



Spring 2001

*Buffalo Branch,  
Federal Reserve Bank  
of New York  
160 Delaware Avenue  
Buffalo, NY 14202  
Tel: (716)849-5023  
Fax: (716) 849-5218*

*Barbara Walter  
Senior Vice President  
and Branch Manager*

*Reggie Melson  
Community Affairs  
Representative  
reggie.melson@ny.frb.org*

*Richard Deitz, Ph.D.  
Regional Economist  
richard.deitz@ny.frb.org*

*Ramon Garcia  
Assistant Economist  
ramon.garcia@ny.frb.org*

*For the online version  
of this and other  
economic research  
published by the  
Federal Reserve Bank  
of New York, visit:  
www.ny.frb.org/  
rmaghome/regional*

★ ★ ★ ★ ★

**Upcoming Event**  
Inner-City Economic  
Development  
Conference

*The Buffalo Branch and  
University at Buffalo will be  
hosting a conference titled  
"The Untapped Urban  
Market" on May 1, 2001.  
For details, call 849-5023.*

# THE REGIONAL ECONOMY

*OF UPSTATE NEW YORK*

## The Information Technology Industry in New York State

In the United States today, information technology (IT) is critical to doing business. Firms of every size and in all industry sectors are investing in IT to increase efficiency, improve technical processes, streamline distribution networks, and gain access to new markets. Between 1995 and 1998, information-processing equipment and software accounted for more than 40 percent of the increase in the nation's private, nonresidential investment.<sup>1</sup> This surge in investment has in turn fueled the extraordinary growth of businesses that supply IT-related products and services. According to U.S. Department of Commerce estimates, IT industries can be credited with nearly a third of the nation's real economic growth from 1995 to 1999.<sup>2</sup>

Not surprisingly, IT industries are becoming increasingly important to local economies. Computer, software, and Internet companies provide well-paying jobs and hold the promise of growth over the long term. Indeed, evidence is emerging that the economic performance of individual metropolitan areas depends in part on the strength of their IT industries.<sup>3</sup>

In this issue of *The Regional Economy*, we assess the prominence of the IT industry in New York State. We calculate the concentration of IT industry jobs in the state relative to the nation and identify the IT businesses that figure most importantly in New York's large metropolitan areas.<sup>4</sup> Using the North American Industry Classification System (NAICS) to define IT activities, we determine that New York IT firms provided 282,800 jobs in 1998, representing about 4 percent of total state employment. This 4 percent figure suggests a concentration of IT industry employment that is similar to the national average. In addition, we find that a number of the state's metropolitan areas are specializing in particular IT activities. For example, Binghamton and Dutchess County show a high concentration of employment in computer and electronic products

manufacturing, while Albany and Utica-Rome show strength in information services and data processing.

### Defining Information Technology

Information technology is a difficult term to define. In its broadest sense, IT encompasses all forms of technology used to create, store, exchange, and use information. The industries that fall under such a broad definition could include anything from broadcast networks and home audio and video equipment manufacturers to graphic arts firms, which are finding significant work in the Internet industry. In more common usage, however, IT represents computer, software, and telecommunications technology, including the manufacturing of computers and telecommunications products, software design and publishing, telecommunications and computer-related services, and Internet and on-line services. These can be considered the "core" IT activities.

To identify the industries that engage in these core activities, we use the North American Industry Classification System, a framework for categorizing businesses that is replacing the U.S. Standard Industrial Classification System. The NAICS reflects the United States' shift from manufacturing to services and thus gives a truer picture than its predecessor of the way the modern economy is organized. In addition, it allows better analysis of relatively new and emerging industries such as IT. For our purposes, we determined that the following five NAICS categories—termed "IT sub-industries" in this study—best define the information technology industry:

- computer and electronic product manufacturing
- software publishers
- information services and data processing services
- computer systems design and related services
- broadcasting and telecommunications services

Although NAICS is an improvement over the previous classification system, it is still an imperfect means by which to describe the complex and evolving IT industry. Some firms involved in the development of information technology are classified under industry codes that could not fit easily into this study's definition. Moreover, firms in all industries employ people with IT-related skills. Also, data on the number of jobs in specific IT industries for metropolitan areas are often unavailable because disclosure would reveal employment levels at individual firms. In such cases, we used broader industry classifications to obtain data—a strategy that required including some businesses not related to IT.<sup>5</sup> Nevertheless, although the definition of information technology used in this study is not ideal, it provides a good benchmark for analysis and a useful tool for comparing New York State's IT industry employment with the nation's.

We note, too, that the information technology industry experienced considerable growth over the past few years,

particularly in some areas of New York State. However, the most recent data available for this type of analysis are from 1998. Thus, the recent expansion is not reflected in our study.

### The Concentration of Information Technology Industry Jobs in New York State

The table shows the concentration of jobs in the five IT sub-industries and in the industry as a whole for New York State and its nine largest metropolitan areas. Also shown is the total IT industry employment for each area and for the state. Job concentration is measured using a common gauge known as a location quotient.

Location quotients are 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 of all jobs, the location

### New York's Shrinking Manufacturing Sector

Between 1969 and 1999, New York State lost 52 percent of its manufacturing jobs—a larger percentage than any other state—while nationwide manufacturing employment fell less than 9 percent. What about New York State can explain this steep decline? According to a study by the Federal Reserve Bank of New York, much of the decrease can be attributed to the *geographic dispersion* of manufacturing activity. In the early 1900s, manufacturing was highly concentrated in a few major port cities in the Northeast, due mostly to the large labor force and ready access to land and water transportation. Since that time, however, the gradual migration of the U.S. population to the south and west, coupled with transportation and other technological advances, has made it possible for manufacturing to take root in other parts of the country. As a result, the past few decades have seen the concentration of manufacturing jobs tend to even out across states.

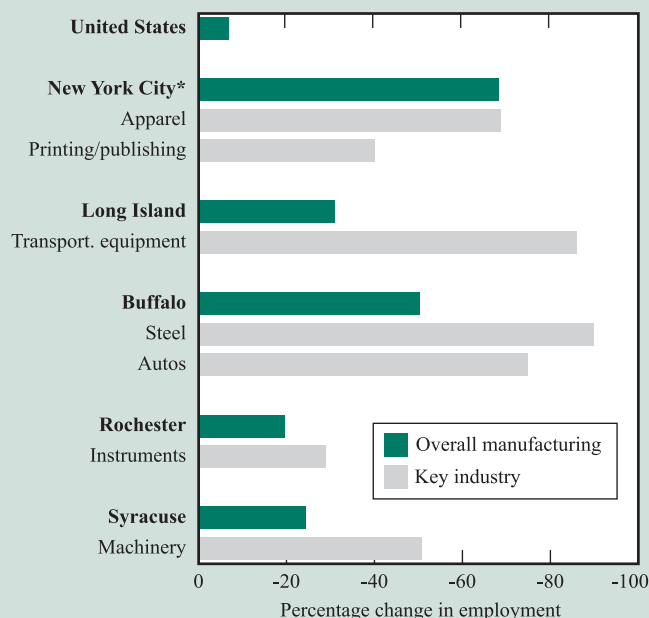
In New York State, New York City has experienced the sharpest cutbacks in manufacturing jobs. Between 1969 and 1999, manufacturing employment fell 68 percent—a drop that accounts for nearly three-fifths of the state's net manufacturing job loss. In upstate New York, employment trends have differed across metropolitan areas. While upstate cities are alike in their strong reliance on the manufacturing sector, each has traditionally had its own distinct and highly specialized industries. Thus, much of the variation in performance across the metropolitan areas appears to be a function of how key local industries fared (see chart).

The study concludes that despite persistent weakness in overall manufacturing employment, some positive signs exist. Certain industries have maintained a fairly strong presence in the region. For example, New York City's publishing and apparel industries and Rochester's instruments industry still account for a significantly larger share of employment and earnings locally than nationally. More broadly, New York's reduced reliance on

traditional manufacturing is likely to make the state's economy less vulnerable to ongoing weakness in this sector.

For the complete article, see Jason Bram and Michael Anderson, "Declining Manufacturing Employment in the New York–New Jersey Region: 1969–99," Federal Reserve Bank of New York *Current Issues in Economics and Finance* 7, no.1 (January, 2001), [http://www.newyorkfed.org/rmaghome/curr\\_iss/ci7-1.html](http://www.newyorkfed.org/rmaghome/curr_iss/ci7-1.html).

**Percentage Decline in Manufacturing Employment: New York Metro Areas and Their Key Industries, 1969-99**



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

\*New York City comprises the five boroughs of the Bronx, Brooklyn, Manhattan, Queens, and Staten Island.

## Location Quotients for Information Technology Industry Employment in New York State, 1998

	Computer and Electronic Product Manufacturing	Software Publishers	Information Services and Data Processing Services	Computer Systems Design and Related Services	Broadcasting and Telecommunications Services	Total Information Technology Industry	Total Information Technology Industry Employment
Binghamton	<b>9.4</b>	0.1	<b>1.7</b>	0.6	0.8	<b>3.9</b>	15,601
Dutchess County	<b>6.2</b>	0.2	0.6	<b>2.0</b>	0.6	<b>2.9</b>	10,286
Nassau-Suffolk	<b>1.5</b>	1.2	<b>1.4</b>	0.8	0.9	1.2	51,293
Rochester	1.2	0.7	<b>1.5</b>	1.1	0.8	1.1	20,944
Utica-Rome	1.2	0.2	<b>3.2</b>	0.3	0.8	1.0	4,359
Syracuse	<b>1.3</b>	0.1	0.7	0.5	0.9	0.9	11,685
New York City	0.1	0.8	<b>1.3</b>	1.0	<b>1.5</b>	0.9	125,895
Albany	0.2	0.9	<b>3.0</b>	0.8	1.0	0.8	11,808
Buffalo-Niagara Falls	0.5	0.1	0.9	0.4	0.7	0.5	10,567
New York State	0.8	0.7	<b>1.3</b>	0.8	1.1	0.9	282,802

Sources: U.S. Bureau of the Census, *County Business Patterns*; authors' calculations.

Notes: A location quotient (LQ) is a common measure of employment concentration. An LQ of 1.0 indicates a concentration of employment equal to the U.S. average. LQs greater than 1.25 (in bold) are thought to show above-average employment in a particular industry. Employment numbers were estimated from ranges of values in cases where exact totals were not published.

quotient would be 2.0 (30/15). A location quotient of 1.0 means that a region's concentration of employment in an industry is identical to that of the nation. It is generally believed that location quotients between 0.75 and 1.25 represent average employment in an industry, while location quotients above 1.25 indicate specialization in that industry. When a region shows average employment in an IT industry, much of the good or service produced is assumed to be for local consumption; when a region specializes in an IT industry, firms are thought to be exporting some of their product outside the local area.

#### Statewide Location Quotients

The IT location quotients for New York State indicate average employment in three of the five sub-industries and in the IT industry as a whole. With a location quotient of 0.7, software publishing is somewhat less concentrated in New York State than in the nation as a whole, while the sub-industry of information services and data processing services, with a location quotient of 1.3, is somewhat more concentrated.

#### Location Quotients for New York's Metropolitan Areas

The location quotients for the state's metropolitan areas tell a different story, however, often showing exceptionally high or exceptionally low employment in IT sub-industries. Four areas show particular strength in computer and electronic manufacturing: Binghamton, Dutchess County, Nassau-Suffolk, and Syracuse. Binghamton and Dutchess County have very high location quotients in this industry (9.4 and 6.2, respectively), largely because of their status as historical locations of IBM. Although the company has reduced its presence in these areas, it still provides a substantial number of jobs and has brought related firms to the areas. Research shows that a metropolitan area's specialization in a particular industry is often linked to the presence of a dominant firm such as IBM.<sup>6</sup> The firm's presence can lead to an accumulation of a particular technological competence and the development of similar firms that can capitalize on that knowledge.

Dutchess County also shows a high concentration in computer systems design and related services, the only metropolitan area in the state to do so. This industry is largely involved in the development or modification of software and the design of computer systems that integrate computer hardware, software, and communication technologies. Dutchess County's strength in the industry can also be attributed in part to the presence of IBM.

New York City is the only metropolitan area to have a significant concentration of jobs in broadcasting and telecommunications services. However, this concentration primarily reflects the area's high level of employment in broadcasting, which was included in the measurement of IT employment in order to obtain data on telecommunications jobs. None of the state's metropolitan areas shows a high concentration of employment in software publishing. This industry is strongest in the Nassau-Suffolk metropolitan area, which has a location quotient of 1.2.

Several metropolitan areas show a high concentration of employment in information services and data processing services. This industry provides, stores, creates access to, and processes information. While facilities such as news syndicates, libraries, and archives are included (a significant presence in New York City), the industry is largely made up of on-line information service providers and data processors. Most notable for specializing in these activities are Utica-Rome and Albany, with location quotients of 3.2 and 3.0, respectively.

#### Conclusion

Our analysis of New York State employment data indicates a concentration of information technology jobs that is on a par with that for the nation as a whole. The state's engagement with IT businesses has been very diversified: although the state does not excel in any of the five IT sub-industries examined in this study, it has a generally average level of employment in all of

them. By contrast, the state's metropolitan areas tend to specialize in particular IT businesses. Thus, Binghamton and Dutchess County show significant concentrations of employment in computer and electronic product manufacturing, and Albany and Utica-Rome have a high proportion of jobs in information services and data processing services.

The prevalence of IT specialization in the state's metropolitan areas bears further comment. Our findings in this regard are consistent with national studies of technology-related industries, which have shown that metropolitan areas tend to possess competence in a specific technology.<sup>7</sup> This tendency suggests that the location of technology industries owes much to individual regions' particular competitive advantage—be it the long-term presence of a dominant firm, as in the case of Binghamton or Dutchess County, or some other attribute, such as the presence of advanced research facilities. For example, the Buffalo-Niagara region is home to a significant level of world-class biotechnology research. This indigenous advantage could lead to the development of firms that benefit from the knowledge obtained through such research. Our findings on specialization may have some import for metropolitan areas seeking to develop an IT industry cluster. Although many regions around the United States and the world have sought to become

the next Silicon Valley, such a course may be difficult in the absence of an existing base of industry knowledge.

### Notes:

<sup>1</sup> Michael R. Pakko, "Capital Deepening," Federal Reserve Bank of St. Louis *National Economic Trends*, May 2000.

<sup>2</sup> U.S. Department of Commerce, Economics and Statistics Administration, *Digital Economy 2000* (June 2000).

<sup>3</sup> Ross C. DeVol, *America's High-Tech Economy: Growth, Development and Risks for Metropolitan Areas* (Milken Institute, July 1999).

<sup>4</sup> A metropolitan area consists of a large population nucleus and its associated county, together with adjacent counties that have a high degree of economic and social integration with that nucleus. This study looked at the nine most populated metropolitan areas in New York State: Albany, Binghamton, Buffalo-Niagara Falls, Dutchess County, Nassau-Suffolk, New York City, Rochester, Syracuse and Utica-Rome.

<sup>5</sup> For example, to obtain employment data for computer and peripheral equipment manufacturing, we had to include data for computer and electronic product manufacturing, which encompasses electronic equipment not associated with information technology.

<sup>6</sup> Joseph Cortright and Heike Mayer, "A Comparison of High Technology Centers," Institute for Portland Metropolitan Studies, Regional Connections Working Paper no. 4, April 2000.

<sup>7</sup> See Cortright and Mayer, "A Comparison," and DeVol, *America's High-Tech Economy*.

*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.*

Buffalo Branch  
Federal Reserve Bank of New York  
PO Box 961  
Buffalo, NY 14240-0961

PRESORTED  
STANDARD  
U.S. POSTAGE  
**PAID**  
PERMIT NO. 1  
BUFFALO NY