A New Micro View of the U.S. Rural Economy

By Mark Henry and Mark Drabenstott

Rural areas are thought to have two salient features, remoteness and small scale, that tend to inhibit economic growth. These features have explained at least partially why economic growth in the nation's rural areas has generally trailed that in metropolitan areas. However, the rural economic turnaround in the 1990s, while not uniform, suggests that some rural communities may have found ways of overcoming their remoteness and small scale. Put simply, some rural areas appear to have an advantage over others in terms of economic growth rates.

How have rural economies been performing and why have some been able to perform better than others? Accurate answers to these questions are hard to come by. Typically, the performance of the nation's rural counties is compared with the performance of metropolitan counties, and then a summary comparison is drawn. But such an aggregate approach has drawbacks. One conceptual weakness is that rural places usually compete for economic activity with the metropolitan area at the center of their economic sphere, not with all metropolitan areas. In short, the usual "macro" view of the rural economy may overlook critical "micro" information and linkages.

This article uses a new *micro-region* approach to measure and explain rural economic performance. In the first section, rural economic performance is measured by assessing rural performance within a framework of multicounty economic regions. Recently defined by the Commerce Department based on commuting and economic patterns, each of these micro-regions has a metropolitan center and a surrounding area. Analysis of the economic regions reveals that rural counties in a surprising number of micro-regions throughout the nation are adding jobs at a faster rate than their neighboring metropolitan area. Further analysis shows that many of the jobs pay low wages. In the second section, factors are considered that appear to explain why some rural places have been enjoying solid job growth. Analysis suggests that a critical mass of similar firms has been a major factor in rapid job growth, although a spillover of economic activity from urban areas has also helped many rural areas. The concluding section considers the implications of these micro-level findings for public and private decisionmakers.

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A MICRO-REGION FRAMEWORK

Traditionally, economists have assessed the performance of the rural economy by measuring economic growth in all of the nation's nonmetropolitan, or rural, counties and then comparing that growth with all of the nation's metropolitan, or urban, counties. Put another way, this approach assumes an economic contest between the nation's 2,376 rural counties on one side and its 692 metropolitan counties on the other. Comparing employment growth rates for these two groups of counties, therefore, provides one measure of how well the rural economy has been doing. Chart 1 demonstrates this approach, suggesting that the rural economy in the 1990s has rebounded somewhat from weakness in the 1980s. In fact, by this aggregate approach rural areas pulled ahead of metropolitan areas from 1990 through 1993. This is not altogether surprising given that the 1990-91 recession hit metropolitan areas much harder than rural areas.

The aggregate approach, however, does not provide a complete picture of rural economic performance. By relying on an average for all rural counties, the approach masks the underlying pattern of rural strength and weakness. More fundamentally, the aggregate approach ignores the geography of economic activity in rural places. In other words, economic growth is a local phenomenon, and thus most rural places see themselves as part of an economic sphere defined by the metropolitan area at the center of their sphere. One question facing rural communities, then, is how well are they able to compete for economic activity with the nearby urban center?

To answer that question it is useful to compare rural and metropolitan economic performance within the same local economic region. The Department of Commerce recently released an economic map that divides the nation into 348 multicounty areas. These areas have strong internal linkages in terms of labor force commuting, finance, trade, and services that serve to distinguish them as independent economic spheres of activity (Johnson).[1] The Commerce Department defines these multicounty areas as "component economic areas," or CEAs.

The 348 CEAs form an excellent basis for analyzing the rural economy because each one has a central node and a surrounding area. There are a few difficulties, however. To examine how well the rural economy has been doing, it would be most useful for each economic area to have a metropolitan center and a surrounding rural hinterland. In practice, some parts of the United States are almost entirely urbanized, while others are almost entirely rural. For instance, 59 of the Commerce Department economic areas are in places such as the Washington-Boston corridor that lack rural counties. In addition, there are 47 economic areas in places like the Great Plains that lack an urban center. For the purposes of this article, therefore, both groups have been excluded. The remaining 242 economic areas are shown in Figure 1.

How well have rural counties been competing with their nearby metropolitan center? To answer this question, employment growth for the rural counties in each of the 242 CEAs was compared with employment growth in the metropolitan center of that same economic area. The comparison was drawn for various employment categories: total employment, total nonagricultural employment, and employment in separate industries. The comparison was made over the period from 1981 to 1993, the last year for which county-level data were available. The goal of the comparison was to reveal those economic areas where employment grew at faster rates in the rural counties than in the neighboring metropolitan center. Put another way, this analysis identifies those CEAs in which rural counties garnered a larger share of the area's total employment.

Chart 1

EMPLOYMENT GROWTH
United States

Average annual percent change
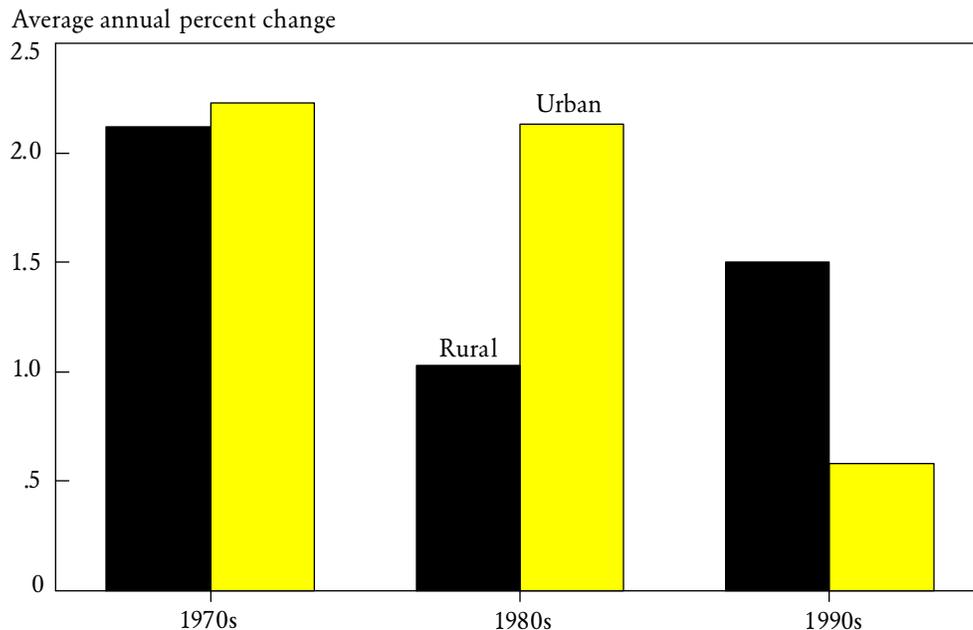
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

When performance is measured this way, rural areas in many parts of the nation appear to have been doing surprisingly well. In particular, in 72 economic areas (or 30 percent of the total number of CEAs in the sample) rural rates of growth in *total employment* were faster than in the neighboring metropolitan center. That is, the rural share of total employment increased over the period (Table 1). The number of micro-regions where rural areas won a bigger share of jobs is even higher when farming employment is excluded. From 1981 to 1993, the number of farm jobs fell by a substantial 686,000, dragging down the employment performance of rural areas. When that loss is set aside, rural growth rates in *total nonfarm employment* exceeded urban growth rates

in 88 economic areas (or 36 percent of the areas in the sample). These 88 CEAs were very important as growth centers in the rural economy. Together, they accounted for 30 percent of the 3.0 million nonagricultural jobs created in rural America from 1981 to 1993.

Geographically, the economic areas where rural counties enlarged their share of total nonfarm employment were scattered throughout the nation (Figure 2). One prominent cluster of strong rural performance was along the manufacturing belt stretching from the Great Lakes into New England, pointing to a migration of industrial activity to rural communities. Another cluster stretched from Texas to Florida, in part reflecting

Table 1

RURAL VS. METROPOLITAN EMPLOYMENT GROWTH IN COMPONENT
ECONOMIC AREAS, 1981-93

| Industry	Number of CEAs with employment in category	Number of CEAs where rural growth exceeded metro growth	Number of CEAs where metro growth exceeded rural growth
Agricultural services, forestry, and fishing	239	104	135
Mining	230	91	139
Construction	242	109	133
Manufacturing	242	155	87
Transportation, communication, and public utilities	242	110	132
Trade	241	95	146
Finance, insurance, and real estate	242	64	178
Services	242	59	183
Government	242	117	125
Total nonfarm	242	88	154
Farming	239	123	116
Total	242	72	170

Source: Author's calculations based on data from the Bureau of Economic Analysis, Regional Economic
Information System.

the spread of tourist-based and retirement-based employment from the coastal urban centers to nearby rural communities. The Rocky Mountains contained several regions with rural winners, underscoring the presence of scenic amenities that have attracted both tourists and newly located businesses. Relatively few economic areas with winning rural counties were found in the nation's Heartland. Much of the rural Heartland depends heavily on agriculture, and that industry was weak throughout much of the 1980s. Thus, in areas where agriculture is important, the economic growth edge probably shifted to metropolitan centers.[2]

Looking at performance across individual sectors of the economy, rural areas did especially well in attracting manufacturing jobs. In nearly two-thirds of the economic areas, rural counties had faster growth than urban centers in manufacturing employment, the only sector in which rural counties gained employment share in a majority of areas (Table 1). The strong performance by rural areas suggests that the nation's

Figure 1

COMPONENT ECONOMIC AREAS (CEAs)
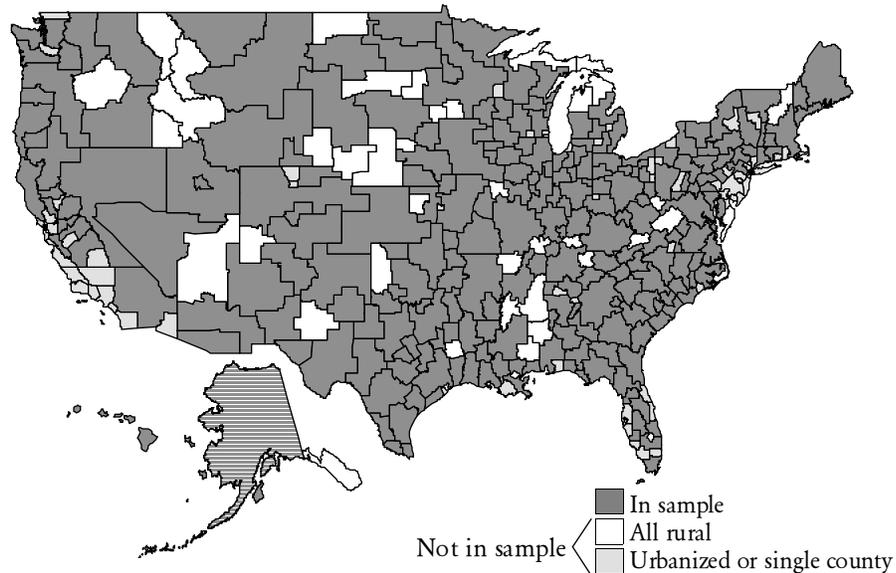
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

manufacturing base became more rural during the period. This migration of manufacturing activity was especially strong in the Great Lakes, mid-South, and Great Plains (Figure 3).

Rural counties did relatively well in several other sectors but displayed a dramatic weakness in services. Rural job growth compared quite well with urban centers in construction, government, transportation and utilities, and natural resource-based industries related to agriculture, forestry, and mining. However, rural areas trailed distantly in adding service jobs, the sector that added the most jobs in the U.S. economy during the period. Rural counties had faster growth in service employment than their neighboring metropolitan hub in only a quarter of the CEAs in the sample.

Employment growth is just one measure of rural economic performance. For a fuller picture of how well the rural economy has been doing, it is useful to take other indicators into account. Income data would be a useful addition to the CEA analysis, but such data are not available on a consistent basis for the 242 micro-regions in this study. Another way to evaluate the quality of the employment trends discussed above is to examine pay levels in industries where rural counties were gaining and losing jobs. Table 2 compares the 15 industries in which rural areas gained the most jobs with the 15 industries where rural areas lost the most jobs. Average wage levels for these two-digit industries are shown relative to the national average for all industries in 1992.

Figure 2

RELATIVE GROWTH IN NONAGRICULTURAL EMPLOYMENT, 1981-93

☐ Not in sample
■ CEAs where rural growth
   exceeded metropolitan growth
☐ CEAs where metropolitan growth
   exceeded rural growth
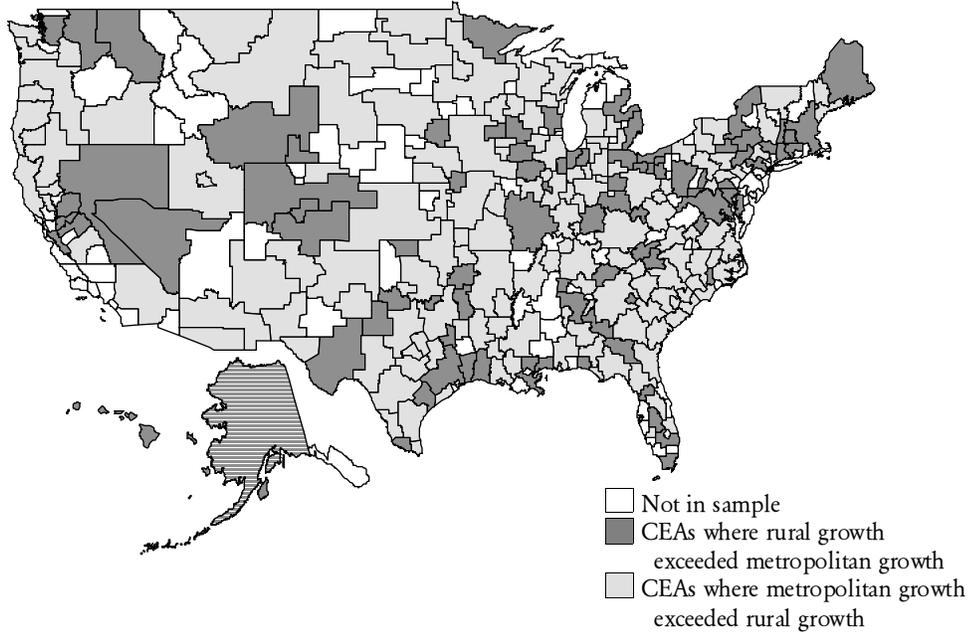
Figure 3

RELATIVE GROWTH IN MANUFACTURING EMPLOYMENT, 1981-93

☐ Not in sample
■ CEAs where rural growth
   exceeded metropolitan growth
☐ CEAs where metropolitan growth
   exceeded rural growth
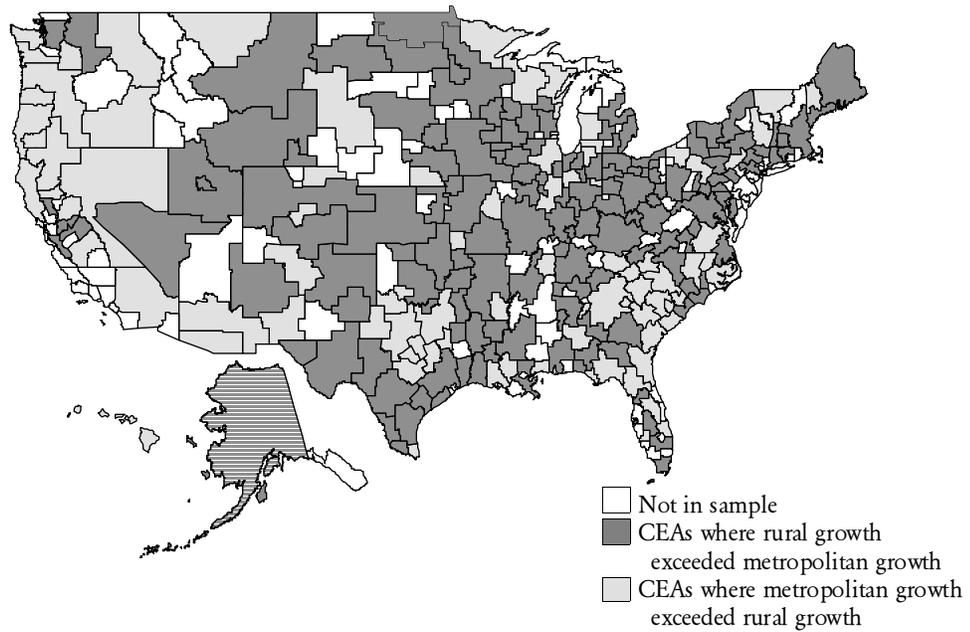
Source: U.S. Department of Commerce, Bureau of Economic Analysis

From these data it is clear that rural areas generally gained lower paying jobs at the expense of higher paying jobs. Of the 15 industries where rural areas gained the most jobs, none had an average wage above the national average. Moreover, of the six industries that provided 100,000 or more new jobs in rural areas, only two had pay levels at least 90 percent of the national average—health services and food and kindred products. These two industries together created about 615,000 jobs in rural America from 1981 to 1992. The other industries in the top six, all of which were nonmanufacturing, created 850,000 rural jobs but at quite low wages: eating and drinking places (30 percent of average pay), food stores (45 percent), membership organizations (35 percent), and business services (66 percent).

Meanwhile, pay was above the national average in 11 of the 15 industries in which rural areas lost jobs over the period. Many of the high-paying jobs lost were in manufacturing or mining. Consolidation in rural financial institutions was also a major source of job loss, although these jobs paid wages closer to the national average.

Rural areas were not alone in losing high-paying jobs over the period in question. Urban places also shed high-paying jobs, many in manufacturing. Thirteen of the 15 industries with the biggest urban job losses also had above-average wages. Yet urban places were able to replace those losses with a somewhat better mix of jobs. Six of 15 industries with the biggest urban job gains paid above-average wages. The leading source of urban jobs was health services, with pay 17 percent above the national average in 1992.

In summary, the rural economy has performed well in nearly four of every ten economic areas throughout the nation. Although this result bodes well for rural America's ability to compete for jobs, the optimism is tempered by aggregate figures showing that many of these jobs pay relatively low wages.

WHY HAS EMPLOYMENT GROWN IN SOME RURAL AREAS?

Employment has clearly grown in some rural parts of the nation, while it has flagged in others. What explains the success of the growing segments of rural America? While explanations often turn to such things as proximity to metropolitan areas and scenic amenities, comparing economic characteristics of rural areas across various CEAs reveals the importance of potential rural growth factors. This section discusses some factors that location theory posits as important in determining where growth is most likely to occur and then uses regression analysis to identify which of these factors have been responsible for recent employment gains in rural America. Overall, the results suggest that growing areas tend to start with a significant clustering in their local industry, and this industry's "critical mass" forms a vital foundation for further growth.

Growth factors in rural America

Setting aside businesses like farming, whose location depends on the natural resource base, economic theory suggests the location of most economic activity normally depends on a handful of variables that influence business decisions (Hoover; Anas; Henderson; and O'Huallachain and Satterthwaite). These same variables are also likely to be major determinants of rural economic activity.

The supply and price of local inputs take account of differences in the cost of doing business in a local area. Labor costs often comprise a large share of a firm's total cost. Thus the local labor supply, its productivity, and local wages have a major influence on the decisions of business firms as to where to locate and whether to

Table 2

WAGE LEVELS IN RURAL INDUSTRIES

Industries with biggest rural job gains	Jobs added (thousands)	Percentage of 1992 average pay for all industries
Health services	510	91.6
Eating and drinking places	364	30.0
Food stores	201	45.4
Membership organizations	162	34.5
Business services	138	66.0
Food and kindred product	104	90.1
General merchandise stores	96	45.0
Special trade contractor	94	83.6
Misc. retail	83	55.3
Automotive dealers	79	67.9
Hotels and other lodging	77	50.8
Trucking and warehousing	58	92.2
Educational services	49	63.2
Agricultural services	41	63.7

Industries with biggest rural job losses	Jobs added (thousands)	Percentage of 1992 average pay for all industries
Depository financial institutions	-310	90.1
Coal mining	-164	158.5
Social services	-136	46.4
Oil and gas extraction	-131	141.0
Rubber and misc. plastic	-118	104.5
Industrial machinery	-109	119.4
Electronic and other electrical supplies	-91	111.3
Apparel	-84	57.5
Textile mill products	-77	82.8
Heavy construction	-60	128.9
Communication	-52	129.2
Chemicals and allied products	-43	148.3
Services not elsewhere classified	-39	129.0
Nondepository financial institutions	-32	110.3
Fabricated metal products	-31	112.5

Source: U.S. Bureau of the Census, County Business Patterns (enhanced)

expand. From one area to another, labor and other business costs often differ widely, reflecting the availability and quality of local inputs. Other things equal, economists generally expect areas with low costs to grow faster than areas with higher costs. That conclusion has also been applied to rural areas; low wages have traditionally been a major factor in attracting manufacturing to rural areas.

Industry clustering takes account of the benefits that flow from businesses locating near firms in the same industry, an effect that economists call localization economies. Firms often find they can lower costs by locating in the same area as similar firms. These savings can come from many sources, but one of the most important is access to a labor market specialized to that industry. Another important benefit from clustering is better access to information about markets and technology. The computer industry, for example, has concentrated in California's Silicon Valley in large measure because the area has a high concentration of highly specialized engineers and other technicians. In that case, the benefits of industry clustering have proven more important than nominal input cost considerations—the Bay area has some of the highest business costs in the nation.

While economists have identified a number of industry clusters in rural areas—such as carpet manufacturing in north Georgia and catfish processing in the Mississippi Delta—not much is known about the overall importance of clusters to rural economic activity (Krugman; Rosenfeld). Economists generally think, however, that the initial size of an industry cluster in a rural area probably has a direct effect on subsequent growth in that industry. For many industries, a threshold critical mass is necessary for rural firms to benefit from a sufficient concentration of industry-specific information and labor. Recent research has begun to point out the importance of rural

industry clusters for certain types of manufacturing. The implementation of computer-aided technologies and flexible production systems, however, may reduce the attractiveness of rural locations for economic activity because of the resulting upgrading of occupations and skill and education requirements within occupations (Knudsen and others; Berman and others).

Urban spillover takes account of the benefits that flow from locating near a metropolitan area. These benefits are derived from what economists call urbanization economies. Spillover benefits include both cost savings and improved access to markets. For example, metropolitan areas often have transportation and communications infrastructure that push down costs of doing business. In addition, metropolitan areas have a richer mix of financial and business services, often at lower cost. And, metropolitan areas provide a local market to which a business can sell its product or service, and the bigger the metropolitan area, the bigger the market. [3]

Urban spillover appears to have become a more important factor in rural economic patterns. Since 1981, 39 percent of the nation's rural counties were either merged into metropolitan areas through suburban sprawl or were adjacent to metropolitan areas. Together, these counties accounted for 54 percent of new rural jobs. Other research has shown that being adjacent to metropolitan areas has been a major characteristic of rural counties with above-average growth in income and employment (Drabenstott and Smith).

In sum, rural economic growth patterns are thought to be affected by three competing forces: input availability and cost, industry clustering, and urban spillover. The question remains, however, which of these factors, singly or in combination, explains the success some rural areas have had in boosting their employment.

A growth model for the rural economy

Sorting out an empirical answer to that question is made possible by combining the micro-region rural economic information with a model designed to relate growth in rural employment to the factors discussed above. An economic growth model developed by O'Huallachain and Satterthwaite to study economic growth patterns in metropolitan areas provides a helpful analytical tool for sorting out the factors behind recent rural employment successes. By definition, the model examines only those areas where employment has been growing.[4] It does not provide explanations for the economic decline occurring in many parts of the rural economy. By providing new insights on why growth is occurring where it is, however, the results from the model provide business leaders and policy-makers with useful information to guide their decisions.

Drawing on O'Huallachain and Satterthwaite, growth in rural employment can be related to the three growth factors in the following equation (see the appendix for a formal derivation of the equation).

$$Growth\ in\ Rural\ Employment = b_0 + b_1\ rural$$
$$industry\ cluster + b_2\ urban\ spillover$$
$$+ b_3\ availability\ and\ cost\ of\ local\ inputs$$
$$+ error\ term \qquad (1)$$

Estimating the equation for a given category of employment—for example, total, manufacturing, or services—provides an empirical measure for the various b coefficents. The size and significance of these coefficients reveal the relative importance of the various factors in the growth of that job category.

Data for the nation's economic areas provide a rich supply of the information needed to test the relationship between rural employment growth and the various growth factors. Growth in rural employment within a CEA can be measured for total employment and one-digit industries from 1981 to 1993. Growth can also be measured for two-digit industries, although data were only available through 1992. Due to the fact that this is a growth model, only CEAs with growth in the industry in question are included in the analysis. Rural industry clusters are measured as the total number of employees in a given industry located within the rural counties of a CEA in 1981. The urban spillover variable is measured as the total work force in the metropolitan portion of a CEA in 1981. Economists generally believe that the size of work force provides a good proxy of the benefits a business derives from being in or close to a metropolitan area. Finally, a number of variables such as wages, educational attainment, and public services provide measures of the cost, availability, and quality of local inputs.

With the employment data available for the nation's economic areas, many different estimations of equation 1 are possible. However, in light of the rural economic growth patterns discussed in the first section, two types of empirical results would be especially useful. First, it would be useful to estimate which growth factors lie behind broad rural trends, noting the regional variation evident in the patterns discussed in the first section. Second, it would be to useful to know if these same growth factors are also at work within individual industries, which are often the focus of policy steps to boost rural economic performance. Accordingly, this article first provides general estimates of the relative importance of the growth factors (looking at growth in total employment, manufacturing, services, and trade) and then examines their role within more narrowly defined rural industries (the 18 two-digit SIC industries in which rural employment grew the most).

Empirical results

Before looking at the empirical results in detail, three results are worth emphasizing at the outset. The principal finding is that rural industry clusters appear to be the most critical factor associated with rural employment growth. Whether the focus is general or is confined more narrowly to one industry, a critical mass of rural business activity appears to be the dominant factor in providing a foundation for rural growth. Urban spillover is generally beneficial to rural job growth, especially in the service sector, although the effect appears less important than a rural industry cluster. Finally, while local input markets have some influence on rural growth, industry clusters and urban spillover are more likely to affect the pace of rural job gains.

General results. Empirical results for the general estimates of equation 1 are summarized in Table 3. The rows of Table 3 report the growth factor coefficients for four broad employment categories: total, manufacturing, services, and trade. Due to limitations in data, the nation's four census regions are used in these general estimates as a broad proxy for variations in local input markets. While regions are a crude proxy, there are sharp regional differences in labor markets across regions, such as union participation rates, wage rates, and tax rates. In determining the effects of the factors on employment growth, what matters is the sign and statistical significance of the coefficient. A growth factor coefficient that is positive and significant indicates the factor had a positive influence on rural job gains. A growth factor coefficient that is negative and significant suggests the factor had a negative effect on rural job growth. Finally, a coefficient that is not statistically significant—regardless of sign—indicates no effect on rural employment growth.

Rural industry cluster is a significant factor in explaining growth in all four broad employment categories. The estimates show that, depending on the employment category, a 1 percent increase in the beginning-period employment in the rural part of a CEA produces from 0.76 to 0.92 percent more growth in rural employment over the entire period. These results suggest that rural job growth is heavily influenced by first having a critical mass in a particular industry.[5]

Urban spillover appears to exert a small positive effect on rural employment growth. A 1 percent increase in the size of the urban area results in an increase in rural job growth of about 0.16 percent overall. The effect is slightly greater in services, smaller in trade, and not significant in manufacturing. Growth in the service sector is highly dependent on information, technology, and human resources. Thus, it is not surprising that rural areas benefit from being able to access these assets in metropolitan areas.

Rural clusters and urban spillover appear to be more important factors in affecting rural employment growth than regional location. For the general regression analysis, regions are used as a broad proxy for variations in the cost, availability, and quality of inputs. The empirical technique used here required that one region be designated as the benchmark region against which comparisons could be drawn. In this case, the Northeast region was arbitrarily selected as the benchmark region. The results show that the West displayed an advantage in total rural employment growth relative to the Northeast, a result that is not surprising given the general pattern of economic activity moving from the Northeast to the West and South. The Midwest held a pronounced edge over the Northeast in the growth in factory jobs, but lagged behind the Northeast in trade jobs. Beyond that, variations across these large regions appeared to be largely insignificant.

In sum, a first approximation of rural growth patterns points to industry clusters as the leading

Table 3

RURAL EMPLOYMENT GROWTH AND GROWTH FACTORS: 1981-93

	Rural industry cluster	Urban spillover	South	Midwest	West	$\overline{R}^2$
Total	**.901**	**.158**	-.027	-.279	**.444**	.530
(220 CEAs)*	(.07)	(.07)	(.21)	(.22)	(.25)	
Manufacturing	**.762**	-.064	.889	**1.601**	**1.085**	.601
(141 CEAs)	(.06)	(.10)	(.55)	(.55)	(.57)	
Services	**.921**	**.111**	.085	-.21	.224	.763
(234 CEAs)	(.04)	(.04)	(.13)	(.14)	(.15)	
Trade	**.902**	**.168**	-.057	**-.593**	.251	.691
(224 CEAs)	(.05)	(.05)	(.15)	(.16)	(.18)	

*Number of CEAs with growth in employment category.

Note: Standard errors are in parentheses.

Bold indicates significance at the .10 level or better.

source of growth, with urban spillovers also ranking as relatively important. Regional variations in input markets appear less important, though these variables were captured in the analysis only by a broad, crude measure.

Industry results. To provide a better test of the relationship between rural job growth and the growth factors, a second round of regression analysis was conducted using growth in the 18 two-digit SIC industries in which rural jobs grew the most. Eighteen industries were selected because they capture a substantial portion of the rural employment gains over the period. Testing the relationship between the growth factors and more narrowly defined industry-level gains required switching to a different group of Commerce Department data. The disadvantage of the more detailed data is that it was only available through 1992 instead of 1993. The advantage is that it contains much better information on the cost,

availability, and quality of local inputs. For the industry-level analysis, those local variables were proxied by average local wages, education level of the labor force, local spending on public services, and the local poverty rate. The latter two variables are frequently used as proxies for variations in quality of life across regions.

Industry results for estimating equation 1 are summarized in Table 4. The most striking result is the widespread, significant influence of industry clusters on rural growth. These 18 industries run the gamut from low-wage manufacturing (such as food processing and printing and publishing) to high-wage service industries (such as health services). Yet critical mass appears to be a major factor in explaining the growth of all these industries. A 1 percent increase in the initial size of the industry cluster was associated with as little as 0.51 percent more growth over the 1981-92 period in agricultural services to as much as 0.78

percent more growth in retail establishments and paper mills. Notwithstanding the result for the paper industry, the advantage of an industry cluster was generally strongest in service industries. Overall, these results indicate that rural places that were well-positioned in a particular industry early on were able to build effectively on that advantage over the period.

Urban spillover was much less of a factor in explaining rural growth. Spillover was significant in only five industries: restaurants, food stores, membership organizations, printing and publishing, and agricultural services. The first three are service industries that clearly benefit from serving larger markets. Although printing and publishing are considered manufacturing industries, they also gain from selling to a larger market. It seems somewhat anomalous to expect urban spillover to have a positive effect on rural employment in agricultural services, although spillover may reflect attempts by some companies to sell lawn and garden products to suburban and urban customers.

Labor market variables were a significant growth factor in about half the rural industries. Educational attainment was a positive factor in seven industries, which were all service industries except for special trade contractors. Educational attainment was significant and negative for food and kindred products, a result consistent with the low-skill nature of many food manufacturing jobs. Education was also a negative factor for membership organizations, a result that may be consistent with low-wage occupations in many of these nonprofit organizations.

Rural wage rates do not appear to be a dominant factor in the industry results. The wage variable was negative and significant for just four industries: restaurants, food stores, educational services, and paper mills. Restaurants and food stores are both low-margin industries that are also labor intensive. Thus, we would expect their job growth to be sensitive to local wages. Other industries may be more sensitive to wages than these results suggest, however. Due to data limitations, the wage variable measures average wages in the economic area, not wages for the industry in question. Thus, this wage proxy may not fully reflect variations in labor productivity and unit labor costs.

Finally, rural quality of life appears to be much less of a factor in explaining rural employment gains. Local spending on public services and the rural poverty rate were significant only in the growth of educational services. These results may not be decisive simply because quality of life is a difficult factor to quantify. Other evidence, for example, suggests that scenic amenities have been a factor in boosting growth in some rural areas (Drabenstott and Smith). Such amenities have not been systematically captured in this analysis.

In sum, industry results parallel the more aggregate findings. Local clusters in a given industry are important to rural growth. Urban spillover effects are less important, although they appear to be a factor in some service industries. Labor factors, especially educational attainment, have some bearing on rural growth, while the quality of life factors tested have much less influence. Thus, this micro approach to rural employment growth suggests industry clusters are more likely to influence the pace of growth in rural areas than oft-cited local issues, such as labor issues. The widespread importance of industry clusters across all of the industries studied here suggests that achieving critical mass is a vital factor in rural economic growth today.

CONCLUSIONS

A micro view of rural economic performance shows that employment has grown faster in a sur-

Table 4

RURAL INDUSTRY EMPLOYMENT GROWTH AND GROWTH FACTORS: 1981-92

Industry	Rural industry cluster	Urban spillover	Wages	Labor force education	State and local spending (per capita)	Rural poverty rate	$\overline{R}^2$
Health services	**.734**	.095	.036	.623	-.081	2.339	.572
(213 CEAs)*	(.05)	(.06)	(.03)	(.95)	(.24)	(1.42)	
Restaurants	**.717**	**.172**	**-.058**	**1.813**	-.070	1.851	.582
(215 CEAs)	(.05)	(.06)	(.03)	(.91)	(.23)	(1.36)	
Food stores	**.764**	**.160**	**-.062**	**2.693**	.061	.930	.559
(225 CEAs)	(.06)	(.06)	(.02)	(.86)	(.24)	(1.33)	
Membership organizations	**.725**	**.122**	-.010	**-1.259**	-.259	-.772	.706
(232 CEAs)	(.04)	(.04)	(.02)	(.68)	(.17)	(1.04)	
Business services	**.718**	.001	.036	-1.837	-.277	-1.458	.441
(191 CEAs)	(.07)	(.09)	(.04)	(1.56)	(.37)	(2.74)	
Food and kindred product	**.677**	-.028	-.018	**-3.076**	.106	-1.112	.450
(135 CEAs)	(.07)	(.10)	(.05)	(1.77)	(.49)	(2.72)	
General retail	**.771**	.032	-.030	.590	.189	-1.640	.499
(193 CEAs)	(.06)	(.08)	(.03)	(1.17)	(.31)	(1.89)	
Printing and publishing	**.764**	**.208**	-.072	1.206	-.132	-1.195	.552
(141 CEAs)	(.07)	(.09)	(.05)	(1.57)	(.41)	(2.56)	
Amusement and recreation	**.619**	.108	-.011	**2.791**	-.109	2.663	.389
(164 CEAs)	(.08)	(.09)	(.05)	(1.49)	(.36)	(2.46)	
Special trade contractors	**.757**	.078	-.019	**2.907**	.153	2.116	.528
(190 CEAs)	(.06)	(.07)	(.03)	(1.03)	(.28)	(1.69)	
Misc. retail	**.777**	.065	-.038	**3.395**	-.205	.364	.483
(188 CEAs)	(.07)	(.08)	(.04)	(1.37)	(.33)	(2.02)	
Auto dealers and service	**.687**	.071	.000	.294	-.238	2.223	.324
(189 CEAs)	(.08)	(.08)	(.04)	(1.34)	(.34)	(2.07)	
Lodging	**.585**	.117	.017	**3.202**	-.111	2.315	.374
(156 CEAs)	(.08)	(.11)	(.05)	(1.79)	(.45)	(2.72)	
Trucking and warehousing	**.656**	.060	.082	-.911	-.218	-3.194	.377
(176 CEAs)	(.07)	(.10)	(.04)	(1.45)	(.39)	(2.29)	
Educational services	**.642**	.104	.063	**4.626**	**-.803**	**6.402**	.527
(143 CEAs)	(.06)	(.10)	(.04)	(1.52)	(.38)	(2.45)	
Agricultural services	**.506**	**.192**	.029	-.225	-.360	-2.221	.369
(203 CEAs)	(.06)	(.07)	(.03)	(1.09)	(.28)	(1.73)	
Transportation equipment	**.670**	.011	-.044	-.031	.211	-.489	.424
(105 CEAs)	(.08)	(.15)	(.06)	(2.26)	(.61)	(3.53)	
Paper and allied products	**.782**	.148	**-.055**	-4.173	-.100	-4.748	.364
(85 CEAs)	(.11)	(.19)	(.03)	(2.52)	(.51)	(4.43)	

* Number of CEAs with growth in employment category.
Note: Standard errors are in parentheses.
Bold indicates significance at the .10 level or better.

prising number of rural places than in the neighboring metropolitan center. Of the nation's 234 micro-regions that contain a metropolitan center and a surrounding rural area, 88 had faster total job growth in the rural area from 1981 to 1993. Gains were even more widespread in manufacturing, where 155 had faster job growth in the rural area.

An examination of the factors behind the rural gains points squarely at rural industry clusters as a major source of growth in rural areas. Urban spillover is also a factor, especially for service industries. Local input markets and quality of life also matter somewhat, probably more than the results indicate due to limitations in the data. Yet, the repeated significance of industry clusters in the general and industry results underscores the value of having a critical mass of business firms in the same industry.

The importance of industry clusters to rural growth is consistent with similar findings for metropolitan areas. O'Huallachain and Satterthwaite found industry clusters to be the major factor explaining urban employment gains from 1977 to 1984. Together, these results suggest that firms derive considerable benefits from locating near similar firms. These benefits are likely to include a pool of specialized labor and the ability to share industry information quickly and at low cost.

The results of this and other studies highlight the importance of industry clusters, but they do not reveal the underlying locational advantages that give some rural areas an initial advantage in a particular industry. While the empirical model used in the analysis does not identify these initial advantages, the findings show that industry clusters are important to continued economic growth in rural areas that gained an initial foothold in an industry. In short, industry clusters appear to reinforce the advantage a particular area has in a given industry (David and Rosenbloom).

Rural areas normally are thought to have two key features—remoteness and small scale—that can slow economic growth. The important role of industry clusters in rural job gains throughout the 1980s suggests that successful rural communities find ways of overcoming the small scale. Put simply, the rural areas that grew in the 1980s tended to be those with a head start in a vital industry.

This finding has far-reaching implications for public and private decisionmakers. Public policymakers are often torn between efforts to specialize and efforts to diversify. Although many issues impinge on that decision, the results from this study suggest some threshold of critical mass in an industry is vital to employment growth in many rural areas. Thus, a greater focus on economic development options keyed to specific industries has merit. Communities that already have a foothold in a particular industry might consider ways to enlarge that presence. Communities that have no leading industry might consider how to develop one or network with nearby urban centers.

Private decisionmakers might expect a further consolidation in rural economic activity. Economic activity in rural America appears to be concentrating—both geographically and along industry lines. To compensate for the distances and small communities in rural America, economic activity appears to be gathering in clumps above a certain threshold. For businesses and financial institutions, vibrant economic activity is likely to continue in rural areas, but firms will find the fastest growing markets where industry clusters are found.

APPENDIX

The growth equation used to analyze rural growth factors is a modification of the model from O'Huallachain and Satterthwaite. The equation is developed as follows:

$$Eln - Eon = a\, Eon^{\alpha}\, U^{\beta}(Xb + e), \quad (1)$$

where

Eln = Employment in the end year for a given industry group in the nonmetropolitan counties of a component economic area;

Eon = Employment in the initial year for a given industry group in the nonmetropolitan counties of a component economic area;

U = Labor force in the initial year in the metropolitan statistical area of the component economic area;

X = A vector of beginning period characteristics for the nonmetropolitan counties in a component economic area. These include the cost and quality of inputs (wages and educational attainment levels) and quality of life factors (local government spending and local poverty rates);

b = A vector of parameters to be estimated; and

e = error term.

Equation 1 is a useful functional form since log transformation yields estimates of parameters that can be used to test for the presence of localization economies (α), spillover effects (β):

$$Ln\,(Eln - Eon) = Ln\,a + \alpha Ln\,(Eon) \\ + \beta Ln(U) + Xb + e\,; \quad (2)$$

and in growth rate terms:

$$Ln((Eln - Eon)/Eon) = Ln\,a + \alpha{-}1\,Ln\,(Eon) \\ + \beta Ln(U) + Xb + e. \quad (3)$$

In equation 3, the key parameters are:

α is a measure of localization economies and can be interpreted as follows (McDonald 1989):

α greater than 1 means increases in Eon lead to a faster growth rate in the rural industry; α greater than 0 but less than 1 means that increases in Eon lead to faster absolute growth but a slower growth rate in the rural industry; and, α less than 0 means that increases in Eon lead to a decline in the rural industry. Note that using the approach in equation 2 avoids the problem of "base-year size" when comparing growth rates between industries. However, it also restricts the analysis to industries that have experienced growth over the period.

APPENDIX (continued)

The other parameters in equation 2 are:

β, which if positive, indicates a spillover or spread of the urban area to the rural hinterland; if negative, it indicates that metropolitan areas with larger labor force

deter growth in the rural area of a CEA;

and b, which is a vector of regression coefficients that reflect the influence of local input costs and amenities at the beginning of the period on industry growth.

ENDNOTES

[1] The 348 component economic areas consist of the nation's 310 metropolitan areas plus 38 more isolated economic areas that lack a city greater than 50,000 (the threshold for being designated a metropolitan area) but do have a city that serves as the economic hub for a multi-county area. Many of the 38 isolated CEAs are found in the Great Plains (Johnson).

[2] For a fuller discussion of the linkages between agriculture and rural economic activity, see Barkema and Drabenstott.

[3] The linkages between metropolitan centers and neighboring rural areas are often quite complex, including flows of investment funds, goods and services, people, knowledge and technology, and political influence. For a fuller discussion of these linkages, see Barkley and others.

[4] As O'Huallachain and Satterthwaite note, not including areas with declining employment may introduce sample selection bias in the regression analysis. However, to the extent that the forces promoting employment growth differ from those causing decline, the sample selection bias is not likely to be large.

[5] The rural industry cluster variable is somewhat more difficult to interpret in the total employment equation. Strictly speaking, the variable should be tied to a particular industry to reflect advantages from locating near similar firms. In the aggregate, the variable might be viewed as a broad gauge of the importance of overall critical mass in rural economic activity. That is, the significance of the variable may suggest that larger rural areas have a competitive advantage over small rural areas.

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