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A Pilot Study of Advanced Manufacturing in the Southern Tier

Part of the NYSAC WORKFORCE INTELLIGENCE PROJECT to develop Workforce Strategies to Grow Business in New York's Regions

by

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Executive Summary

This report presents results from a pilot study of workforce trends in the Southern Tier region of New York State. For the purposes of this study, the Southern Tier encompasses the following nine New York State counties: Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Steuben, Tioga and Tompkins. This report builds on the perspectives that NYSAC obtained through its summer 2006 survey of County leaders by examining the relationship between economic development and the quality and skills of the workforce, and by probing what employers and economic development officials have to say about that relationship.

Analysis of labor demand and supply in the nine counties indicates that the total number of jobs in all industries has declined between 2000 and 2005 by 3%, although there was a slight rebound in jobs between 2004 and 2005. The manufacturing sector was largely responsible for the decline in employment, as manufacturing employment dropped 19% during the five-year period. Non-manufacturing sectors held steady, with a 1% increase in employment during this period. The top three employment sectors in the nine counties are manufacturing, retail, and health care. The export base of the region, those industries that "grow" the regional economy by exporting goods and services outside the nine counties, is centered on post-secondary education, manufacturing, and health care.

Because of a history of public and private investment in specialized industry knowledge, especially in electronics, the Southern Tier has strong assets to bring to a new competitive environment. Southern Tier firms now compete on the basis of high productivity and knowledge; moving beyond routine production to design, niche production for specialized markets, and research and development. In this economy, labor skills are critical to the region's economic future. While the number of jobholders in the manufacturing sector fell between 2000 and 2005, gains in productivity have led to increased output in many industries within manufacturing. Employers drawn to the region identify labor skills as one of the top reasons for locating in the Southern Tier. They also mention the region's schools as a significant asset drawing workers and their families to the region.

The Southern Tier is in an unusual position in December 2006: despite an overall decrease in the demand for manufacturing workers, demand for skilled manufacturing workers is exceptionally strong. Computer and electronics product manufacture is booming, adding 700 jobs between 2004 and 2005. Anecdotal information indicates that this growing demand has continued into 2007.

As our data indicate, wage growth across manufacturing has been dramatic at the same time as wages have decreased in non-manufacturing sectors by 4%. Manufacturing establishments account for only 5% of employers, yet 18% of all jobs in the Southern Tier. This job surge has been significantly driven by U.S. Defense Department contracts received by firms in the region.

Despite increasing wages in select manufacturing industries, the Southern Tier region is suffering from a severe labor shortage. While the current labor shortage is acute, there has been a continuing labor shortage in advanced manufacturing since the late 1990s. This labor shortage is particularly evident in middle skill and high skill jobs.

On the supply side of the labor market ledger, analysis of the U.S. Census Bureau's American Community Survey indicates that the nine county workforce is aging slightly, suggesting an impending need to replace those workers who will be retiring. Already, 19% of the production workers in advanced manufacturing have moved to the Southern Tier in the past five years.

Southern Tier employers and economic development officials believe that the skill shortage and its implications have not been recognized at the state level because the shortages are not uniformly severe across counties, industries, and occupations statewide, and because a "skill mismatch" in the region leaves a substantial population still unemployed even as employers are desperate to find skilled production workers, engineers, technicians and first line supervisors. To some extent, the Southern Tier's labor shortage is invisible to policy makers at the State level because they assume that a shortage of workers is impossible in a region in which there have been so many lay-offs due to down-sizing and re-location of manufacturing jobs.

The general consensus among employers and economic development officials is that the labor shortage is creating a barrier to economic development in the region. Our interviews and focus groups indicate ominously that while firms originally located in the Southern Tier because of its workforce, some are now developing strategies or setting up special facilities to go where they can find skilled workers, in Boston for example. This is particularly true in the search for engineers and other highly specialized personnel.

The skilled manufacturing labor shortage is increasing despite significant efforts on the part of local economic development officials, and it is likely to be exacerbated by the aging of highly skilled operatives heading toward retirement. According to the New York Federal Reserve, while the total number of workers in occupations related to manufacturing (engineering, production, and office and administrative support) is expected to decline during the next five years, in part because of increases in productivity, the 15% retirement rates in these occupations will outweigh the decline in employment levels, producing an overall increase in demand. [1]

At the other end of the age spectrum, there is a low rate of new entries into training programs sponsored by community colleges and technical schools despite the career and income potential of jobs in advanced manufacturing.

Employers also indicate that they are facing significant challenges in attracting skilled workers from outside the region because of conditions related to the quality of life in the region.

- Transportation connections to the closest large cities are expensive and difficult.
- The region's cities and towns have suffered from a lack of investment and a coherent urban policy.
- Housing options are limited relative to the expectations of potential homebuyers.

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[1] Deitz, R. 2006. "Baby-Boom Retirements and Emerging Labor Market Pressures." *Upstate New York Regional Review*, Vol 1, No.1.

- In addition, our interviewees indicate that little has been done to counter negative images of Upstate New York. Recent public depictions of Upstate New York as expensive and a poor place to live or invest deter people from considering Upstate New York and the Southern Tier as a place to live and work.

Together, these trends pose a significant challenge to the region and to the state.

Introduction

This pilot project was undertaken in November 2006 to demonstrate an approach to strategic planning for economic development in New York State regions, focused on documenting trends and anticipating demand for workforce skills. It is intended to contribute to the New York State Association of Counties (NYSAC) Workforce Intelligence Project, which combines research, consultation, and convening activities to help counties plan for and respond to changes in their local and regional labor markets. The goal of the project is to provide decision makers at the county level with up-to-date information about workforce trends and employer perceptions that will help them develop effective policy initiatives.

Project Objectives

This project focuses on the set of counties in Upstate New York [2] (Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Steuben, Tioga and Tompkins) designated by the New York State Department of Labor as "the Southern Tier."

Because of its critical role in the Southern Tier economy, this pilot project focuses on advanced manufacturing, a substantial set of industries in the region with potential for growth and expansion. We recognize that a focused study of this kind captures only a part of what is happening in the counties. It is intended as the beginning of a more comprehensive analysis of how economic development potential in Upstate New York counties is affected by changing industry labor force needs and how they are being met.

The goals of the project overall are to:

- Analyze labor market trends to delineate distinctive patterns in each county, and to determine through commuting patterns the extent to which these counties constitute a regional labor market.

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- Examine key industries in the region and how the location and labor deployment decisions of firms in those industries are affecting the multi-county area.

- Provide insights into how employers view workforce trends, and what policies they think might be effective to help them meet their workforce needs and build the regional economy.

[2] Upstate New York is defined as the 52 counties north and west of the 10 New York state counties that comprise the greater New York City Metropolitan region.

Although a number of studies have been done to analyze the New York State workforce, this project is unusual in emphasizing strategic planning at a regional scale and the use of "workforce intelligence" -- advance information on workforce trends -- to enable County officials to anticipate and plan for the future.

Our Approach

Our approach to understanding trends to assist decision-makers in developing policy options for the Southern Tier of New York is based on:

- A data driven profile of employment and occupational trends in the nine Southern Tier counties, examining county-level patterns.

- Interviews with key informants from organizations engaged in economic development and workforce development at the County and multi-county level. These include university officials engaged in technology transfer and economic development, Community College leaders, and Workforce Investment Board Directors and members. The interviewees were identified from an initial set of networking interviews with economic development and workforce development officials in the Southern Tier counties. Interviews were conducted both by phone and in person, using an interview structure developed in cooperation with NYSAC staff. It is included in Appendix A. A list of interviewees is included in Appendix B.

- Focus groups of employer representatives, across sub-sectors and firm size range. Three focus groups were organized with the help of Workforce Investment Board directors and regional economic development officials. The focus groups were conducted in the region and organized around the same set of questions used in the interviews (see Appendix A).

- Analysis of industry trends in key advanced manufacturing industries and in a set of sub-sectors -- electronic packaging, defense contracting / aerospace, and component manufacturing.

- Recent research on the New York economy, including analyses conducted for The National Governors Association, indexes intended to draw comparisons across state economies, regional reports from the New York State Department of Labor (Workforce New York) and The New York Federal Reserve Bank, as well as models for supporting advanced manufacturing. [3]

- The expertise and local knowledge of NYS County officials and New York State Department of Labor and NYSAC staff.

[3] Among the reports: New York State Economic Development Council. 2006. *Preparing for the Next New York, Supporting Economic Innovation in the Empire State.* Albany: NYSEDC. Fiscal Policy Institute, 2006. *One New York, An Agenda for Sustainable Growth and Shared Prosperity*. Albany: FPI. Regional Technology Strategies Inc. 2000. *Building Skilled Workforces for New York's Regional Economies*. Albany Empire State Development.

The Southern Tier Economy in Context

The economy of the Southern Tier has been affected by a series of policy decisions that placed the region in a disadvantageous competitive position. Trade liberalization made it easier to move routine production jobs out of the region. The deregulation of trucking, energy, financial services, and air transport raised the cost of producing and distributing goods and services in Upstate New York. These policies encouraged firms to re-locate jobs in regions where they could access lower labor costs or achieve economies of scale in the larger, coastal markets. The Southern Tier counties have been moving through a period of adjustment to these conditions over twenty-five years.

Because of a history of public and private investment in specialized industry knowledge, especially in electronics, the Southern Tier had strong assets to bring to a new competitive environment. Southern Tier firms in advanced manufacturing now compete on the basis of high productivity and knowledge. They have moved beyond routine production to design, research and development, and niche production for specialized markets. In this economy, labor skills are critical to the region's economic future. While many routine manufacturing jobs have been relocated and lost to the Southern Tier workforce, regional manufacturing is being transformed by firms oriented around high-value niche markets and the development of new technologies, as well as by defense sub-contracting. Employers drawn to the region identify labor skills as the primary reason for locating in the Southern Tier.

Currently, the Southern Tier economy is benefiting from a job surge connected to defense spending. Between 2004 and 2005, total military contracts awarded to Southern Tier firms totaled $1.16 billion. Tioga County led the state in defense contracts ($975 million).

This defense spending pushed the region's manufacturing employment up to its highest level in four years and its unemployment rate to under 4%, down from 4.5% in November 2005. The employment gains were felt not only in manufacturing, but widely across the regional economy. [4]

As our data analysis indicates, several other sub-sectors within advanced manufacturing showed surprising strength, though not the dramatic increases in employment spurred by defense spending. This strength is manifested in strong wage growth in the manufacturing industry.

As we enter 2007, the Southern Tier is faced with a complex set of issues. Unlike other regions in the U.S. or New York State, manufacturing is central to its economy. At a time when manufacturing is said to be dying, the Southern Tier has a severe shortage of manufacturing workers. Finding ways to meet that challenge is critical to the economic future of the region.

Meeting the demand is, however, much more difficult than in the past, because the manufacturing firms that are so important to the regional economy now look very different from their predecessors. The region's manufacturing base includes a significant number of small firms that meet

[4] Kozlowski, J. New York State Department of Labor. 2006. Workforce New York. November. http:www.labor.state.ny.us/workforceindustry/data/index

specialized needs in niche markets, such as those in the electronic packaging industry, as well as large OEMs like Lockheed Martin. Rather than employing large numbers of semi-skilled workers, these firms need a workforce that has advanced and specialized skills, the ability to work in teams, and can meet very tight project deadlines. They have different labor force needs because, applying the lessons of lean production, they are trying to do more with less.

We are at a historic moment. The Southern Tier has an opportunity to build an unusually diversified economy around strong, specialized manufacturing industries oriented toward global markets. It will take imagination and coherent, coordinated civic action to realize this opportunity.

An Overview of Employment and Occupational Trends in the Southern Tier

The Southern Tier Regional Labor Market

The regional labor market is composed of employers who create the demand for labor and employees who provide the supply of labor. We look at the labor market in general and more specifically at the market for labor in manufacturing, especially the collection of industries categorized as advanced manufacturing. Manufacturing is a key economic sector in the Southern Tier counties of New York State, and some specific industries within manufacturing are growing in terms of output. Having an adequate supply of skilled labor to fill the jobs in growing parts of the manufacturing sector is essential to economic development in the region.

While manufacturing comprises only 5% of employers, the sector accounts for 18% of all jobs and 20% of the regional payroll, attesting to the importance of manufacturing in the Southern Tier.

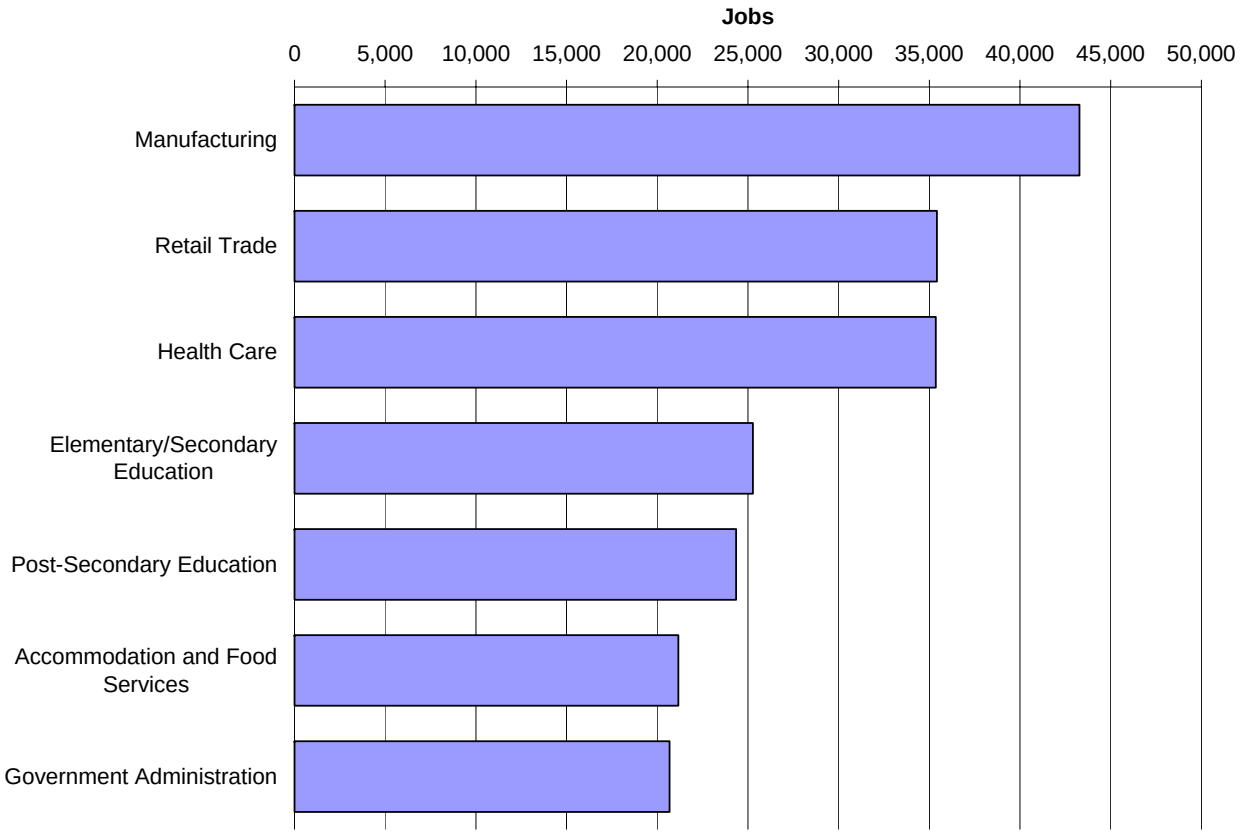
A Summary of Demand for Labor in the Southern Tier (2005 Annual Data)

- All Employers in Non-Agricultural Industries
  - 15,800 employers
  - 293,200 employees
  - $10 billion payroll
  - $34,200 in average wages
- Manufacturing Employers
  - 732 employers
  - 43,285 employees
  - $2.1 billion payroll
  - $48,800 in average wages

Source: New York State Department of Labor. Quarterly Census of Employment and Wages

The top three sectors for employment in the Southern Tier are Manufacturing, Retail Trade and Health Care, as shown in Figure 1. Following in fourth and fifth position are two sectors of educational services -- jobs in Elementary and Secondary Schools and Post-Secondary Education -- each accounting for approximately 25,000 jobs. For this report, the New York State Department of Labor combined public and private sector employers for health care and educational services. Establishments in the Accommodation & Food Service and Government Administration sectors provide 21,000 jobs. The jobs in Government Administration include the federal, state and local levels of government and do not include government jobs in health care or educational services.

Figure 1. Top Sectors of Employment in the Southern Tier, 2005



Source: New York State Department of Labor. Quarterly Census of Employment and Wages

The Economic Base of the Southern Tier, 2005

The Economic Base comprises industries that "grow" the region by exporting goods and services to locations outside the region — whether to a neighboring region in New York or Pennsylvania, or a far-off destination in Asia or Europe -- or that provide services, such as education or health care, to people who come into the region to obtain these services. These industries are central to growing the local economy because they bring money *into* the region. The net impact of these export industries on the region depends on how much of the income they generate is retained and circulated within the local economy. That impact is made greater by strengthening the ties to supporting industries and plugging the leaks (such as retail expenditures outside the region) that send money out of the local economy. By determining which local industries have a greater share of total employment than their share of total employment nationally, we can identify which export industries particularly contribute to the economic base of the regional economy.

A Location Quotient analysis of industries in the Southern Tier was performed to determine how their share of regional employment compares with those industries' share of employment nationwide. The Location Quotient is an index of the proportion of regional employment in a sector or industry relative to its national share. An index score greater than 1 means that there is a higher concentration of employment in that sector or industry in the Southern Tier.

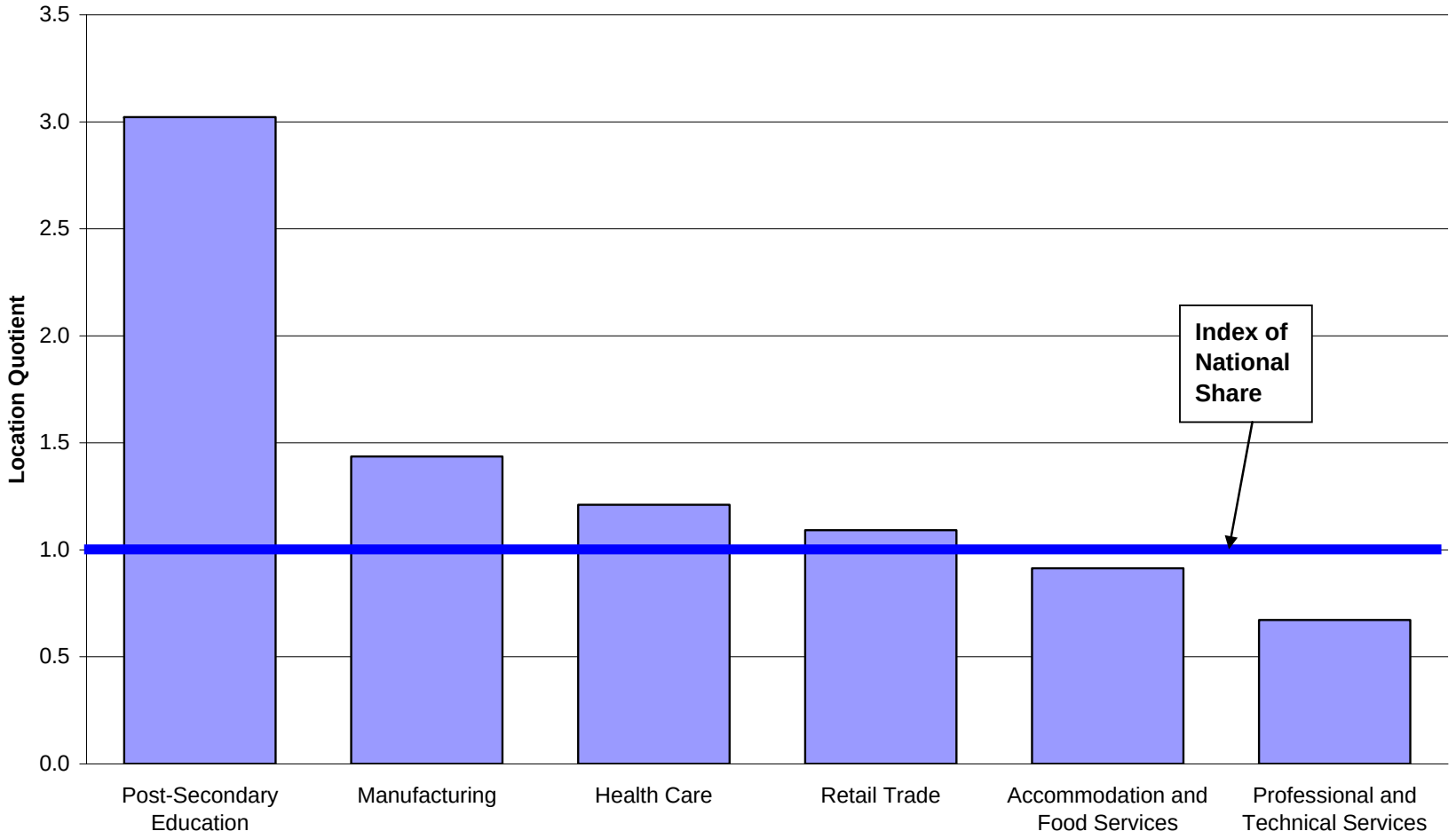
In the Southern Tier:

- Post-Secondary Education is an export industry because colleges and universities in the region draw students and research expenditures from outside the region. For this report, the New York State Department of Labor tabulated employment for both private and public post-secondary institutions, including colleges and universities, community colleges, and trade schools.

- Manufacturing is also a major export activity of the regional economy, with employment far above the national share.

- With high levels of employment, Health Care organizations are also a part of the region's economic base because at least a portion of institutions in this sector provides services to people from outside the region. An example is a healthcare facility specializing in heart transplants.

Figure 2. Post-Secondary Education, Manufacturing, and Health Care Form the Economic Base of the Southern Tier Region



Source: New York State Department of Labor. Quarterly Census of Employment and Wages

Key Industries in Manufacturing Contributing to the Economic Base of the Southern Tier, 2005

The Manufacturing Sector employed 43,285 workers in 732 establishments. The average annual wage across the Manufacturing Sector in the Southern Tier was $48,810.

Computer and Electronic Product Manufacturing (NAICS 334) is a key industry contributing to the economic base of the Southern Tier region. There were 77 establishments employing 13,198 persons in 2005, accounting for almost one-third of all employment in manufacturing. The average annual wage was $62,044, among the highest for all industries making up the manufacturing sector.

Advanced Manufacturing is a term used by the US Department of Labor to identify a grouping of specific manufacturing industries with high growth potential -- in terms of some combination of employment and output. The classifications are done at a more detailed level and some of the establishments in Computer and Electronic Product Manufacturing are included, but not all. Some of the industries in the Southern Tier that are designated by the US Department of Labor as belonging to Advanced Manufacturing include Industrial Machinery Manufacturing (NAICS 3332); Computer & Peripheral Equipment Manufacturing (NAICS 3341); Navigational, Measuring, Electromedical, & Control Instruments Manufacturing (NAICS 3345); Medical Equipment & Supplies Manufacturing (NAICS 3391); and Motor Vehicle Parts Manufacturing (NAICS 3363). In the Southern Tier in 2005, there were 113 manufacturing establishments that fit into the category of Advanced Manufacturing, and they provided 12,950 jobs with an average annual wage of $63,095.

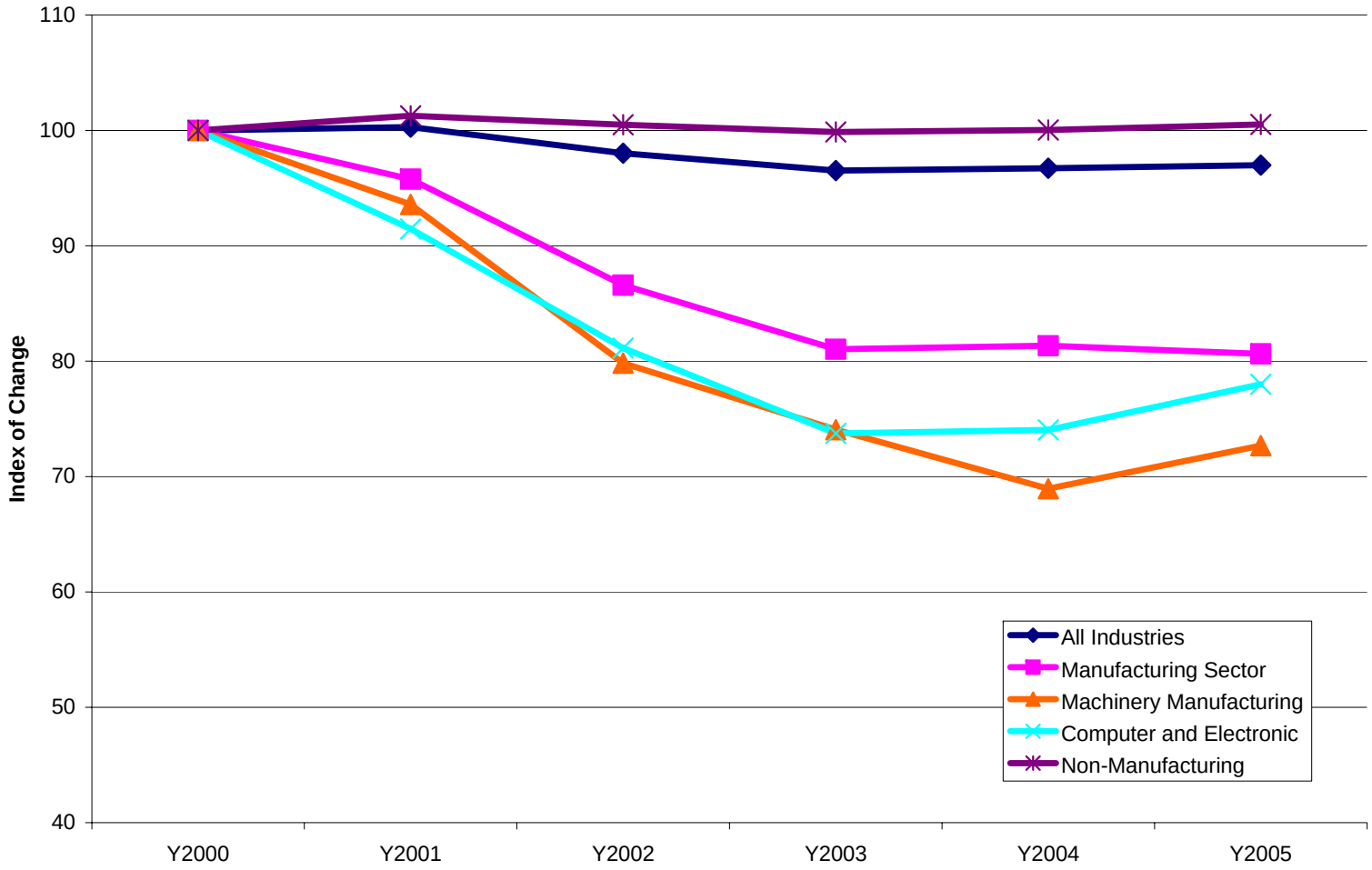
Recent Employment Trends in the Southern Tier Regional Labor Market

The number of jobs by industry relative to their base in 2000 is displayed in Figure 3. The Index of Change is set to 100 for the year 2000 and then rises or falls with the relative change in jobs.

The total number of jobs in all industries has declined since 2000, falling from 302,355 to 293,260 in 2005. Between 2004 and 2005, there was a slight rebound in jobs. The Manufacturing Sector was largely responsible for the overall decline in employment, as employment dropped by 19 percent with the Index falling from 100 to 81 in five years. Employment in the Machinery Manufacturing industry declined 27 percent, with the Index hitting a low point of 69 in 2004. Between 2004 and 2005, employment increased by more than 200 jobs. The Computer and Electronic Product Manufacturing industry had a drop-off in employment with the steepest declines in the interval between 2000 and 2002, and an upturn of almost 700 jobs in between 2004 and 2005.

During this period, jobs in the Non-Manufacturing Sectors have held steady with a very slight 1 percent increase.

Figure 3. Employment Trends in the Southern Tier, 2000-2005



Source: New York State Department of Labor. Quarterly Census of Employment and Wages

Change in Real Wages for Workers in the Southern Tier, 2000-2005

While the number of jobholders in the Manufacturing Sector fell between 2000 and 2005, gains in productivity have led to increased output in many industries within manufacturing. This has translated into gains in real wages. Change in "real wages" refers to change in the average annual wages after controlling for inflation. The percentage change in average annual wages in the figure is based on wages that have been controlled for inflation using the Consumer Price Index for Urban Wage Earners and Clerical Workers.

The largest gain in real wages has occurred in the Computer and Electronic Product Manufacturing Industry, where wages in the Southern Tier have increased more than 11 percent. The average wages in Machinery Manufacturing have barely increased, growing by just over 1 percent.

By contrast, wages for workers in the Non-Manufacturing Sectors have declined by more than –4.0 percent.

Figure 4. Changes to Average Wages in Constant Dollars, 2000-2005

Source: New York State Department of Labor. Quarterly Census of Employment and Wages

National and Regional Perspectives on Advanced Manufacturing

Advanced manufacturing is a term applied to industries with excellent prospects for growth and calling for a skilled workforce. Growth refers mainly to output, and does not necessarily mean an increasing number of jobs. If growth in output is healthy, then these industries should also have growth in real wages. The US Bureau of Labor Statistics has designated a series of manufacturing industries under the heading of Advanced Manufacturing. The following are examples of small and large manufacturing businesses in the Southern Tier that are classified under Advanced Manufacturing:

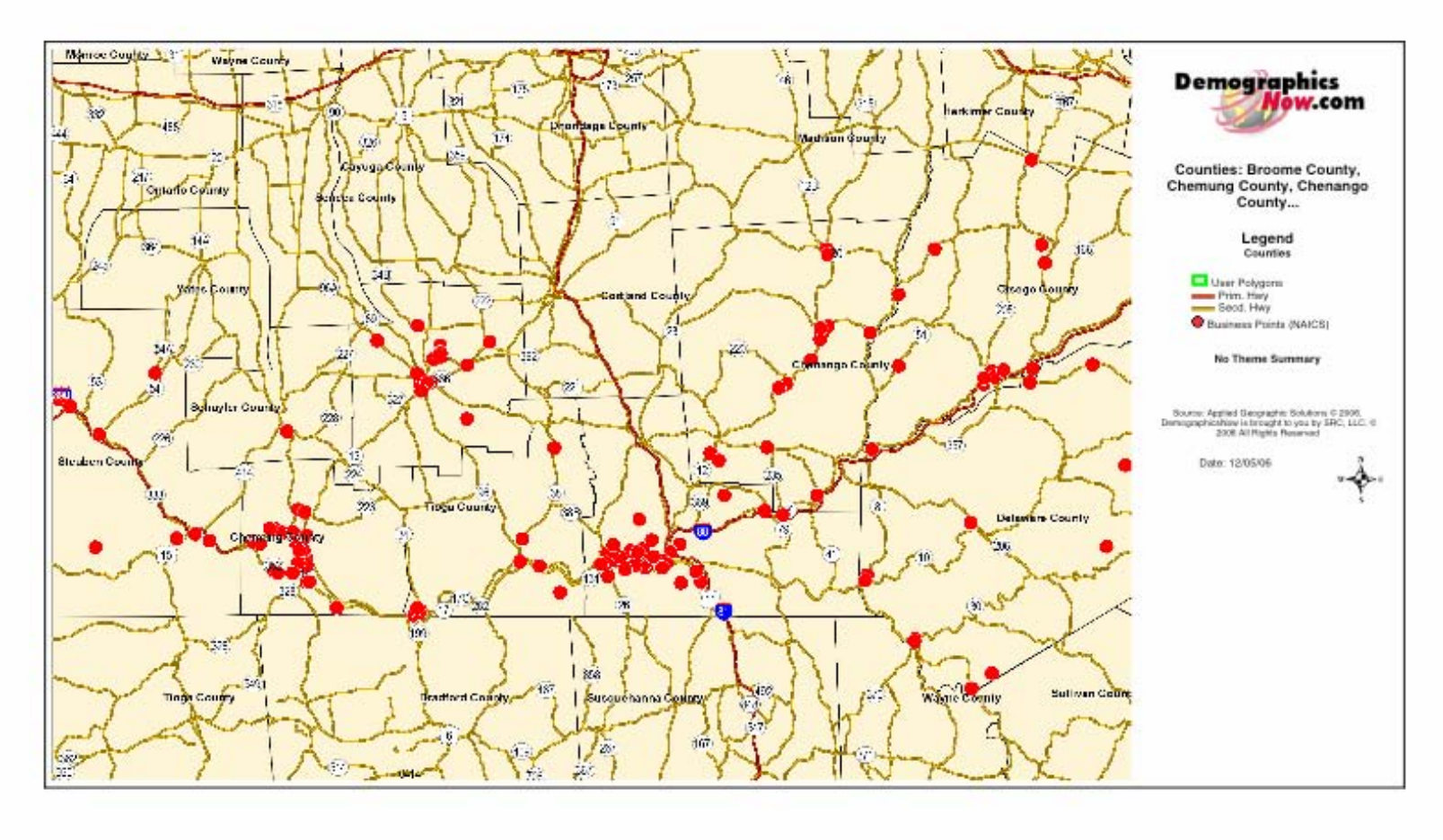
- Computer and Electronic Product Manufacturing
  - Computer and Peripheral Equipment Manufacturing
    - ICS Industries, Endicott
    - Trans Act Technologies, Ithaca
  - Navigational, Measuring, Electromedical, & Control Instruments Manufacturing
    - Lockheed Martin, Owego
    - EZ Red Co, Deposit
- Transportation Equipment Manufacturing
  - Motor Vehicle Manufacturing
    - Medical Coaches Inc, Oneonta
  - Aerospace Products and Parts
    - Norwich Aero / Esterline, Norwich
    - BAE Systems Platform Solutions, Johnson City
- Medical Equipment and Supplies Manufacturing
    - Transonic Systems, Ithaca
    - CWS, Norwich

Source: InfoUSA, Workforce & Innovation Technical Solutions (WITS)

Establishments in Advanced Manufacturing in Southern Tier Region

Advanced manufacturing establishments are distributed widely in the Southern Tier Region. There are concentrations in the Binghamton, Elmira, Ithaca, Norwich and Oneonta areas and others distributed throughout the nine counties. These data are produced by InfoUSA and are part of a workforce planning package being developed for the US Employment and Training Administration by Demographics Now.

Map 1. Distribution of Advanced Manufacturing Establishments in the Southern Tier



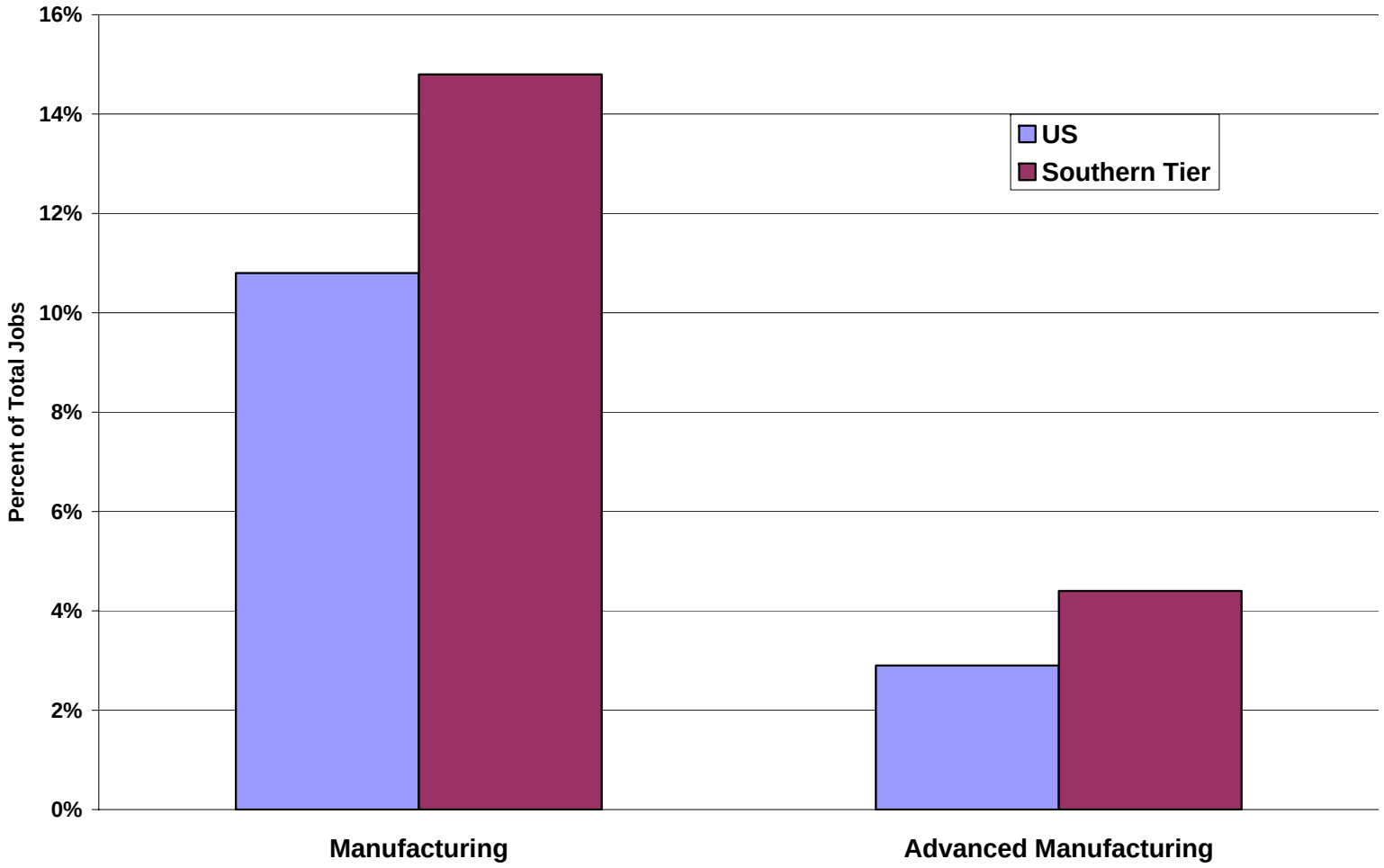
Employment and Wages for Advanced Manufacturing

The New York State Department of Labor and the United States Bureau of Labor Statistics produce the Quarterly Census of Employment and Wages (QCEW) covering establishments in New York State. In order to protect the privacy of individual establishments, data from the QCEW that might reveal characteristics of individual businesses are not publicly distributed. The Division of Research and Statistics in the New York State Department of Labor produced special tabulations of businesses in the Southern Tier Region that match the US Department of Labor's designations for Advanced Manufacturing. Advanced manufacturing industries include both high skilled knowledge intensive industries and those that carry out routine production.

The proportion of the Southern Tier's jobs in manufacturing and advanced manufacturing are compared with the United States in Figure 5. Manufacturing in general as well as Advanced Manufacturing provide a relatively high proportion of the jobs in the region and are major strengths in the region's economy.

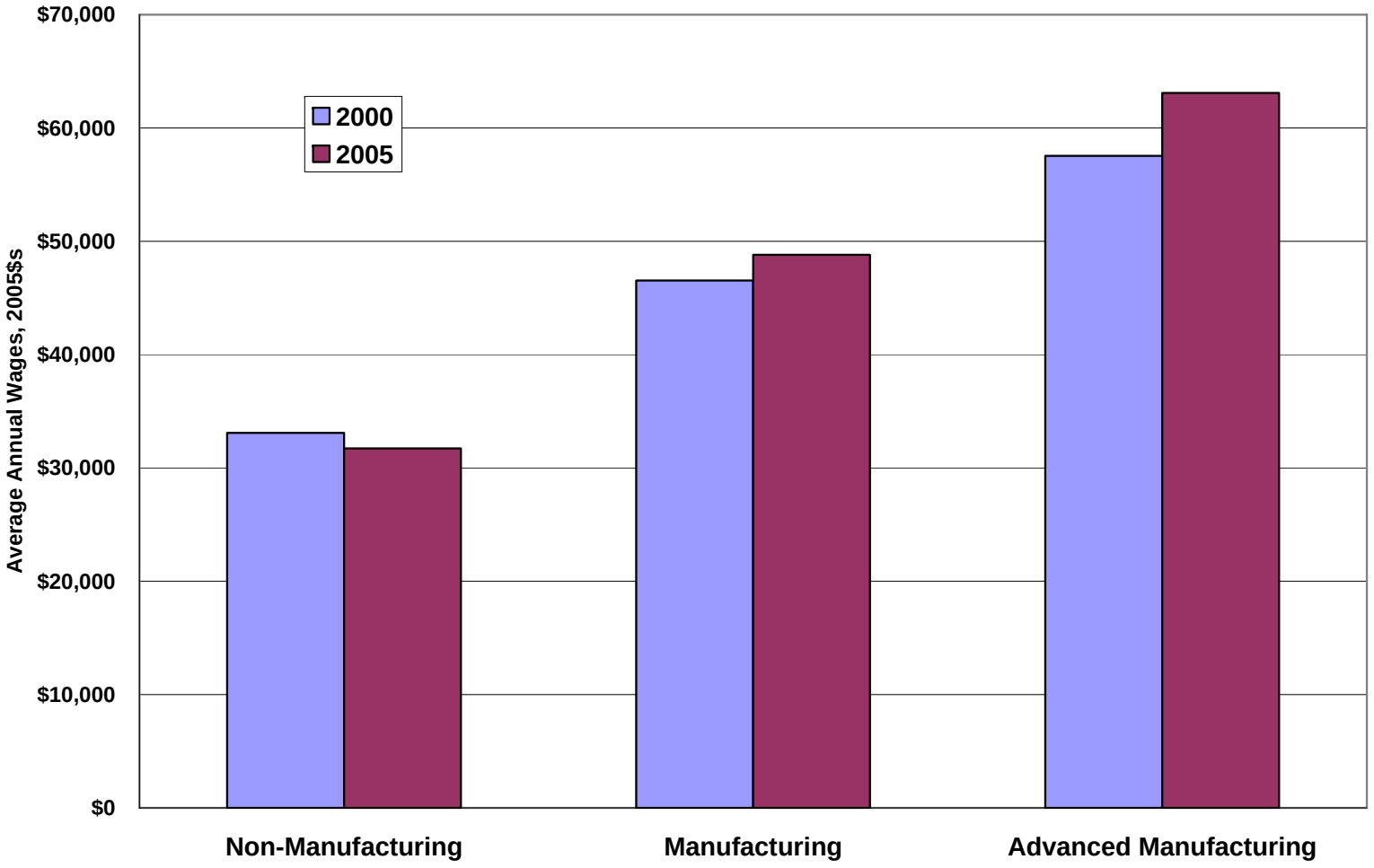
The average annual wages in 2005 (see Figure 6) for Manufacturing in general in the Southern Tier were $48,810, far higher than the wages in Non-Manufacturing, which were $31,720. Jobs in Advanced Manufacturing paid even better with an annual average wage of $63,100. The trend in wages is displayed in Figure 6. The dollar figures have been adjusted to control for inflation and are expressed as 2005 dollars in order to gauge real growth in wages. In real terms, average annual wages in Advanced Manufacturing have increased by 10 percent between 2000 and 2005. And wages in Manufacturing in general have grown by 5 percent. On the other hand, average annual wages for non-Manufacturing have declined by 4 percent.

Figure 5. Advanced Manufacturing is Strong in the Southern Tier



Source: New York State Department of Labor. Quarterly Census of Employment and Wages

Figure 6. Manufacturing Jobs in the Southern Tier are Paying Well and Annual Pay is Rising



Source: New York State Department of Labor. Quarterly Census of Employment and Wages

Supply of Labor for Establishments in the Southern Tier Region

We're drawing engineers from a 40-mile radius, from two counties north all the way down into Pennsylvania.
a medical equipment manufacturer

In this part of our analysis, we examine characteristics of the workforce that affect the supply of workers. "Journey to Work" patterns displayed in Map 2 illustrates how the residential locations of the workforce for the Southern Tier are distributed among the nine counties making up the Southern Tier Region and surrounding counties as well. For this analysis we use The Census 2000, which reported on the commuting patterns of workers, tying together their place of residence with their place of work.

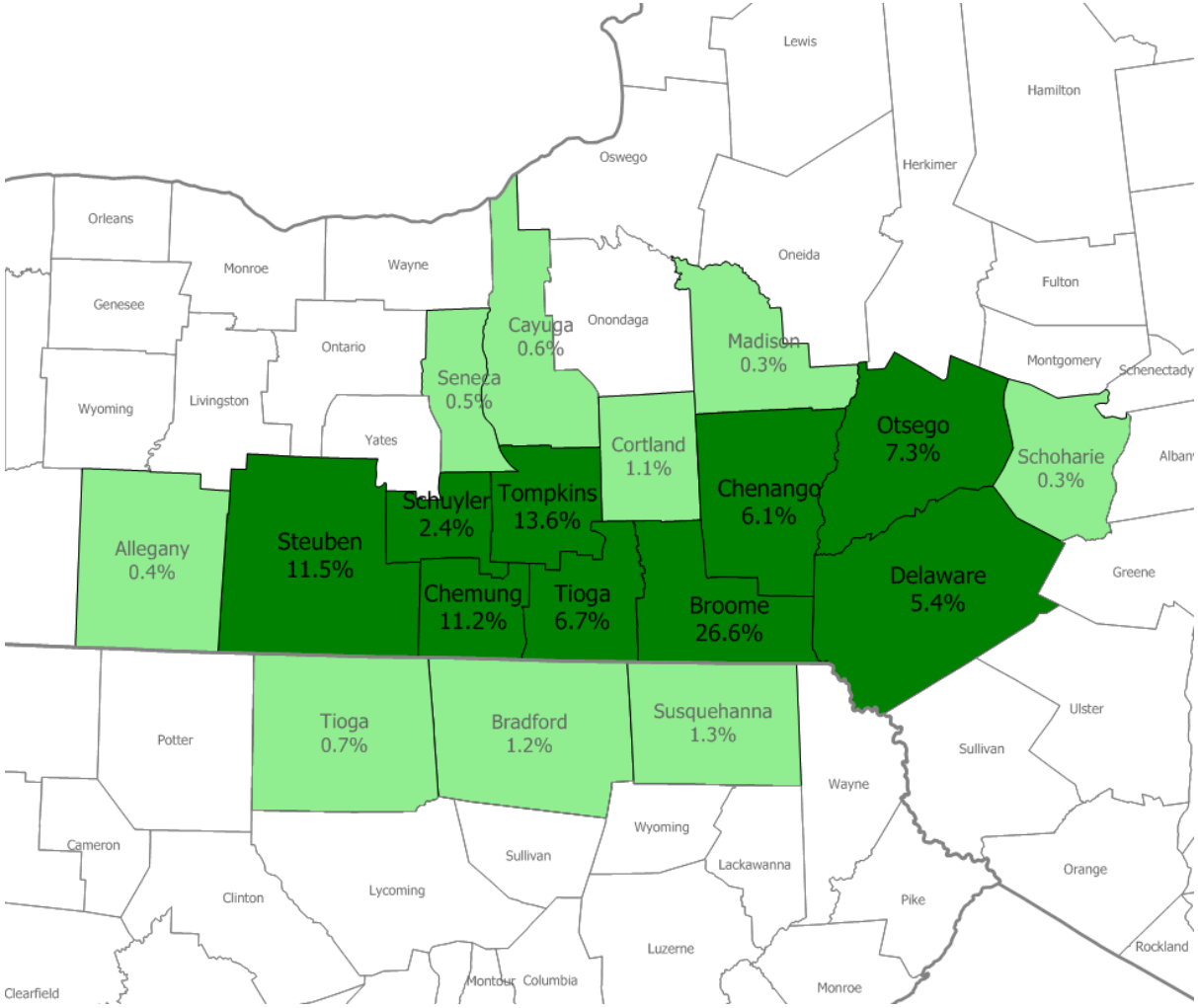
The Census 2000 estimated that 327,366 persons worked in the NYSDOL- defined Southern Tier Region, and that 91 percent of the region's workers lived in one of the nine counties within the region. Persons working and living in the same county made up 78 percent of the region's workers, while 13 percent of the region's workers commuted from homes within the Southern Tier Region to counties outside the region. The remaining 9 percent commute to work in the Southern Tier from homes outside the region.

On the following map, the nine counties making up the Southern Tier Region are shaded a darker green while neighboring counties contributing a substantial proportion to the workforce are shaded a lighter green. Three border counties in Pennsylvania—Bradford, Susquehanna, and Tioga—contributed 3.3 percent of the Southern Tier's workers.

The percentages show the breakdown by county of residence for the Southern Tier region's workforce. The reliance on workers commuting across county and even state boundaries varies by county and industry. Publicly available data from the Census Bureau limits our ability to look at commuting patterns by industry. We can look at county level data for all workers, and identify those most and least dependent on non-resident workers and where those workers live, Steuben County, at the western edge of the administrative region, drew almost 1,200 workers from Pennsylvania's Tioga County. Employers in Tompkins County relied on 2,600 residents of Cortland County as an important part of the county's workforce. The draw of labor does not stop at the county border, and extends beyond to areas outside the New York State DOL- designated administrative region.

We recruit from Syracuse to Scranton and everything in between, but you can't keep people who live too far a field because, anything over an hour away, they can't sustain it after awhile from a family standpoint.
a large defense contractor

Map 2. Distribution of Workers Working in or Commuting to the Southern Tier, 2000



Source: Census 2000, County-To-County Worker Flow Files

Population and Workforce Characteristics in the Region's Core and Peripheral Counties: The Workforce as a Regional Asset

Commuting patterns demonstrate that the supply of labor for industries in the Southern Tier extends beyond the nine core workplace counties making up the Southern Tier to an additional nine peripheral commuter counties. These 18 counties, 15 in New York State and 3 in Pennsylvania, form the larger geographic area from which employers in the Southern Tier draw workers. This is an area of slightly less than 1.2 million people supplying the Southern Tier's labor market.

Unlike a watershed where all water flows in the same direction into a basin, labor sheds are made up streams and counter streams. Some residents of the peripheral commuter counties travel to work locations in the Southern Tier, while Southern Tier residents are commuting in the opposite direction to work in one of the "peripheral commuter" counties. The labor force is a regional rather than a purely local asset.

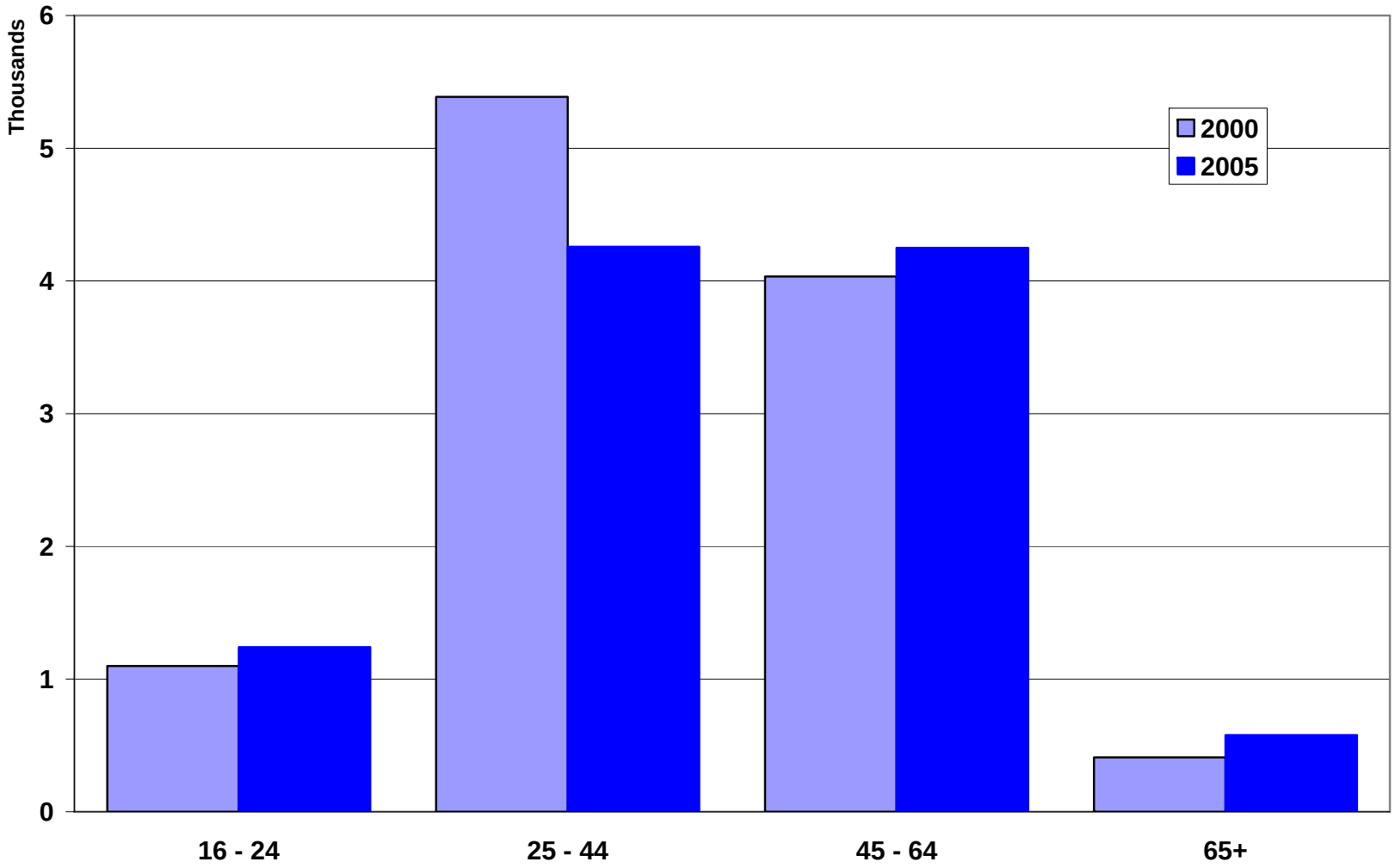
The total number of workers in the 18 counties, as reported in Census 2000, was 536,000 making up 74 percent of the adults aged 18 to 64 years of age. The number of workers may include older persons, but we are using the ages 18 to 64 as a base because they are the prime working ages. 18 percent of the workforce was employed in the manufacturing sector. The pool of Production Workers -- that is, persons reporting their occupation as one of the categories involved in manufacturing production -- was 55,000, or roughly 10 percent of the workforce.

The Census Bureau's American Community Survey for 2005 was a survey of 2.5 percent of the households in the nation. These data give us a glimpse of the changing age composition of production workers in advanced manufacturing industries. We used the public use microdata files from the American Community Survey and the Census 2000 in order to create these tabulations and were limited to the groupings of counties identified on the survey records. The correspondence between our tabulations and the larger commuter zone were quite good and only Susquehanna County, PA was left out. The production workers in advanced manufacturing were summarized in four age groups: 16 – 24; 25 – 44; 45 – 64; and 65 and older and presented in Table 7. The only age group with a decline in the number of workers was for those 25 to 44 years of age. This decline coupled with small increases in the number of workers aged 45 to 64 and 65 and older shows that the workforce is aging slightly. In the coming years with many of the workers reaching retirement ages, replacing these highly skilled workers will be a major issue.

One source of workers is recruitment from other areas of the country and the world. Of the production workers in advanced manufacturing, the Census 2000 reported that 19 percent of them had moved to the region in the past five years. Less than 1 percent of the workforce had migrated from overseas.

The total population of the larger labor market area is projected to increase only slightly from 1.180 million in 2000 to 1.186 million by 2010. The number of young adults aged 18 to 24, primary ages for entry-level workers, is projected to increase from 132,000 to 136,000 over the same interval, 2000 to 2010. Adults aged 25 to 64 are also projected to increase from 592,000 to 634,000.

Figure 7. Production Workers Are Aging Slightly



Sources: Census 2000, Census Bureau American Community Survey for 2005

Two Key Occupations for Manufacturing in the Southern Tier Region

To add depth to our analysis of advanced manufacturing industries, we examined two key middle-skill occupations for advanced manufacturing businesses in the Southern Tier. For both occupations the NYS Department of Labor predicts decreases in the total number employed (because of increased productivity due to automation and process innovation), although there will be a substantial need for replacement workers. There also may be a decline in demand across industries while some specific industries show an increase. This is especially important if the new demand is for machinists with specialized skills that are not present in total occupational labor force. In that case, you would have skill mismatch.

Machinists (SOC 519061)

> *"Set up and operate a variety of machine tools to produce precision parts and instruments. Include precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and machining procedures."*
>
> In the Southern Tier, the NYS Department of Labor estimated for 2004 that there were 15,420 Machinists at work in all industries. They project the number will be reduced to 14,950 by the year 2014. While the total number of Machinists is expected to decline by -3.0 percent over the ten year interval, the annual need for replacement workers is anticipated to be 360. Even though an occupation may not be increasing in total numbers, because of retirement and workers moving to other occupations there continues to be a need for replacement workers.

Inspectors, Testers, Sorters, Samplers, and Weighers (SOC 519061)

> *"Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment."*
>
> In the Southern Tier, the NYS Department of Labor estimated for 2004 that there were 21,150 Inspectors at work in all industries. They project that number will reduce to 19,480 by the year 2014. In spite of an anticipate decline in the number of Inspectors, the average annual number of openings for Inspectors will be 480, due to the need to replace those who retire or move on to other occupations.

Growing Industry and Shrinking Employment

In explaining the dichotomy between a growing industry and shrinking employment, the US Bureau of Labor Statistics observes:

> *"The manufacturing sector's overall outlook is continuing demand-driven output growth, coupled with productivity-led employment declines."*

The computer and electronic product manufacturing industry -- which includes computer, communication, semiconductor, and navigational production -- highlights the dichotomous relationship between the growth of manufacturing output and the productivity-led declines in employment. Firms within this group, pushing the envelope of technological innovation, are expected to see their output grow as they continue to create new products and expand markets such as digital technology, artificial intelligence, and multimedia applications, and as the Internet and demand for global information networking flourishes (*Monthly Labor Review*, November 2005).

Employment gains will be limited, however, as companies continue to implement productivity-enhancing technologies, outsource jobs overseas, and face stiff import competition.

What Do the Employers Have to Say?

Our interviews and focus groups with employers covered a wide range of topics. A summary of the interview questions that we used is included as Appendix A to this report.

> *Looking around the table at our firms, the themes I see are:*
> 1. *Founders who are from the region.*
> 2. *People who went to Binghamton U.*
> 3. *A reputation as a good place to work.*
> 4. *Export markets – we're all selling 90-100% outside the region.*
>
> an electronic component manufacturer

Manufacturing Matters

The single most important theme that ran through all our interviews and focus groups was that, despite losses of manufacturing jobs, manufacturing is still critical to the New York State economy. Employers in the Southern Tier indicated frustration with what they perceived as New York state neglect of manufacturing as central to a diversified economy in regions West of the Hudson Valley. They attributed this neglect to:

- Statistics that do not capture regional trends separately. State statistics are biased by Hudson Valley and Downstate trends. There has been no effort to highlight the Southern Tier's manufacturing strengths in the U.S. The last regional analysis was done by a California non-profit in the 1990s.
- The media, especially downstate, focuses on Upstate job losses rather than on productivity gains. There is no equivalent of *The Rochester Business Journal* serving the Southern Tier to report on the trends specific to the region.
- Small growing firms have less visibility than large, downsizing firms, and lack a regional trade association.
- Large and small firms are oriented toward lean production, with fewer workers doing more complex work. Advanced manufacturing employment has been growing slowly but has a positive economic impact on the region because of the high wages earned by the workforce.

> *Lean Manufacturing is the only way we're going to stay competitive. We have a plan for growth, but the only way we can do it, given the workforce and the size of our factory, is lean manufacturing.,*
> *a medical equipment manufacturer*

We have no turnover. The problem is finding people in the first place.
a software/hardware maker

When we lose people, it's to other local contract manufacturers.
an electronic packaging firm

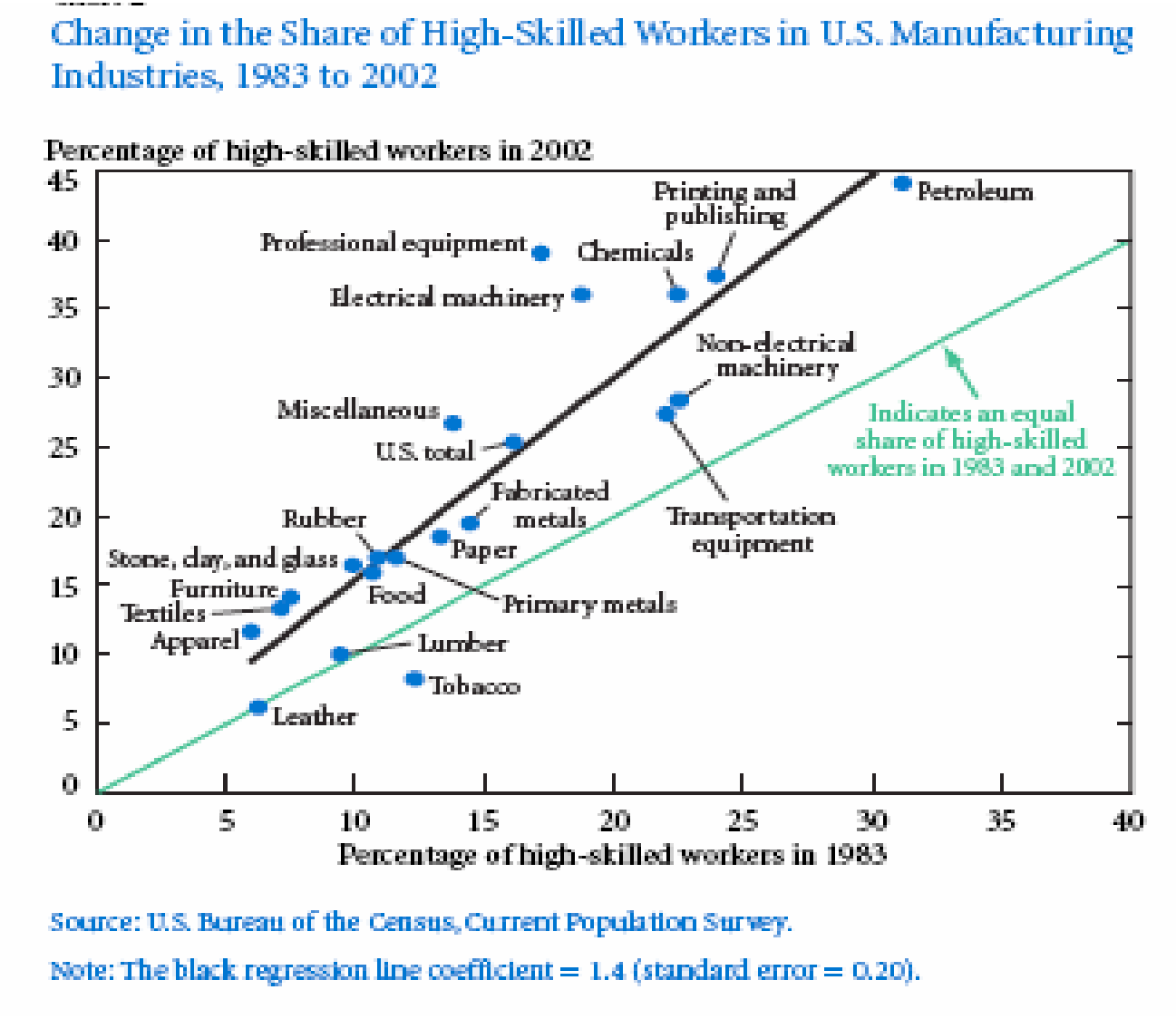
Economic development officials point to the difference between the old and new manufacturing economy.

- Although the total number of jobs has declined, manufacturing produces 64% of the nation's exports and almost 25% of our total economic out-put.
- Manufacturing jobs remain "good jobs" -- total compensation is 20% higher than that of the average U.S. worker.
- A strong manufacturing sector contributes to a more sustainable, diversified economy.
- High skill jobs are growing in manufacturing as industries restructure.
- A strong manufacturing sector has "ripple effects throughout the economy", producing jobs in business and consumer services and retailing.

We sell 100% outside the region, but we try to buy locally as much as possible in supplies and subcontracts because our founders are dedicated to the community. We do all of our fabrication locally.
a medical equipment manufacturer

The graph below demonstrates how the proportion of high skilled workers in manufacturing sectors increased between 1983 and 2002. [5]

Figure 8.



[5] Deitz, R. 2006. "A Leaner, More Skilled U.S. Manufacturing Workforce" www.newyorkfed.org/research/current_issues

How Do Firms Obtain the Workers They Need?

Our interviews and focus groups indicated different challenges and strategies among small and large firms.

Large Firms

High-Skilled

National recruiting and "go to where the workers are"

Medium-Skilled

Promote from within: Both national and regional recruiting

Entry-level

Applications from broader regional labor market and training

> *Most manufacturing non-exempt employees are local, though we've had to recruit nationally for some specialties. Entry-level management we have traditionally developed from within, again with a few from outside the region in some technical specialties. Engineering is a national market, and they tend to jump around depending on who got the latest contract.*
> a large defense contractor

Small Firms

High-Skilled

Regional recruiting

Medium-Skilled

Promote from within: Some regional recruiting

Entry-Level

Applications from local labor market and training

> *At the lower end of the skill spectrum, it's a mixed bag. #1, we look for attitude and work ethic; #2, someone who's trainable. Then, we'd like to have basic math and maybe blueprint reading skills. For the middle -- first line supervisors and lower management – we try to develop people internally first, if possible. In engineering, including drafting people and records people as well as degreed manufacturing engineers … we've got a good supply in this generation, but not the next.*
> an electronic component manufacturer

Small firms rely on personal networks for applicants. They assume that they will need to train most of the entry-level workers they hire. To obtain mid-skill workers, including first line supervisors, and technicians with specialized skills, they promote from within the firm. They have particular difficulty attracting the engineering talent they need because they typically recruit from within the region rather than nationally.

We tried to advertise, and it was a disaster. Lockheed Martin has so swamped the local paper that your little ad doesn't even get seen. National ads yielded completely inappropriate resumes; we got zero interviews out of it. We do better talking with people we know.
a software/hardware maker

Large firms cast a much wider net when recruiting at all levels. They advertise for entry-level workers beyond the region in the broader Upstate area and in Pennsylvania. They obtain mid-skill workers by advancing from within the firm but, because they need many specialized skills currently in low supply in the region (for example air craft painters), they are recruiting nationally for many mid-skill jobs. They use a wide variety of methods, including large summer internship programs and national advertising to recruit the engineering talent they require. Recruiting emphasizes the Northeastern states because potential employees are less likely to be afraid of cold weather and more likely to have a positive view of Upstate New York.

Advertising is very ineffective for us; you see the same resumes over and over. We've had to do a lot of focused sourcing through Monster, our own website, and using recruiters more now.
a large defense contractor

What Limits the Region's Ability to Attract High-Skilled Workers?

The polls should get out and look at what other states have done. I started out here, went to Raleigh where everything is new, then to Vermont where it's not, but when I came back here, even I thought "Holy cow, everything's old here!" The visuals are hard to overcome. It looks messy. Old has got to be quaint, not just dilapidated.
a large defense contractor

Our interviews and focus groups cited four factors as most important to the ability of firms in the region to attract the skilled workforce they need:

- A negative perception of the Southern Tier as a place to live. They cite the appearance of urban areas in the region as a particular "turn-off" to potential employees unfamiliar with the region. They said that the problem is not necessarily the fact that the buildings are old, but rather that there has been a lack of investment. They also cited the negative image of Upstate New York as, at the same time, expensive and poor.

- Lack of a critical mass of firms that could provide alternative employment opportunities. Although the electronics industry is expanding, there is still a problem achieving a "critical mass" in comparison with other concentrations of electronics firms, such as those in Texas and California. This is particularly important to attracting skilled workers, who know that when their current multi-year projects end, they will be back on the job market. Employers find this problem difficult to tackle because they don't want to advertise the other job opportunities in the region, but recognize that it hinders them in attracting skilled employees.

- A limited supply of the kind of housing stock and suburban communities that skilled employees are accustomed to and prefer.

- Poor access to near-by large cities. The Southern Tier is perceived to be an isolated region, and better transport connections to New York and Philadelphia would alleviate that isolation.

A plus for the region should be the cost structure for young families, especially housing, but strangely, we've struggled because of the housing market here. There's little temporary housing, prices have doubled, it takes a long time to buy compared with elsewhere, and assessments are so high that new homes don't get built. It's an availability issue, not an affordability issue.
a large defense contractor

Employers and their representatives also talked about the cost of living in New York State – high taxes, gas prices, transportation, and consumer energy costs. In discussing taxes, they noted that New York is competing with other high cost states – Massachusetts, New Jersey, Connecticut – but they emphasized quality over absolute cost, that is, the quality of services received per tax dollar is poor.

They also noted the costs to employers of being in a state that had too many jurisdictions, making for less cost effective public service provision and too much bureaucracy.

I think the key is the infrastructure to make people feel good about living here -- the way it looks as they drive around, and socially -- to support a sense of community.
The big 3 are:

- *Our downtowns need help. The kids – young singles – need a place to have a social network: nightlife, sporting events, bars.*
- *We need to entice builders to build new, mixed, planned communities, not just one house at a time like they do here.*
- *Indoor recreation centers for families during the winter months, like they have in Ohio.*

The other big liabilities we face in selling the region are:

- *Income taxes vs. other states. Once they get that idea in their head that taxes are high here, it's hard to shake.*
- *All the layers of government you see here, especially when people look at what value I am getting in government services quality for my money vs. elsewhere.*
- *The inflexibility of state monies – the tobacco settlement monies, for example -- to respond when the floods hit Binghamton, or to jazz up downtown.*
- *A very negative press and inward-looking populace.*

a large defense contractor

What Attracts High-Skilled Workers to the Southern Tier?

You cannot sell this area by explaining to someone from the Carolinas or Dallas about the short tee times or the park system or the hunting & fishing; they have to experience the benefits of it.
a large defense contractor

Our interviews and focus groups identified four factors as important in attracting high and mid-level skilled workers to the Southern Tier:

- Previous experience with the area. The mostly likely candidates to take jobs had family connections in Upstate New York or had attended school in the Upstate area. Many of our focus group participants had undergraduate or graduate degrees from an Upstate University.
- The quality of life. Our interviewees identified the "sense of community", outdoor sports (hunting, fishing, hiking, running, golf) and short commute times to work as significant advantages.
- The quality of schools and educational opportunities at every level, from primary school through college.
- The quality and range of cultural opportunities, which was noted as exceptional for a region of this population size.

If you can get interns to come here for a summer, and especially two summers, it's a lot easier to persuade them to hire on. They had fun, they learned a lot, they see we have some cool programs, they see a ton of talent … and they become a part of the technical community, which in turn helps sell the area.
a large defense contractor

The employers also noted that these attractions are more important to older (over 30 years of age) workers. Attracting younger workers requires a different strategy, focused on vital central city environments with social and cultural opportunities.

The arts community, that's been a tremendous benefit.
a large defense contractor

What Would Improve the Skills of Entry-Level Workers and Decrease Training Costs?

This question has been raised many times, and the answers typically focus on basic skills and positive exposure to work in manufacturing. The employers we interviewed expressed frustration at the lack of exposure to manufacturing work in primary and secondary schools, and to advanced manufacturing and electronics as an interesting and valuable field.

> *A lot of the conversation (among employers) is about the disconnect between what businesses need and what parents encourage their kids to go into.*
> a WIB Director

> *It's hard to find people in the next generation without a sense of entitlement.*
> a software/hardware maker

Our interviewees described in various ways a workforce that is bifurcated between highly skilled people coming out of New York institutions of higher education, and people who have adapted to a situation of declining opportunities for people with minimal skills.

> *We can't expect to make a workforce when they don't know what it is to work. A lot of our applicants have no idea what it means to be an employee. I choose employees based on whether I think they can learn.*
> an electronic packaging firm

All of the employers we interviewed do some training, and in many cases training that extends over a number of years at great expense. They are prepared to hire entry-level employees with little or no experience if those applicants have the desire to learn and work hard, as well as "soft skills" such as basic reliability as an employee and the ability to work in a team.

> *Most of our workers are trained by us. Of a thousand applicants, less than 50 have any schooling in what we do. We now see mostly high school graduates, and too many are applying only because Dad said, "Get out and get a job."*
> an electronic packaging firm

What I hear from our manufacturing HR person is that the skills they need most are:

1. *soldering skills;*
2. *basic electronics;*
3. *interpersonal and conflict resolution skills – to work on a team, and maybe to train or supervise others;*
4. *and blueprint reading.*

a large defense contractor

We really can't find the skills we're looking for off the market. We have to teach and train things like winding or soldering. So, you look for personality: drive, the desire to learn, the interest in a challenge. Even at the level of engineers, we can't expect people to walk in with the right skills. We have to train them.

an electronic component manufacturer

Employer and Training Provider Insights on Skill Needs and How to Better Meet Them

Our interviews and focus group indicated that employers in advanced manufacturing are connected to a surprisingly wide array of educational institutions, including the regional Community Colleges, SUNY Binghamton University, BOCES, and Cornell University. They utilized college internship programs and community college training programs. While generally satisfied with the quality of skill provision in the existing programs, they felt that too few people were entering or graduating from the programs from which they drew job applicants.

> *The community college has a very good program for electronic technicians (but) I just hired an electronic tech, and got just <u>five</u> resumes. BOCES used to have an electronics program, but it went away for lack of interest from students.*
> a medical equipment manufacturer

In assessing what might help to fill the "skill gap", the following suggestions surfaced:

Community Colleges need help with funding, and building the market for, courses and training programs. They face significant risks in establishing training programs, and don't have adequate means to assess whether there will be sufficient applicants to warrant their cost, or to increase the applicant pool. While Community Colleges in the region have programs that contribute to the labor supply for skilled manufacturing workers (such as the Broome Community College program in electrical engineering technology and the Corning Community College programs in machining technologies and electrical technology), the number of participants in these programs is small. Graduates frequently leave the region or go on to Bachelor's degree granting institutions. Scaled up programs are needed, but require more public – private - nonprofit partnerships to design, market, and financially support them.

More cooperation among Community College training programs across the Southern Tier, allowing people residing in one region to access training in another. This would enable the educational infrastructure to begin to replicate the range of training and skill acquisition opportunities available in more populous metropolitan regions.

Two interviewees noted that other states, such as North Carolina, have more effective methods to include Community Colleges in statewide planning for industry-specific skill development. [6]

[6] For a description of innovative community college programs focused on industry –oriented training, see Stuart Rosenfeld and Cynthia Liston. "Cluster Hubs: Putting Learning in Context." *Community College Journal* December 2006/January 2007: 16-21.

Small and medium size employers have different labor force needs than large firms. While large firms have resources to seek out employees, including national networks and advertising budgets, small firms must rely on personal networks and local employment programs. Small employers also had some very imaginative ideas about how to locate workers who might have the kinds of related manual skills that would make them good employees in electronics products manufacturing.

- Among the most difficult skills to obtain are small hand skills – ability to work with tiny parts and soldering skills. They noted that jewelry manufacturing requires similar basic skills and that workers employed in that industry might be recruited to work in electronic packaging.

- They also suggested potential workers might be found among former military personnel returning to Upstate New York.

These kinds of suggestions indicate that small employers are thinking hard about where their future workforce is going to come from and should be consulted as part of any strategic workforce planning effort.

It's hard to write everything in 4th or 5th grade English when you're dealing with electronics. For about a third of our people, English is their second language, so their English skills inhibit training.
an electronic packaging firm

Even in the low-end jobs, we need to have some level of computer skills, even data entry or dealing with a database. Logic flow is a big part of the software programming we do, so any experience programming machine tools or reprogramming CADD equipment is a big leg up.
a component assembly firm

Our biggest problem is finding and keeping employees with the mechanical skills we need in maintenance and molding operations. We've gotten some out of automotive because they know repair diagnosis and can work with machinery. It's tough to find middle level skills; in the CADD area, for example, maybe 2 out of 20 resumes are possibly qualified.
a motor manufacturer

Because of the difficulty of recruiting engineering talent from outside, we have to have a pretty solid engineering base that is local. That means we need solid K-12 schools and a good community college system. A lot of our engineers started in the engineering program at the community college, then went on to a 4-year school. Now I hear the community colleges are going in a different direction, more focused on the liberal arts. Wrong direction. I think that's not well suited to our economy or our needs in this region.
a large defense contractor

Positive Developments in Meeting Workforce Needs

We put our people through a yearlong program in lean manufacturing. It was a big commitment, but the interesting payoff was a night-and-day change in attitude. Suddenly our people were thinking, "Someone actually cares about us and what we think."
a medical equipment manufacturer

There is more recognition of the role that workforce skills play in strengthening County economies and regional labor markets. This recognition has resulted in workforce oriented programmatic initiatives by economic development agencies and educational institutions, and more partnership building among educational institutions, workforce development agencies, economic development coalitions, and community organizations.

- In Chemung, Schuyler and Steuben counties, the CSS Workforce Investment Board has joined with Corning Community College and Greater Southern Tier BOCES to build a skill development program in advanced manufacturing, using a model of industry-specific, employer driven and designed curriculum development. Because of current funding streams, the initial program focuses on the under-skilled and the creation of competent entry-level workers. This model features careful assessment and a wider support network of services to enable entry-level workers to sustain themselves in obtaining the training that they need.

- Corning Community College and its partners are opening the Chemung County Academic and Career Advancement Center in Elmira to provide a wide range of assessment, skill development, and support programs.

- Broome County has initiated a program to develop the region's first entry level manufacturing certification program. Skills developed in the 52-hour program include hand tool usage, shop floor math, technical report writing, interpersonal communications skills, and basic computer skills.

- The Alliance for Manufacturing and Technology has stepped up its efforts to help small and medium size enterprises strategically plan and undertake lean production programs in order to increase their competitiveness.

- The Greater Binghamton Coalition has undertaken a program to help employers attract young talent by connecting them with young "ambassadors" already located in the region.

We know that we've got to build the rest of the pipeline. Right now our program is trying to build the competencies of the underskilled, low-income person just entering or reentering the workforce into a trainable entry-level employee, but we know the next thing employers will say is "OK, now how are you going to address the incumbent worker?"

a community college training provider

Future Trends Affecting the Southern Tier Workforce

If we look at the future, there are both near-term and long-term trends and challenges that will affect the economic development of the Southern Tier.

Near-Term

- A well-documented, persistent labor shortage for entry, middle, and high skilled jobs in advanced manufacturing is inhibiting growth in the region.

> *We do anticipate downturns, but we are restricted by the legislation: firms are not eligible for the program until after they report a loss in sales, and they must prove that their losses are a direct result of import competition.*
> a statewide broker of business consulting services

- A skill mismatch with the available workforce. There is still an unemployed and underemployed workforce in the region. It is unclear how they can come to benefit from the growth in the advanced manufacturing, or whether wages in non-manufacturing jobs in the region will eventually rise.

> *It's easier to find entry-level people because several companies have been shrinking. The big gap is in middle level people with 5-10 years experience … those are hard, hard to find.*
> a software/hardware maker

- Increasing need to assist existing small and medium-sized firms with competitive strategies. The concentration of electronic packaging firms in the region, for example, is critically important to its advanced manufacturing potential, but they are subject to intense competition. They need help in strategic planning, lean production processes, and in identifying and reaching new markets.

> *The Southern Tier is behind the curve in adapting to new market conditions. Some smaller firms don't know how to adapt when their target market has shifted, and can't afford to bring in help to assist them in making the transition from being a captured contractor of a large firm to identifying new markets.*
> a business development consultant

Long-Term

- Defense contract drawdown. Defense contractors are diversifying, but they also are relocating operations outside the region in the search for high-skilled labor, particularly specialized engineers. More strategic planning needs to be done to determine ways to take advantage of the infusion of investment represented by defense contracts, but also to anticipate the end of this investment surge. Defense contracts are an opportunity, but need to be considered in the context of plans for developing a sustainable regional economy.

> *Military contracts have long cycles: 5 to 7 years to develop a prototype, but then – if you get the contract -- it can last you 15 to 20 years. Of course, they can just cancel the contract at any time, too.*
> an electronic component manufacturer

- An aging medium-skilled workforce. The advance guard of the baby boom is aging, and their skills will have to be replaced in the workplace. It is not clear, however, how fast aging workers will retire, given longer life spans and the need for income into the traditional retirement years. More information is needed as to the rate at which older workers will retire and what the replacement needs will be.

> *The "brain drain" and an aging workforce have some firms in a panic.*
> a business development consultant

Beyond Winners and Losers: Planning for a Diverse Economy, Oriented Around High Productivity Manufacturing

The conventional way to understand economic restructuring is to look for winners (those adding jobs) and losers (those down-sizing or reducing the size of their workforce). The situation in the Southern Tier presents a more complicated situation, because the *overall* growth and long-term vitality of the manufacturing sector is dependent on the ability of *each* small and medium-size firm to produce more with fewer medium-skilled and high-skilled workers. Our interviews and focus groups indicated that manufacturing firms in the Southern Tier are intensely interested in lean production methods in order to increase their competitiveness in global markets … and the personal engagement of their workers. This kind of "process innovation" is likely to slow the growth of the manufacturing workforce but, at the same time, produce a growing array of successful export base businesses that pay higher wages. The employment of these workers will, in turn, fuel growth in other sectors of the regional economy because of their purchasing power.

So, decision-makers must move beyond the concepts of winners and losers to look at product innovators, process innovators, and the synergy between the two. Real growth in employment comes with the development of new products. There are a number of firms in the Southern Tier creating new products – hybrid engines, flexible electronics, and pharmacy automation and workflow equipment, for example. These firms depend on process innovators, such as electronic packaging firms, that are implementing lean production in order to compete in national and global markets. Long-term planning needs to focus on the *product* innovators, but with an understanding of how they can be served by a value chain of *process* innovators in the region.

There also has to be more thought given to how to capture the growth occurring in the region. The "leakage" of retail and service expenditures outside the Southern Tier diminishes the job creation potential of the investment in advanced manufacturing, and the potential tax revenue that could be derived from an expansion in that investment. The ability of workers outside the advanced manufacturing sectors to "keep up" depends on capturing more of the expenditures that currently are made outside the region. This includes both business and personal expenditures.

On the state level, they have used a "shotgun approach" to address foreign competition issues in the past. The state has too many programs spread throughout too many agencies, and this often leads to competition among state agencies rather than a cohesive policy plan that can deliver results.
a statewide broker of business consulting services

Next Steps

This pilot study demonstrates how a combination of "on the ground" interviews and focus groups combined with an analysis of relevant data can potentially assist regional decision-makers, particularly those at the county level, in anticipating and preparing for workforce needs in their regional labor market.

The broader goals of the NYSAC – Cornell project are to help County leaders develop strategic economic development / workforce development plans that use Upstate New York's unusual advantage in labor force skills and educational institutions to grow their regional economies.

> *The Southern Tier has good economic development agencies, but is a long way from integrating economic development and workforce development.*
> a county economic development director

The results of this Pilot Study can be enhanced and extended in the following ways:

The Development of Partnerships across Key Employers, Organizations and Institutions

- Our interviews and focus groups indicated that new partnerships are developing among economic development and workforce development organizations, institutions of higher education, and both large and small firms. These partnerships are particularly evident in Broome, Tioga, Chemung, Schuyler, and Steuben Counties and need to be extended across the Southern Tier.

- Partnerships between economic development and workforce development organizations need to emphasize the development of middle and higher-level workforce skills as critical to building the economic strength of the region.

Research

- Studies reviewing strategic plans for workforce development indicate that other states, such as California and Pennsylvania, have proposed steps to understand the role advanced manufacturing is playing in changing the state economy, and its implications for policy toward regions with a concentration of firms in a particular industry within advanced manufacturing. New York State needs to draw on the models being developed in other states in devising -- in cooperation with local officials -- policy solutions specific to industries and regions.

- A more extensive examination of export base industries and their workforce issues in the Southern Tier Counties will sharpen our grasp of the common issues and remedies likely to have the greatest impact on regional economic growth.

- We need to reexamine the historic divide between Economic Development organizations working with firms at the high end, and Workforce Development agencies working with workers at the low end, of the skill spectrum.

- Parallel studies and convening efforts in other regions of Upstate New York will illuminate common themes, help identify workforce development models and specific programs that would be beneficial if replicated in other areas of the state, and explore the current relationship and potential synergies between differing regional industry concentrations in the advanced manufacturing sector.

- While beyond the scope of this Workforce Intelligence project, it would be desirable – both empirically and politically – to document via an input-output model the "ripple effect" that a strong manufacturing sector has on producing jobs in business and consumer services and retailing throughout a region.

Questions to Be Considered

- What strategies can be developed for retaining college graduates and attracting younger workers, focused on vital central city environments with social and cultural opportunities. How do they differ from those strategies for attracting and retaining experienced workers? Is there an intersection?

- How do we rethink how Upstate New York is portrayed to potential employees and relocating firms as part of a strategic effort to highlight its strengths in advanced manufacturing. What are the roles of various levels of government in this effort?

- How can we support educational institutions to better provide for the labor market needs that stretch across counties in the Southern Tier?

We gathered a group of potential incoming employers, and they pretty much laid out what they look for in deciding where to locate, <u>in order</u>:
#1, the numbers, demographic profile and skill level of the workforce.
#2, what resources you have to train them.
#3, what funding is available for training.
And then #4, even before they get to things like tax incentives, are quality of life issues.
a tri-county "strategic summit" member

Appendix A

NYSAC Workforce Intelligence Interviews -- Questions for Firms

About your business ...

1) Why is your firm located in the Southern Tier region?
    a. Founded here; B) Customers here; C) Workforce; D) Other

2) How has your firm developed over time?
    - Did it develop from an incubator program?
    - Did it develop from a university-based research program?

3) How would you describe the products you produce?
    - What proportion of them go into military hardware?
    - What do you do when military contracts decline?

4) What is the market for those products?
    - What percent of your products do you sell to Southern Tier firms?
    - What percent do you export outside the region?

5) Is there an intersect between your business and the photonics industry … in products, markets, or skills needed?

6) Do you know what NAICS Code your business falls under?

7) Is your firm unionized?

8) Is your firm's work organized around projects or continuous production?

9) How are trends in supply chain management by your customers affecting your business and workforce needs?

About finding the skills you need ...

10) Do you out-source skilled work outside the region?
    - Are there activities that you would keep in the region if there were subcontractors with the appropriate workforce?
    - Are there activities that you would do in-house if you could find the appropriate employees?

11) How do you recruit: A) high-skilled workers (e.g. engineers); B) medium-skilled workers (e.g. machinists)?

12) Which occupations or skill-sets do you have the most difficulty recruiting? Why?

13) With whom do you compete for high-skilled and medium-skilled workers?

14) Do you work with local temp firms? How does that work out?

About developing the skills you need ...

15) Do you train your own workforce? In what skill areas?
    Do you use external programs to train your workforce? Again, in what skills?
    - Which programs do you use and where are they located?
    - What certifications do you seek, and why?

16) Is there a career ladder for people to advance within your firm, or do your people find that they have move to another firm to get a job with more responsibility?

17) Do you interact with colleges and universities in obtaining high-skilled and medium-skilled workers?
    What about community colleges and technical schools?
    If so, how … and which ones?

18) Do you offer internships?

19) What organizations do you work with to solve your labor force needs?: WIBS, colleges, community colleges, technical schools, private providers, non-profit providers, trade associations, websites, email listservs, informal networks.

About the future …

20) What proportion of your workforce is nearing retirement?
    What are your plans to replace those workers?

21) What do you anticipate will be your skill needs in the future?

22) What do you anticipate will be your hiring needs in the future?

Recommendations …

23) What could the following players do to improve your workforce situation:
    - Government agencies (especially at the county, multi-county, or state level)?
    - The public schools?
    - Community Colleges and Voc Ed schools?
    - Colleges and Universities?
    - Professional and trade associations?

Appendix B

List of Interviewees

Tompkins County Area Development (TCAD)

Felchar Manufacturing Corporation
Binghamton NY

Work Force Development / Community Education
Learn to Earn
Corning Community College

Lockheed Martin Systems Integration – Owego
Owego NY

The Alliance for Manufacturing & Technology
Binghamton NY

C & D Assembly, Inc.
Groton NY

Greater Binghamton Coalition
Broome and Tioga Counties

Pipeline For Progress
Corning NY

Innovation Associates
Johnson City NY

BAE Systems Electronics & Integrated Solutions
Johnson City NY

Broome-Tioga Workforce Development Board
Innovation Associates Professional Placement, Inc.
Johnson City NY

BAE Systems Electronics & Integrated Solutions
Johnson City NY

Lockheed Martin Systems Integration – Owego
Owego NY

Tompkins County Workforce Development Board

Transonic Systems
Ithaca NY

New York State Trade Assistance Adjustment Center
Binghamton NY

Southern Tier Economic Growth
Elmira NY

Norwich Aero / Esterline Corporation
Norwich NY

Custom Electronics, Inc.
Oneonta NY

RPA Electronics Design, LLC
Binghamton NY

Chemung Schuyler Steuben Workforce New York
Corning NY

Felchar Manufacturing Corporation
Binghamton NY

Broome-Tioga Workforce Investment Board

Institute for Community College Development
Cornell University

New York State Trade Assistance Adjustment Center
Binghamton NY

Appendix C

List of Figures and Maps