

Effects of Microbusinesses on U.S. Regional Economic Growth*

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Introduction

Microbusinesses¹ are playing an increasingly important role in U.S. regional economic development. Policies are shifting from traditional regional development strategies aimed at attracting large firms to initiatives that support the start-up and growth of small-scale enterprises. Microenterprise development is recognized by many community economic development practitioners as a promising economic development strategy, especially in rural communities. Recent studies documenting the economic importance of microenterprises to local economies suggest that they should be included in any comprehensive development plan (Muske and Woods 2004; Muske, *et al.* 2007; Atasoy, *et al.* 2007; Deller and McConnon 2008).

Microenterprises are considered by many in the economic development community to be an important and integral part of the U.S. economy (Muske, *et al.* 2007; Association for Enterprise Opportunity, 2008; Deller and McConnon 2008). According to the Association for Enterprise Opportunity (AEO), there are over 24 million microenterprises operating in the U.S. and microenterprise employment represents 18% of all private (non-farm) employment and 87% of all businesses in the United States. Microbusinesses are embedded in communities throughout the country and range in type from specialty food entrepreneurs to technology-based businesses.

Microenterprises are the smallest of the small businesses and, unlike the U.S. Small Businesses Administration's definition of a small manufacturing business (i.e. one that employs 500 or fewer employees) they typically employ very few workers. The Association for Enterprise Opportunity defines a microenterprise as a business with five or fewer employees, requiring \$35,000 or less in start-up capital, and does not have access to the traditional commercial bank financing. Deller and McConnon (2008), define microenterprises as having between one and four employees². Muske and Woods (2004) and Muske, *et al.* (2007) consider firms that employ fewer than 10 people as microbusinesses. For purposes of this study, a microenterprise is defined as a business employing between one and four employees.

¹ The words microbusiness and microenterprise are used interchangeably in this paper.

² This definition does not include sole proprietorships without employees.

There are a number of studies that have examined the importance of small-scale businesses to economic development. Small business advocates argue that smaller firms are more flexible than larger firms and are able to adapt more rapidly to a changing environment. Acs and Audretsch (1990 and 1993) maintain that in the manufacturing sector, the development of small-scale, flexible production technologies has enabled small firms to flourish. As many point out, including Edmiston (2007) and Robbins *et al.* (2000), smaller businesses are known to be more efficient at innovation. This means they produce more innovations for a given amount of research and development (R&D) than larger firms. Furthermore, the constant innovation and experimentation of small businesses lead to numerous business start-ups and stops, which is essential to the efficient allocation of limited resources (Robbins *et al.* 2000). This process of renewing business stock is referred to as ‘churning’ and is at the heart of the advocates’ arguments as to why small businesses are vital to state and national welfare (Headd, 1998).

Proponents of small-scale business development also cite their contribution to local and regional employment growth. With their ability to employ workers from the secondary labor market (i.e. lower education levels, women, immigrants, etc.), small businesses may represent a poverty alleviation strategy (Robbins *et al.*, 2000). In addition, by employing secondary labor force participants, smaller firms also provide experience and on-the-job training to a broader segment of the population, thereby making more individuals employable to other firms (Shaffer, 2006).

Another benefit of small businesses, suggested by Robbins *et al.* (2000), is the role they play in providing insulation against the effects of recession. They point out that when a recession occurs and large firm’s lay-off employees, a significant number of displaced employees either start their own small businesses or are absorbed into employment by the small business sector. Goetz (2002) states that the increases in self-employment in rural areas could be a response to job losses due to globalization and labor saving technological changes in the 1980s. Atasoy *et al.* (2007) found that microbusinesses have a positive and substantial economic impact on communities throughout New England.

Opinions have been mixed regarding the ability of small businesses to stimulate economic growth. Davis *et al.* (1996) in their book *Job Creation and Destruction*, claim that in the U.S. manufacturing sector gross job destruction rates decline sharply with firm

and plant size. Edmiston (2007) maintains that larger firms offer higher quality jobs than smaller-scale firms in terms of wages, benefits and stability. Larger firms can also benefit from economies of scale and have the ability to finance R&D and bring their innovations to market. On the other hand, Deller and McConnon (2008), in a panel study of U.S. states, found that a higher percentage of firms classified as microenterprises were associated with higher levels of economic growth in two out of three metrics used to measure economic growth.

Thus, it is clear that the contribution of small businesses, particularly microenterprises, to economic growth has not been fully explored in the literature. This paper is a step in filling that gap by examining the influence of microbusinesses, defined as firms employing between one and four employees³, on county-level economic growth from 1990 to 2000. We propose a unique application of the well-known Carlino-Mills county growth framework to investigate the relationship among population growth, employment growth and microbusinesses.

Conceptual Model

The Carlino-Mills model of simultaneous equations for employment and population addresses the notion of “people follow jobs” or “jobs follow people,” assuming that profit-maximizing firms and utility-maximizing households, are geographically mobile. Competitive firms maximize their profits by minimizing their production costs; however, many factors can affect the variation of these costs among different geographic locations. The availability of qualified labor, wage rates, local taxes and transportation are examples of production costs that may vary regionally. Households maximize their utility with the consumption of goods and services, desirable work locations, or other non-market amenities, such as the proximity to water or the abundance of recreation opportunities. In the Carlino-Mills framework, firms are assumed to enter and leave regions until profits are equalized at alternative locations and households are expected to migrate until their utility levels are equalized across regions. The original Carlino-Mills model is specified according to the following system of simultaneous equations:

³ This definition does not include sole proprietorships without employees.

$$E_t^* = \alpha_0 P_t + \alpha_1 S_t$$

$$P_t^* = \beta_0 E_t + \beta_1 Z_t$$
[1]

Where the two endogenous variables E_t^* and P_t^* are employment and population equilibrium level at time t . They are determined simultaneously according to P_t and E_t , the population and employment level at time t , along with S and Z , which represent sets of additional exogenous variables that affect production costs and utility maximization across geographic locations. Furthermore, employment and population are not likely to reach their equilibrium level concurrently but rather adjust to the equilibrium level with a temporal lag respective to one another:

$$E_t = E_{t-1} + \lambda_E (E_t^* - E_{t-1})$$

$$P_t = P_{t-1} + \lambda_P (P_t^* - P_{t-1})$$
[2]

Where λ_E and λ_P are the speed of coefficient adjustments ($0 \leq \lambda_E, \lambda_P \leq 1$) and $t-1$ indicates that the variables are lagged by one period. Equation system [2] is then substituted into [1] and, after rearrangement of terms, the following structural equations are obtained:

$$E_t = \lambda_E \alpha_0 P_t + \lambda_E \alpha_1 S_t + (1 - \lambda_E) E_{t-1}$$

$$P_t = \lambda_P \beta_0 E_t + \lambda_P \beta_1 Z_t + (1 - \lambda_P) P_{t-1}$$
[3]

The system [3] represents simultaneous equations where each endogenous variable (employment and population) depends on the other endogenous variable, a set of exogenous variables, and on its own lagged value.

Empirical Model

As previously mentioned, this paper intends to analyze the impact of microenterprises on county-level employment and population growth during the 1990's.

For this purpose, the original Carlino-Mills model described in [3] is expanded to include three business size variables:

$$\begin{aligned} \text{Emp}_{i,90-00} &= \alpha_0 + \alpha_1 \text{Pop}_{i,90-00} + \alpha_2 \text{microenterprise}_{i,90} + \alpha_3 \text{very small business}_{i,90} + \alpha_4 \text{large} \\ &\quad \text{business}_{i,90} + \sum_j \alpha_j \text{S}_{i,90} + \varepsilon_{i,90-00} \\ \text{Pop}_{i,90-00} &= \beta_0 + \beta_1 \text{Emp}_{i,90-00} + \beta_2 \text{microenterprise}_{i,90} + \beta_3 \text{very small business}_{i,90} + \beta_4 \text{large} \\ &\quad \text{business}_{i,90} + \sum_j \beta_j \text{Z}_{i,90} + \mu_{i,90-00} \end{aligned} \quad [4]$$

Where $\text{Emp}_{i,90-00}$ and $\text{Pop}_{i,90-00}$ are the growth rates of employment and population in county i between 1990 and 2000 respectively. S and Z are sets of additional exogenous variables that affect production costs and utility maximization and $\varepsilon_{i,90-00}$ and $\mu_{i,90-00}$ are assumed to be spherical disturbances with zero means. The microenterprise variable represents the percent of establishments that employ between 1 and 4 employees. Very small business and large business variables correspond to the percent of establishments that employ 5 to 19 and 250 or more workers, respectively. All explanatory variables are measured for county i in year 1990. Although the focus of this study is on the effects of microenterprises on economic growth, the very small and large businesses variables are included to provide a comparison among different business sizes. The variable definitions, statistics and data sources are listed in Table A.1.

The expanded Carlino-Mills framework, described in [4], captures the simultaneous nature of employment and population growth. Positive employment growth increases the number of available jobs and attracts migrants to a county. At the same time, positive net migration increases the number of people in a county, which positively affects employment by increasing demand for goods and services and producing a larger workforce (Lewis, 2001). In addition, this model aims to clarify the relationship between microenterprises, employment, and population growth.

Microenterprises are expected to positively contribute to employment growth as innovative entrepreneurs grow their businesses. They will also utilize the secondary labor market, which provides jobs to people whom otherwise would likely be unemployed. Also by acting as a safety net against economic downturns and recessions, they likely

contribute to decreased levels of unemployment. The impact of microenterprises on population growth is not as straightforward. Individuals probably do not consider the local availability of microbusinesses when making their migration decisions. Nevertheless, microenterprises could provide more employment opportunities, reducing the likelihood that people will leave their native regions to find work. Consequently, the presence of microenterprises could reduce the impact of population out-migration experienced by some U.S. regions.

Data

The sample used in this study consists of 2405 counties in the contiguous U.S. As previously stated, the endogenous variables are county-level employment and population growth between 1990 and 2000. Each endogenous variable also depends on the other endogenous variable, its own lagged value and a set of exogenous variables. The exogenous variables are divided into five categories; business size, amenities, business factors, local factors and geographic factors. The variable definitions, statistics and data sources are listed in Table A.1.

Business Size

These are the three main variables of interest in this paper. The microenterprise variable is defined as the percentage of establishments that employ between 1 to 4 workers. The very small business variable is calculated as the percentage of establishments with 5 to 19 employees. The large business variable is the percentage of establishments that have 250 or more employees.

Amenities

The amenities variables are assumed to influence households' migration decisions. However, they are not expected to impact the firms' location decisions. Therefore these variables are only included in the population growth equation. The explanatory variables in this category measure the attractiveness of a county to its residents and potential in-migrants. As Deller *et al.* (2001) point out, amenities and quality of life are significant factors in household migration decisions. Hence, we included two climate variables,

January temperature and July humidity, assuming that warmer winters are preferred over colder winters and that a lower humidity rate in July is preferable. Moreover, since living close to the water is generally considered an amenity for most people, we included a coastal effect dummy variable in the model. Furthermore, locations with varied topography seem to be more desirable places to live. Thus, the model includes 4 dummy variables, accounting for differences in landscape across U.S regions. According to Glaeser *et al.* (2001), the presence of a rich variety of services and consumer goods such as restaurants, theaters, and an attractive mix of social patterns, is becoming a critical factor in determining the attractiveness of an area. Hence, a restaurants per capita variable and a recreation establishment's per capita variable were added to the model to account for these types of amenities. Finally, as a measure of a "disamenity", a crime rate variable was also included in the model.

Business Factors

The business factor variables were only included in the employment equation since they are not expected to have a major impact on household migration decisions. The supply of labor is an important factor for firms since they are looking for qualified workers at the lowest possible costs. Hence, the percentage of the population with a college degree is included as a measure of the availability of skilled labor. The total annual payroll divided by the number of workers is a variable put in the model to represent the cost of labor.

Some businesses may want to locate close to others in similar industries and be part of an industry cluster. Other firms' strategies may be to locate close to their market to minimize transportation costs or close to their suppliers for increased availability of inputs. Thus, four variables that describe the industrial structure of a region were integrated into the model to account for the mix of business types.

Local and Geographic Factors

Two additional sets of explanatory variables were included to account for other factors used in past studies to explain employment growth and household migration decisions. The local factors include variables such as proximity to highways and airports,

and median housing values. A suburban and a rural dummy variable were included in the model to account for the differences between metropolitan and non-metropolitan regions⁴. In addition, eight dummy variables representing the U.S. Census regions were included in the growth model.⁵

Results

Equation system [4] was estimated for 2405 U.S. counties using a two-stage least squares regression model. The results for county-level employment and population growth during the 1990's are listed in Table A.2. The model fits the data very well, explaining 74% and 82% of the variation in employment and population growth, respectively. The results demonstrate that the three business size variables had a significant impact on employment growth during that time period. However, there are differences in the sign and the magnitude of this impact. Our estimates suggest that a one percentage point increase in the proportion of establishments employing between one and four employees raises employment growth by 0.304 percentage points. Very small businesses (i.e., 5 to 19 employees) were also positively linked with employment growth although their contribution was smaller (i.e., 0.181) than the growth level associated with microenterprises. On the other hand, a relative abundance of large businesses (i.e., 250 or more employees) was found to be negatively related to the growth rate of employment. According to our results, a one percentage point increase in the concentration of large businesses reduced employment growth by 2.716 percentage points.

All the business size-variables significantly influenced population growth in the 1990's at a 1% significance level. But, the signs for the three coefficient estimates for population growth are the opposite of the signs for the same coefficient estimates describing employment growth. The presence of microenterprises did not contribute to population growth between 1990 and 2000. Rather, a one percentage point increase in the proportion of microenterprises decreased population growth by 0.16 percentage points. This finding supports the idea that a high concentration of microenterprises does not influence individuals' migration decisions. The same is also true for very small

⁴ The urban counties category was the omitted category in the model.

⁵ The South Atlantic (Census Division 5) region was the omitted region in the model.

businesses, which are associated with a larger decline in population growth. On the other hand, large businesses were found to be strongly and positively linked to population growth. However, large businesses tend to be concentrated in high amenity areas which, for many, are very desirable locations to live and work. In this case, the high concentration of local amenities could be driving population growth rather than the actual availability of large businesses.

Other results indicate that climate and natural amenities influence population growth. In particular, counties with warm winter, low summer humidity and varied topography seem to be more desirable places to live and consequently they are found to experience a higher level of population growth. Focusing on employment, we find that educational attainment is a key factor supporting regional economic vitality, while taxes per capita and a county's distance to the nearest airport had a negative effect on employment growth during the 1990's.

Conclusions

Our results demonstrated that microenterprises had a positive and significant impact on county-level employment growth in the U.S. during the 1990's. Policies aimed at developing the microbusiness sector will likely stimulate job creation and employment growth.

The results of our study also indicate that higher concentrations of microenterprises are associated with lower county-level population growth rates. Nevertheless, since population and employment growth are interdependent, well formulated policies should also focus on attracting migrants into a region. The availability of a highly educated labor force was also found to be an important factor in employment growth. Thus, it would be appropriate for community development practitioners to focus their efforts on attracting and retaining highly skilled labor in their regions.

REFERENCES

- Acs, Z. J. and Audretsch, D. B. (1993). "Small Firms and Entrepreneurship", Kluwer Academic Publishers, Boston, MA.
- Acs, Z. J. and Audretsch, D. B. (1990). "The Economics of Small Firm: A European Challenge", Kluwer Academic Publishers, Boston, MA.
- Association for Enterprise Opportunity (2008). www.microenterprises.org. Accessed: 2008.
- Atasoy, S., McConnon Jr., J. C. and Gabe, T. (2007). "The Economic Impact and Importance of Microbusinesses to the New England Economy", Resource Economics and Policy Department Staff Paper No. 560, The University of Maine, Orono, Maine, p. 25.
- Aquilina, M., Klump, R. And Pietrobelli, C. (2006) "Factor Substitution, Average Firm Size and Economic Growth", *Small Business Economics*, **26**, 203-214.
- Beck, T., Demirgüç-Kunt, A. and Levine, R. (2003). "Small and Medium Enterprises, Growth and Poverty: Cross-country Evidence", *World Bank Policy Research Working Paper* No. 3178, December.
- Carlino, G. A. and Mills, E. S. (1987). "The Determinants of County Growth", *Journal of Regional Science*, **27**, 39-54.
- Davis, S. J., Haltiwanger, J. C. and Schuh, S. (1996). "Job Creation and Destruction", MIT Press, Cambridge, MA.
- Deller, S. C. and McConnon Jr., J. C. (2008). "Microenterprises and Economic Growth: a Panel Study 1977-1997", *Applied Economics Letters* (forthcoming).
- Deller, S. C., Tsai, S.T.H., Marcouiller, D. and English, D.B.K. (2001). "The Role of Amenities and Quality of Life in Rural Economic Growth", *American Journal of Agricultural Economics*. **83**, 352-65.
- Edmiston, D. K. (2007). "The Role of Small and Large Businesses in Economic Development", Federal Reserve Bank of Kansas City, *Economic Review*, second quarter, <http://kansascityfed.com/Publicat/econrev/PDF/2q07edmi.pdf>. Accessed February 11, 2008.
- Glaeser, E. L., Kolko, J. and Saiz, A. (2001). "Consumer City", *Journal of Economic Geography*, **1**, 27-50.
- Goetz, S. J. (2002). "Proprietor Employment Dependent Counties", The Northeast Regional Center for Rural Development, Rural Development paper, RDP-17.

- Headd, B. (1998). "Small Business Growth by Major Industry, 1988-1995". U.S. Small Business Administration, Washington, DC, Office of Advocacy. Available at http://www.sba.gov/ADVO/stats/ind88_95.txt. Last accessed July 5.
- Lewis, D.J. (2001). "Public Conservation Land and Economic Growth in the Northern Forest Region", University of Maine, Orono, Maine.
- Muske, G. and Woods, M. (2004). "Micro Businesses as an Economic Development Tool: What They Bring and What They Need", *Journal of the Community Development Society*, **35**, 97-116.
- Muske, G., Woods, M., Swinney, J. and Chia-Ling, K. (2007). "Small Businesses and the Community: Their Role and Importance within a States' Economy". *Journal of Extension*, **45**. Available at <http://www.joe.org/joe/2007february/rb4.shtml>. Last accessed February 10, 2008.
- Robbins, D. K., Pantuosco, L. J., Parker, D. F. and Fuller, B. K. (2000). "An Empirical Assessment of the Contribution of Small Business Employment to U.S. State Economic Performance", *Small Business Economics*, **15**, 293-302.
- Shaffer, S. (2006). "Establishment Size and Local Employment Growth", *Small Business Economics*, **26**, 439-454.

APPENDIX

Table A.1. Variable Descriptions, Statistics and Data Sources.

Variable Name	Definition and Data Sources*	Mean (std)
Population growth in % (90-00)	$[(\text{Population 2000} - \text{population 1990}) / \text{Population 1990}] \times 100$. (1)	12.440 (15.77)
Employment growth in % (90-00)	$[(\text{Employment 2000} - \text{employment 1990}) / \text{Employment 1990}] \times 100$. (1)	16.021 (16.52)
Population 90	Population 1990. (1)	98,674 (295,284)
Employment 90	Civilian labor force employed 1990. (1)	46,055 (141,497)
<u>BUSINESS SIZE</u>		
Percent microenterprise	$[\text{Number of establishments with 1 to 4 employees}] / \text{Total number of establishments}] \times 100$, 1990. (2)	58.133 (5.60)
Percent very small business	$[\text{Number of establishments with 5 to 19 employees}] / \text{Total number of establishments}] \times 100$, 1990. (2)	31.416 (3.42)
Percent large business	$[\text{Number of establishments with 250 or more employees}] / \text{Total number of establishments}] \times 100$, 1990. (2)	0.487 (0.39)
<u>AMENITIES</u>		
January temperature	Mean temperature for January, 1941-70. (Fahrenheit degrees) (3)	32.822 (11.99)
July humidity	Mean relative humidity July, 1941-70. (3)	56.782 (14.30)
Coast	= 1 if county has an access to the coast, otherwise 0. (4)	0.102 (Na)
Plains	= 1 if the topography is flat, smooth irregular or slight relief plains (McGrannahan topography codes 1 to 4) otherwise 0. (3)	0.483 (Na)
Tablelands	= 1 if the topography is tablelands with moderate, considerable, high or very high relief (McGrannahan topography codes 5 to 8) otherwise 0. (3)	0.065 (Na)
Plains with hills or mountains	= 1 if the topography is plains with hills, high hills, low mountains or high mountains (McGrannahan topography codes 9 to 12) otherwise 0. (3)	0.072 (Na)
Open hills and mountains	= 1 if the topography is open with low hills, hills, high hills, low mountains or high mountains (McGrannahan topography code 13 to 17) otherwise 0. (3)	0.239 (Na)
Crime per 100,000 habitants	Serious crimes per 100,000 population, 1991. (1)	3,394 (2,307)
Restaurants per capita	Number of "eating and drinking" establishments (SIC 58--) per 1,000 county residents, 1990. (2)	1.610 (0.75)
Recreation establishments per capita	Number of "amusement and recreation services" establishments (SIC 79--) per county 1,000 residents, 1990. (2)	0.318 (0.26)
<u>BUISNESS FACTORS</u>		
Higher education	Percent of county population, 25 years and over, with bachelor's degree or higher, 1990. (1)	14.230 (6.76)
Cost of labor	Total annual payroll (\$1,000) divided by total number of employees (mid-march) 1990. (2)	17.178 (3.72)
Percent agricultural establishments	$[\text{Number of "agricultural services" establishments (SIC 07--)}] / \text{Total number of establishments}] \times 100$, 1990. (2)	1.555 (0.86)
Percent manufacturing establishments	$[\text{Number of "manufacturing" establishments (SIC 20--)}] / \text{Total number of establishments}] \times 100$, 1990. (2)	6.454 (3.21)
Percent business services establishments	$[\text{Number of "business services" establishments (SIC 7300)}] / \text{Total number of establishments}] \times 100$, 1990. (2)	2.532 (1.47)
Percent hospitality establishments	$[\text{Number of "hotel and other lodging places" and "eating and drinking places" establishments (SIC 7000 and 5800)}] / \text{Total number of establishments}] \times 100$, 1990. (2)	8.104 (2.63)

Table A.1. Continued

Variable Name	Definition and Data Sources*	Mean (std)
LOCAL FACTORS		
Median household income	Median Household money income, 1989. (1)	24,873 (6,478)
Percent black population	[Population by race, black / Total population] x 100, 1990. (1)	8.358 (13.41)
Median housing value	Owner-occupied housing units, median value, 1990. (1)	58,226 (34,906)
Tax per capita	Taxes per capita from local government finances, general revenue. In Dollars, 1986-1987. (1)	483.504 (294.39)
Highway	= 1 if there is at least one interstate highway in the county, otherwise 0. (5)	0.439 (Na)
Distance to nearest airport	Distance in kilometers from the center of the county to the closet airport. (Airport with enplanements > 100,000) (5)	86.875 (53.91)
GEOGRAPHIC LOCATION FACTORS		
Suburban	=1 if non metropolitan counties adjacent to a metro area (McGrannahan 1993 urban influence codes 3 to 6) otherwise 0. (3)	0.395 (Na)
Rural	=1 if non metropolitan counties not adjacent to a metro area (McGrannahan 1993 urban influence codes 7 to 9) otherwise 0. (3)	0.337 (Na)
New England	=1 if U.S. Census Bureau Division 1, otherwise 0. (6)	0.022 (Na)
Middle Atlantic	=1 if U.S. Census Bureau Division 2 otherwise 0. (6)	0.048 (Na)
East North Central	=1 if U.S. Census Bureau Division 3, otherwise 0. (6)	0.140 (Na)
West North Central	=1 if U.S. Census Bureau Division 4, otherwise 0. (6)	0.200 (Na)
East South Central	=1 if U.S. Census Bureau Division 6, otherwise 0. (6)	0.117 (Na)
West South Central	=1 if U.S. Census Bureau Division 7, otherwise 0. (6)	0.151 (Na)
Mountain	=1 if U.S. Census Bureau Division 8, otherwise 0. (6)	0.090 (Na)
Pacific	=1 if U.S. Census Bureau Division 9, otherwise 0. (6)	0.042 (Na)

* All variables are measured at the county level.

(1) U.S. Bureau of Census, County and City Data Book 1994.

(2) U.S. Bureau of Census, County Business Pattern 1990.

(3) David McGrannahan. Natural Amenities scale for U.S. counties. USDA 1999.

(4) The National Outdoor Recreation Supply Information System (NORSIS) USDA 1997

(5) U.S. National Transportation Atlas.

(6) U.S. Bureau of Census.

Table A.2. Estimation Results for the Population and Employment Growth Model

	2 SLS	
	Population	Employment
Intercept	5.766 (0.97)	-19.419*** (-2.67)
Population growth (90-00)	Na	0.833*** (36.20)
Employment growth (90-00)	0.898*** (36.57)	Na
Population 90	1.198E-6*** (2.67)	Na
Employment 90	Na	-6.760E-6*** (-6.35)
<u>BUSINESS SIZE</u>		
Percent of microenterprise	-0.160*** (-2.84)	0.304 *** (4.26)
Percent of very small business	-0.291*** (-3.75)	0.181 * (1.87)
Percent of large business	1.487*** (4.19)	-2.716 *** (-6.27)
<u>AMENITIES</u>		
January temperature	0.197*** (11.44)	Na
July humidity	-0.0917*** (-5.67)	Na
Coast	-2.042*** (-4.66)	Na
Plains	1.395*** (3.46)	Na
Tablelands	1.381** (2.41)	Na
Plains with hills or mountains	2.982*** (5.98)	Na
Open hills and mountains	0.946** (2.43)	Na
Crime	6.800E-5 (1.04)	Na
Restaurants per capita	0.250 (1.07)	Na
Recreation establishments per capita	0.106 (0.17)	Na
<u>BUSINESS FACTORS</u>		
Higher education	Na	0.079*** (2.77)
Cost of labor	Na	-0.033 (-0.67)
Percent agricultural establishments	Na	-0.608*** (-3.68)
Percent manufacturing establishments	Na	0.083* (1.71)
Percent business services establishments	Na	-0.071 (-0.44)
Percent hospitality establishments	Na	0.447*** (7.42)
<u>LOCAL FACTORS</u>		
Median household income	4.050E-4*** (10.93)	Na
Black population	0.061*** (4.68)	Na

Table A.2. Continued

	2 SLS	
	Population	Employment
Median housing value	4.290E-6 (-0.73)	Na
Tax per capita	1.120E-4 (0.21)	-0.003*** (-6.36)
Highway	-0.385 (-1.59)	0.261 (0.90)
Distance to nearest airport	Na	-0.019 *** (-5.98)
<u>GEOGRAPHIC LOCATION FACTORS</u>		
Suburban	0.539* (1.68)	-0.417 (-1.09)
Rural	1.434** (3.24)	-1.119** (-2.13)
New England	-2.509*** (-2.94)	1.463 (1.58)
Middle Atlantic	-1.540** (-2.28)	-1.078 (-1.48)
East North Central	-6.020*** (-12.48)	5.626*** (11.32)
West North Central	-5.230*** (-9.94)	6.076*** (12.24)
East South Central	-3.041*** (-6.94)	2.871*** (5.80)
West South Central	-5.784*** (-11.51)	3.756*** (8.03)
Mountain	-5.301*** (-6.19)	6.860*** (10.99)
Pacific	-2.501*** (-3.19)	0.912 (1.34)
<i>F statistic</i>	360.7***	278.6***
<i>R-squared</i>	0.82	0.74

*** Significant at 0.01; ** Significant at 0.05; * Significant at 0.10.