agricultural service, forestry and fishing, mining, construction, manufacturing, services, and government, as well as the unemployment rate to control for the business cycle. The urbanization variables are the distance to nearest metropolitan area, the incremental distances to the next metropolitan area with a population of 250 thousand, 500 thousand, and 1.5 million, and population density. The census division variable group includes census divisions 2-9. The variables and data sources are listed in the Appendix.

Heteroscedasticity is often a problem in cross-sectional data. In order to correct for possible heteroscedasticity, all regressions in this study are estimated using the White's adjusted variance in the variance-covariance matrix. Serial correlation can also be a problem in cross-sectional data, although it does not occur frequently and is typically not worrisome (Schmidt, 2005, p. 225). The error terms for all the micropolitan areas in this study are regressed on the census divisions in the population regression in order to determine if the census divisions are able to explain the distribution of the error terms; the results indicate no significant spatial dependency in the error terms. A correlation matrix and variance inflation factors are analyzed to check for any multicollinearity in the data. The correlation matrix shows that almost all the variables have very weak to moderate correlation, while the variance inflation factors indicate no major problems.

4. Regression results

4.1. OLS Results

The estimated population growth regression includes 50 variables and has an R^2 of 0.557, which is very good for a cross-sectional regression. All of the significant variables have the expected signs. Table 2 shows that 22 variables are significant at the five percent level or less. Higher values of the following significant variables induce population growth in micropolitan areas in the 1990s: January temperatures, percent bachelor's degrees, birth rates, percent

[2] The American Housing Survey has more recent five-year estimates of rents and housing prices, but it surveys only 138 housing units a year for counties with populations less than 70,000; this sample size is not sufficient to gain meaningful estimates of representative housing prices and rents.

married households, per capita county highway spending, census divisions 3-8 (East North Central, West North Central, South Atlantic, East South Central, West South Central, and Mountain divisions), and topography (where 1 = flat plains, and higher numbers indicate increasing hills and mountains).[3]

Table 2. Population growth regression significant variables.

Dependent Variable: GrPop90-00			
Independent Variables	Coefficient	t-stat	Robust Std. Err.
Constant	-36.47	-1.15	31.70
TempJan	0.566***	3.97	0.14
TempJuly	-0.648*	-2.55	0.25
Humidity	-0.206*	-2.53	0.08
Topography	0.165*	2.02	0.08
Distance to Next Metro	-0.0266*	-2.37	0.01
Incremental Distance 250k	-0.0172**	-2.61	0.01
D3	9.933**	3.11	3.20
D4	10.58**	2.99	3.54
D5	18.06***	4.68	3.86
D6	10.92**	3.14	3.48
D7	7.958*	2.03	3.92
D8	14.79**	2.91	5.09
PcAgServJobs90	-1.274*	-2.00	0.64
PcMinJobs90	-0.960***	-6.68	0.14
PcMfgJobs90	-0.197*	-2.39	0.08
PcBA90	0.884***	3.62	0.24
Births90	0.721*	2.58	0.28
PcPopHisp90	-0.135*	-2.11	0.06
PCMrdHH90	0.728***	3.32	0.22
ctyspending92onhighway	559.0***	3.78	147.89
ctyspending92onsafety	-521.0*	-2.44	213.86
st92inctaxburden	-218.5**	-2.75	79.51

*Significant Variables - * p<0.05, ** p<0.01, *** p<0.001.*

Higher values of the following variables decrease population growth: July temperatures, humidity, distance to next metropolitan area regardless of size, incremental distance to the next metropolitan area with a population of 250,000 or less, percent of jobs in agricultural service, mining, and manufacturing, percent Hispanic, county spending on safety, and the state income tax burden.

There are 317 micropolitan areas that have a less than average wage of all the 511 micropolitan areas in the study. For these 317 micropolitan areas, the average population growth is 10.8 percent, well above the 7.2 percent growth of the 194 areas that have higher than average wages. Furthermore, these 317 locations tend to have a higher average amenity scale. This indicates that migration to micropolitan areas is related to amenities. This is not surprising, as earlier studies have found natural amenities to be important in non-metropolitan migration in the 1990s (Rappaport, 2003; Deller et al., 2001; McGranahan, 2008).

[3] See USDA Natural Amenity Index: http://www.ers.usda.gov/.

4.2. Growth effects and analysis

The amenity growth effect (λ_φ) is determined by the growth of expenditure on housing minus the growth of wages, given by $\lambda_\phi = \alpha b_{Ph} - b_W$, where α is the share of expenditure that goes toward housing, and b_{Ph} and b_W are regression coefficients from the rent and wage regressions. There have been different values for α used in the literature, but a conservative value of α = 0.23 is used here (Rickman and Rickman, 2011). The model shows that, in the 1990s, micropolitan area amenities are relatively more attractive compared to the rest of the nation ($\lambda_\phi^{511\,micros} = -0.27$ vs. $\lambda_\phi^{US} = -0.40$). The growth effects model indicates that micropolitan areas have benefited from relatively attractive natural amenities that induced in-migration and population growth, which supports the analysis of the previous section.

The equation for the productivity growth effect (λ_A) is a weighted growth of population and wages. It is characterized by the following equation: $(1-\beta-\gamma)b_N + (1-\gamma)b_W$, where β is the share of labor in production, γ is the share of capital, and b_N and b_W are regression coefficients from the population and wage regressions. The model shows that productivity is significantly lower in micropolitan areas than nationwide in the 1990s ($\lambda_\phi^{511\,micros} = 0.29$ vs. $\lambda_\phi^{US} = 0.37$). It is therefore unlikely that the migration to micropolitan areas is motivated by micropolitan productivity and by spatial differences in economic opportunity.

Some studies in the economic literature (Cebula, 1979; McGranahan, 2008) have found that high "housing prices" and rents deter interregional in-migration. Others have found that job-related migration is significantly affected by the state of housing markets; for example, Valetta and Kuang (2010) determine that the state of the housing markets has been an important reason why people are not migrating for jobs.

Furthermore, Glaeser (2007) finds in a study on urban mega-regions that differences in housing supply arising from varied land use regulations are a substantial determinant of regional population growth. This implies that the housing supply growth effect is important in explaining the growth of regions. The housing supply growth effect (λ_L) is defined by the model as equal to $b_N + b_W - \left(\frac{\delta b_{Ph}}{\delta - 1}\right)$, where δ is the elasticity of housing supply. Overall, the model indicates that the housing supply in micropolitan areas is significantly less flexible than the housing supply nationwide in the 1990s, which could have been a major deterrent to regional migration and economic growth ($\lambda_\phi^{511\,micros} = -1.12$ vs. $\lambda_\phi^{US} = -0.75$).

Thus, the state of local housing markets deserves closer attention. In order to gauge the full impact of local housing market conditions on micropolitan area growth, a proxy for housing market conditions is developed here. One way to estimate the relative conditions in regional housing markets is to look at the $\frac{growth\ in\ median\ gross\ rent}{growth\ in\ housing\ supply}$ ratio (referred to as the Rgr/HSgr ratio) during the period. Assume that two cities with similar population, employment, and income growth both experience a ten percent increase in their respective housing supply during a given period. If one city has a much higher Rgr/HSgr ratio than the other, then this implies that the housing supply is more rigid in that city because rents have had to increase more in that city to produce the same ten percent increase in the housing supply. Therefore, the Rgr/HSgr ratio is a measure of the relative flexibility of the local housing supply and local housing market conditions.

Loveridge et al. (2007) state that the economic performance of areas with outlier growth could be caused by factors which are difficult to measure, such as economic policy, local leadership, and organizational structure. It is likely that areas with effective leadership, effective organizational structure, and a pro-growth attitude will have a local regulatory environment that has a positive impact on the housing supply, and vice versa. Therefore, the efficiency and the overall state of local housing markets are likely to be symptoms or reflections of the local regulatory environment. This study argues that the Rgr/HSgr ratio can also be used as a proxy for the local regulatory environment.

5. The role of the housing supply and the regulatory environment

5.1. The 1990-2000 Period

Since housing prices and rents are not reported in the 2010 Census, the performance of housing markets have to be analyzed and classified as either flexible or inflexible during the 1990-2000 period. Micropolitan areas that are found to have flexible housing markets during that period are assumed to have flexible housing markets at the beginning of 2000-2010 period. The study finds that rigid local housing markets and rigid regulatory environments have a significant impact on the overall economic performance of micropolitan statistical areas. As can be seen in Table 3,

micropolitan areas with Rgr/HSgr growth ratios below average (i.e., flexible housing markets) have far better economic performance in the 1990-2000 period. Overall, population increases by an average of 9.2 percent, employment increases by 21.5 percent, and the average wage increases by 39.9 percent in the 511 micropolitan areas during the period. Micropolitan areas with below average Rgr/HSgr ratios (flexible housing supply and good regulatory environments) perform significantly better, especially with regard to population and employment growth. The micropolitan areas with below average Rgr/HSgr ratios have an average population growth of 15.2 percent (compared to 3.9 percent for the micropolitan areas with above average Rgr/HSgr ratios), employment growth of 25.7 percent (compared to 17.7 percent), and average wage growth of 42 percent (compared to 38.1 percent).

Table 3. Economic performance of micropolitan areas in different Rgr/HSGR groups, 1990 to 2000.

Rgr/HSgr Ratio	Average Growth of all Micropolitan Areas	Growth of Areas With Below-Average Rgr/HSGR	Growth of Areas With Above-Average Rgr/HSGR
Rent 1990-2000	54.00%	49.00%	58.40%
Population 1990-2000	9.20%	15.20%	3.90%
Employment 1990-2000	21.50%	25.70%	17.70%
Wages 1990-2000	39.90%	42.00%	38.10%

Interestingly, Table 4 also shows that some of the micropolitan areas with Rgr/HSgr ratios below the average have very high growth in "median gross rent." Moreover, a robust increase in housing supply results in a low Rgr/HSgr ratio, indicating the importance of flexible housing supply and the regulatory environment. For example, micropolitan areas in census division 8, the Mountain division, with below average Rgr/HSgr ratios (only 2.6 on average) have experienced an increase in the average "median gross rent" of 67.2 percent during the 1990s. This is well above the 55.6 percent increase in rent in micropolitan areas with above average ratios (8.4 on average) in the same census division.

Table 4. Census Division growth performance based on Rgr/HSgr.

Performance with Rgr/HSgr Below Average					
Division	Rgr/HSgr	Pop90-00	MGR90-00	Empl90-00	Wage90-00
1	0.6	6.30%	6.40%	11.80%	41.20%
2	2.7	8.30%	29.40%	10.30%	41.50%
3	3.8	14.00%	69.70%	33.70%	43.10%
4	4.1	12.40%	61.60%	33.40%	47.10%
5	2.3	19.80%	56.00%	22.50%	45.00%
6	2.8	16.50%	63.20%	29.30%	41.50%
7	3	11.60%	41.80%	29.90%	38.10%
8	2.6	21.70%	67.20%	37.60%	39.40%
9	2.3	18.40%	45.20%	25.20%	37.80%

Performance with Rgr/HSgr Above Average					
Division	Rgr/HSgr	Pop90-00	MGR90-00	Empl90-00	Wage90-00
2	9.1	0.10%	43.00%	5.60%	35.10%
3	8.2	4.10%	66.70%	19.60%	38.80%
4	8.6	4.00%	60.40%	25.30%	41.50%
5	6.3	3.90%	50.20%	9.40%	38.70%
6	6.5	3.50%	51.10%	18.70%	36.50%
7	7.5	3.40%	40.70%	17.90%	36.10%
8	8.4	4.10%	55.60%	16.00%	34.90%
9	6.8	9.80%	76.50%	17.20%	35.50%

The micropolitan areas in census Division 8 (Mountain division) with below average Rgr/HSgr ratios have significantly more robust economic growth with a population increase of 21.7 percent, employment growth of 37.6 percent, and average wage growth of 39.4 percent. The micropolitan areas in the same census division (Mountain division) which had higher than average Rgr/HSgr ratios have slower economic growth with population increasing only 4.1 percent, employment 16 percent, and wages 34.9 percent. These results illustrate that a flexible housing supply and the regulatory environment are important inter-regionally, and that the reason for local micropolitan growth is not simply due to the overall region doing well.

5.2. The 2000-2010 Period

Looking at the economic performance during the 2000-2007 period (before the December 2007-June 2009 recession), the micropolitan statistical areas with low Rgr/HSgr ratio (flexible housing supply and relatively good regulatory environments) have significantly better economic performance. For these micropolitan areas, Table 5 shows that population increases by 6.8 percent (versus a decline of 0.3 percent in micropolitan areas with relatively inflexible housing supply and rigid regulatory environment), employment increases by 6.7 percent (versus a 0.3 percent decline), and wages increases by 24.7 percent (versus 21.9 percent).

Table 5. Economic performance of micropolitan areas in different Rgr/HSGR groups, 2000 to 2007.

2000-2007	511 Micros	Rgr/HSgr Below Avg.	Rgr/HSgr Above Avg.
Population Growth	3.3%	6.8%	-0.3%
Employment Growth	3.1%	6.7%	-0.3%
Wages Growth	23.3%	24.7%	21.9%

The Great Recession resulted in more than 5.5 million jobs being lost nationwide, a decline in the average household income of $3,250, a loss in aggregate real estate wealth of $3.4 trillion, and a decline in stock wealth of $7.4 trillion.[4] The recession also affected the micropolitan statistical areas as it did the rest of the nation. It is not surprising that micropolitan areas with flexible housing supplies and good regulatory environments have experienced better overall economic performance during the decade (which includes the recession). Table 6 shows that micropolitan areas with flexible housing supply and below average Rgr/HSgr ratio have a population growth of 10.1 percent during the 2000-2010 period (versus 1.3 percent), a decline in employment of 1.9 percent (versus 7.4 percent decline), and a wage growth of 32.2 percent (versus 31.3 percent).

Table 6. Economic Performance of Micropolitan Areas in Different Sectors from 2000 to 2010.

2000-2010	511 Micros	Rgr/HSgr Below Avg.	Rgr/HSgr Above Avg.
Population Growth	5.7%	10.1%	1.3%
Employment Growth	-4.7%	-1.9%	-7.4%

6. Conclusions

Among other things, this study finds that migration during the 1990s was highly amenity-related. However, the major focus of this study is to show the overall impact of the regulatory environment on economic growth. The findings support the conclusion that high rents and the state of local housing markets have important implications for economic growth. The results also show that the economic performance of outlier growth areas may be explained by the presence (or lack) of economic policy efforts and institutional leadership, consistent with Loveridge et al. (2007).

The study examines the linear relationship between rent and population growth and finds that 91 of the 511 micropolitan areas experienced an increase in rent during the 1990s despite a decline in population growth. Moreover, 94 micropolitan areas have had rent decline despite an increase in population growth. This supports the main hypothesis of the study that the regulatory environment has a significant role to play in micropolitan area growth.

[4] PEW report: www.pewtrusts.org/~/media/Assets/2010/04/28/CostoftheCrisisfinal.pdf.

The study concludes that housing supply flexibility and the Rgr/HSgr proxy for the regulatory environment are important factors that explain the economic performance of micropolitan areas. However, a major limitation of the study is that it does not explain why some micropolitan areas experience a relatively high increase in housing prices/rents relative to other micropolitan areas that undergo a similar increase in housing supply during the period. For example, some micropolitan areas could have simply run out of land (although this seems rather unlikely because micropolitan areas tend to be rural in nature). Moreover, factors other than the regulatory environment and population growth could be affecting housing costs, such as differences in the state of housing markets at the beginning of the period and in the quality of housing across micropolitan areas, as well as differences in economic freedom. Therefore, the results of the study *do not* imply that housing supply and regulatory environments (as embedded in the Rgr/HSgr ratio) are the only explanations behind the unexplained economic growth of some micropolitan areas. Further analysis of these issues could be the subject for another study.

The assumption that the state of local housing markets is a symptom of the overall local regulatory environment might not be a true representation for every micropolitan area. However, it is safe to surmise that many micropolitan areas did not achieve their potential economic growth during the period of the study because of difficult regulatory environments.

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Appendix

Variables	Data Source
Rent	USA Counties Program-US Census [5]
Housing Prices	USA Counties Program-US Census
Number Owner Occupied Units	USA Counties Program-US Census
Number of Renter Occupied Units	USA Counties Program-US Census
Private Non-Farm Employment	USA Counties Program-US Census
Private Non-Farm Payroll	USA Counties Program-US Census
Population Density	USA Counties Program-US Census
Census Divisions 2-9	US Census
Births per 1,000 population	USA Counties Program-US Census
Percent African American	USA Counties Program-US Census
Percent Asian American	USA Counties Program-US Census
Percent Hispanic American	USA Counties Program-US Census
Percent of Married Households	USA Counties Program-US Census
Percent of Population in the 25-49 Age Group	USA Counties Program-US Census
Percent of Population in the 50-64 Age Group	USA Counties Program-US Census
Percent of Population in over 65 or Older	USA Counties Program-US Census
Educational Attainment - persons 25 years and over - Bachelor's, Master's, or Professional degree	USA Counties Program-US Census
Educational Attainment - persons 25 years and over - percent high school graduate or higher	USA Counties Program-US Census
Presence of a Land Grant University	Association of Public and Land Grant Universities
Local Per Capita Sales Tax Revenues	USA Counties Program-Econ Census
Local Per Capita Spending on Health Care	USA Counties Program-Econ Census
Local Per Capita Spending on Highway Infrastructure 1992	USA Counties Program-Econ Census
Local Per Capita Spending on Public Education 1992	USA Counties Program-Econ Census
Local Per Capita Spending on Public Safety	USA Counties Program-Econ Census
Local Per Capita Property Tax Revenues	USA Counties Program-Econ Census
Right to Work State	The National Right to Work Legal Defense Foundation
State Per Capita Spending on Highway Infrastructure	USA Counties Program-Econ Census
State Per Capita Spending on Public Safety	USA Counties Program-Econ Census
State Per Capita Corporate Income Tax Revenues	USA Counties Program-Econ Census
State Per Capita Income Tax Revenues	USA Counties Program-Econ Census
State Per Capita Property Tax Revenues	USA Counties Program-Econ Census
State Per Capita Sales Tax Revenues	USA Counties Program-Econ Census
Average Wages	USA Counties Program- US Census
Employment in Ag-Service: Percent of Total Jobs	USA Counties Program- US Census
Employment in Farming: Percent of Total Jobs	USA Counties Program- US Census
Jobs in Construction: Percent of Total Private Non-Farm Jobs	USA Counties Program- US Census
Jobs in Government: Percent of Total Employment	USA Counties Program- US Census
Jobs in Manufacturing: Percent of Total Private Non-Farm Jobs	USA Counties Program- US Census
Jobs in Manufacturing: Percent of Total Private Non-Farm Jobs	USA Counties Program- US Census
Jobs in Mining: Percent of Total Private Non-Farm Jobs	USA Counties Program- US Census
Mean Gross Rent	USA Counties Program- US Census
The Unemployment Rate	USA Counties Program- US Census
Distance to Next Metropolitan area	Partridge et al., 2010

[5] http://censtats.census.gov/usa/usa.shtml.

Incremental Distance to the Next Metropolitan Area with a Population of 1.5 million or less	Partridge et al., 2010
Incremental Distance to the Next Metropolitan Area with a Population of 500,000 or less	Partridge et al., 2010
Incremental Distance to the Next Metropolitan Area with a Population of 250,000 or less	Partridge et al., 2010
Humidity	USDA.GOV[6]
Land Surface Form Typography codes	USDA.GOV
Mean January Temperature	USDA.GOV
Mean July Temperature	USDA.GOV
Water (Sq. Miles)	USDA.GOV

[6] http://www.ers.usda.gov/data-products/natural-amenities-scale.aspx.