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THE REGIONAL ECONOMY

Understanding Regional Economic Growth in the New Economy: Industry Clusters

Why are some metropolitan areas prospering, while others are not? Areas such as Atlanta, Austin, and Boise City are experiencing rapid economic growth, but many regions of upstate New York have been growing more slowly. In its recently released article on the best places to do business, *Forbes Magazine* noted the importance of “high-tech clusters” to a region’s economic performance.¹ *Forbes’* observation underscores the prevalence of two beliefs about the new economy. One is that technology is a driving force behind contemporary economic growth. The other is that strong *industry clusters* are important to a region’s success.

An industry cluster is a group of similar and related firms concentrated in a particular geographic area, such as the collection of computer-related businesses in Silicon Valley. The concept of industry clusters has provided a new and, many believe, improved way of understanding regional economies. At the same time, a growing number of economists, governments and business firms are viewing strong industry clusters as one of the keys to competitiveness in the global marketplace.

This article seeks to explain why industry clusters are receiving so much attention. It discusses how and why clusters form, what makes them successful, and why they are believed to contribute to regional economic growth. The article also examines what the evidence on industry clusters suggests about local economic development, and describes strategies used by communities adopting a cluster approach. The final section outlines New York State’s efforts to identify the industry clusters that are important to its economy, as well as the challenges faced in this process.

What Are Industry Clusters?

Economists have long noted how firms tend to locate near one another. This phenomenon, termed *agglomeration*, offers an economic explanation for the development of cities. Proximity creates a number of advantages, such as reduced distances between buyers and

sellers, a common labor pool, and easier communication with suppliers and consumers. As economic activity agglomerates, a tendency toward *geographical specialization* may also develop. This process generally begins when firms competing in the same industry are drawn to a region by some natural advantage that minimizes costs. For example, the automobile industry took root in western New York largely because of the availability of inexpensive electric power and locally produced steel. Once established, an industry gains momentum as the region adapts to meet the industry’s specialized needs, including suppliers, support services, workforce, and infrastructure. The result is a cluster of firms able to produce at costs lower than those incurred by firms located in regions that are not specialized. This competitive advantage means that firms within an industry cluster are able to export products and bring in new wealth to the region. The benefits of clustering help explain why the automobile industry concentrated in Detroit and the brewing industry in Milwaukee, when at one time these industries were spread throughout the Northeast and Midwest.

Why Clusters Are Important

Research suggests that the most dynamic feature of industry clusters is the ability to foster improvement in efficiency and promote innovation.² This characteristic is a direct result of the mix of competitive and cooperative relationships that a cluster develops. Proximity encourages intense competition among rival firms, leading to technological advances within the industry. Communication with suppliers is enhanced, improving supply channels and promoting cooperation in research and development efforts. Additionally, the industry’s importance to the local economy can lead to the formation of supportive relationships between firms and local universities. The result is a critical mass of industry-related information about everything from markets to industrial processes.

Since much of this information is passed on through face-to-face contact and other restricted forms of communication, its leakage outside the region is slowed. As a result, the local industry cluster retains the benefits of the information for a longer period of time. The knowledge exchanged and held among the cluster's firms acts to further augment competitive advantage. In addition, innovation that occurs within a cluster can lead to the development of entirely new industries, or "spin-offs," which in turn benefit from the region's specialized inputs. For example, technology developed at Rochester's Eastman Kodak has spawned related firms in optics and imaging.

The ability of industry clusters to foster industry improvement and innovation has brought to light their important roles in the new economy. Current economic theory points to knowledge and innovation as fundamental catalysts for economic growth, with evidence suggesting that productivity within firms or industries is correlated with the amount spent on research and development.³ This is especially true for regions in advanced economies such as the United States, which find it increasingly difficult to compete with developing nations on the cost of labor and other basic inputs. In the world marketplace, competitiveness is becoming less dependent on the cost of physical resources, and more dependent on the way those resources are deployed.

Clusters and Local Economies

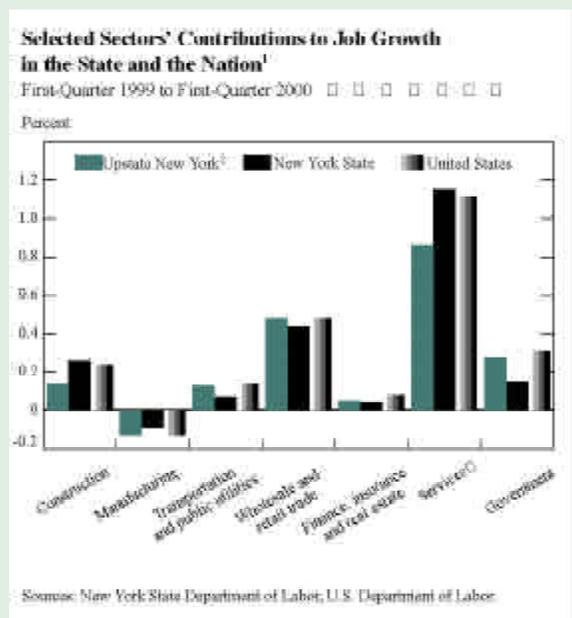
The concept of industry clusters and their roles in economic growth have wide-ranging implications affecting firms, workers, governments, and numerous other public and private institutions. Above all, cluster theory implies that the formation of industry clusters is market driven and that the role of government is limited. Industries become successful initially because a region offers a natural advantage that provides firms with a competitive edge.

Without the initial factors necessary for competitiveness, the industry is unlikely to take hold. This means that a region's attempts to build an industry cluster through recruitment efforts may prove difficult.

While the presence of certain assets is critical, cluster theory suggests that these assets must be connected through a network of formal and informal relationships. A well-functioning network requires a variety of linkages: between competing and supporting firms, between firms and local institutions, and between firms and local governments. Through these linkages, firms learn about new technologies, new markets, and changing consumer tastes, while governments and local institutions learn about industry needs. At the same time, the exchange of information promotes the creation of new industry knowledge. The dynamics of this web of interrelationships help to produce an industry cluster with the collective competitiveness necessary for success in the global marketplace.

The evidence regarding industry clusters has persuaded many communities to shift the focus of economic development strategies from individual firms to groupings of firms. These communities are trying to facilitate collaborative networks by bringing members of industry clusters to the table to discuss mutual interests. In many of these instances, competitors meet face-to-face for the first time. Included in these initiatives are further efforts to enhance the ability of clusters to innovate. Many regions are promoting a "culture of innovation," characterized by support for new ideas and by openness to change. Concurrently, they are developing knowledge-based resources by forming research consortiums, improving public schools, and creating comprehensive worker training programs. In total, these efforts underscore a key principle of contemporary cluster theory:

Upstate Metro Area Update



Albany

The decline in manufacturing employment halted in 2000, although retail employment contracted by about 600 jobs. The services, construction, and transportation and public utilities sectors all posted significant gains. Government jobs increased 3.2 percent at the local level, but fell at the state level and remained unchanged at the federal level.

Binghamton

Modest losses in the manufacturing and government sectors were more than offset by a hefty 19 percent gain in the finance, insurance, and real estate sector, coupled with sizable increases in service, retail and construction jobs.

Buffalo

The manufacturing sector continued to shed jobs in the first quarter of 2000, but other industries expanded. In particular, employment in the construction industry added 4.8 percent. In the service sector, the pace of job growth slowed to 1.4 percent, less than half its 1998-1999 rate.

in the new economy, the application of knowledge and information is critical to the success of all industries.

Industry Clusters in New York State

Industry cluster theory also provides a new framework for understanding how regional economies are organized. As a result, many economic development agencies are seeking to identify and measure their key industry clusters. Empire State Development (ESD), the economic development arm of New York State, recently undertook such an initiative and identified thirteen clusters that are significant to the state economy. The table below identifies the most concentrated industry cluster in each of New York’s ten regions.

ESD used a common gauge for industry concentration known as a *location quotient* (LQ). It is calculated by dividing the percentage of a region’s employment in an industry by the percentage of total U.S. employment in that industry. For example, if the manufacturing sector provided 30 percent of all jobs in a region, and the U.S. average was 15 percent, the LQ would be 2.0 (30/15). An LQ of greater than 1.0 shows that a region has a higher concentration of employment in an industry relative to the average for the nation.

LQs are not a perfect measure of concentration for a number of reasons, including the difficulties of defining an industry with available data. In calculating LQs, analysts use the Standard Industrial Classification (SIC) system to identify a group of related industries. Unfortunately, the SIC system does not always distinguish industries in useful or appropriate ways. For example, the medical devices industry would need to include manufacturers of surgical knives. However, the SIC system categorizes these implements under the cutlery industry, which includes knives used

in food service as well as surgery. Problems are also encountered in deciding on the appropriate support industries to include in an industry cluster. For instance, should a film industry cluster include insurance companies that underwrite policies protecting against cost overruns and “flops?” Use of the SIC is further complicated by an outdated coding scheme, which, for example, does not classify information technology as an industry. Fortunately, the SIC will be replaced over the next several years with a more modern system.⁴ Despite these obstacles, LQs provide a rough approximation of the existence and size of industry clusters.

Industry Clusters in New York State, by Region

Region	Industry Cluster	Location Quotient
Western	Transportation Equipment	1.75
Finger Lakes	Optics & Imaging	17.80
Southern Tier	Info. Hardware & Software	2.27
Central	Industrial Machinery & Equipment	1.45
North Country	Biomedical/Biotech	1.75
Mohawk Valley	Apparel & Textiles	1.77
Capital	Biomedical/Biotech	1.75
Mid-Hudson	Biomedical/Biotech	1.61
New York City	Apparel & Textiles	2.83
Long Island	Financial Services	1.33

Source: *New York State Industry Cluster Profiles*, Empire State Development, May 1999.

ESD’s analysis shows how the state’s various regions have come to specialize in different industries. For example, the fashion, apparel, and textile industry became significant in the New York City area because of the large local market. Similarly, as noted previously, a transportation equipment cluster formed in western New York because of the presence of the steel industry

Rochester

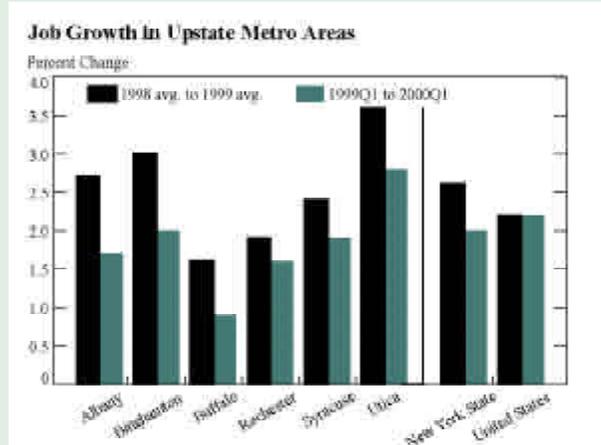
Layoffs at Rochester’s large employers – Kodak, Xerox, and Bausch & Lomb – contributed to the loss of about 1,200 manufacturing jobs since the first quarter of 1999. Strong growth in service, retail, and construction jobs more than offset these losses, while the finance, insurance, and real estate sector saw a 1 percent decline in employment.

Syracuse

The region’s manufacturing sector continued to add jobs, as it had throughout 1999, although the retail sector lost about 1 percent of its employed. Strong employment gains in wholesale trade, construction, services, and transportation and public utilities contributed to the area’s growth in the first quarter.

Utica

Sizable job increases in the wholesale trade, retail, services and transportation and public utilities sectors helped boost the area’s growth in the first quarter. The finance, insurance, and real estate sector lost nearly 5 percent of its jobs, and the manufacturing sector contracted as well.



Sources: New York State Department of Labor, U.S. Department of Labor

Notes:

¹Contribution rates are net job gains by sector divided by net job gains in total (for all sectors); this yields a percentage growth rate by sector weighted according to its impact on total growth.

²Upstate New York comprises fifty-two counties. It does not include New York City, Westchester, Putnam, and Rockland Counties, and Nassau and Suffolk Counties on Long Island.

and the availability of cheap electricity. The table also shows how the level of industry concentration can vary. The Finger Lakes region's LQ of 17.80 in optics and imaging reflects the presence of Eastman Kodak, Xerox, and Bausch & Lomb in Rochester. Long Island's most intensive industry, financial services, is largely connected to the financial district, and has a much smaller LQ of 1.33, indicative of a more diverse economy. The difference between these LQs highlights the difficulties inherent in cluster analysis. Optics and imaging is a more specialized industry, employing only about 91,000 workers in New York State compared with the more than 580,000 employees in financial services.⁵ Overall, this type of analysis can reveal more information if based on smaller geographical units—such as counties or metropolitan areas—rather than entire regions. Nevertheless, the study is a good first step in a cluster analysis of the New York State economy.

Conclusion

Cluster theory implies that industries flourish when their specialized needs are met and when firms compete vigorously and collaborate widely. These characteristics minimize costs and promote innovation, resulting in a collective competitive edge. This concept has changed the way that many regions see their economies and interact with them. In the new view, regional

economies are composed of clusters of related firms supported by economic infrastructures, not individual companies. And while the growth of “high-tech” industries has led some communities to offer incentives to particular firms, other regions are developing community assets, facilitating networks, and encouraging innovation in an effort to bolster all firms. Finally, cluster theory is being used to shed some light on the current disparity in economic performance among metropolitan areas, as it provides insight into the ways in which a region's economic environment allows industries to gain competitive advantage in the new economy.

Notes:

¹ Tim W. Ferguson and William Heuslein, “Best Places,” *Forbes*, May 29, 2000.

² Michael E. Porter, *The Competitive Advantage of Nations* (New York, NY: Free Press, 1990).

³ Paul Krugman, “Increasing Returns and Economic Geography,” *Journal of Political Economy* 99, no. 3 (1991), and Paul Romer, “Increasing Returns and Long-Run Growth,” *Journal of Political Economy* 94, no. 5 (1986).

⁴ The Standard Industry Classification system is now being replaced by the North American Industry Classification System (NAICS). The NAICS identifies new industries and revises concepts and definitions so that industry-classified statistics better reflect the contemporary economy.

⁵ Empire State Development, Division of Policy and Research, *New York State Industry Cluster Profiles* (May 1999).

Richard Deitz and Ramon Garcia

The views expressed in this newsletter are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.
