Ohio Economic Analysis, 2007

Understanding the Environment and Charting a Course for the Future

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Table of Contents

Table of Charts & Figures

Preface

To gauge the state of the overall economy is a very complex undertaking, encompassing several different facets and measures of business, finance, demographics and societal trends. What we understand as 'the economy' is the sum total of several million daily transactions and interactions among individuals and institutions—often occurring hourly or even in a matter of minutes. And these economic activities take place within a diverse array of regulatory frameworks and international policy directions.

Understanding the economy becomes more difficult when one realizes it is not a steadily-moving train, but rather is fraught with unpredictable business cycles and unexpected economic events or shocks. In many respects, the economy is driven more by psychology, such as consumer or business confidence, than hard fact. The popular media provides an ever-expanding array of economic indicators and statistical reports, many of which only serve to further confuse our understanding of the situation. For governments, businesses and other stakeholders involved in workforce and economic development, the task is no less challenging. It takes strong judgment to weigh the trade-offs and impacts. Successfully seeing 'the trees for the forest' will enable policymakers in all arenas to better understand the true shape of the Ohio economy and take steps to improve all facets of economic well-being.

Our goal in this report is to set a benchmark about what we know about the Ohio economy, compare this benchmark with past progress and set a foundation upon which to build strategic options for the future. The first step in this process is to provide an overview of Ohio's economy in Section I, including size, make-up and standing relative to neighboring states. This is followed by an examination of industrial employment at the state and sub-state level in Section II. Section III focuses on measures of economic health such as per capita income and poverty rates. A summary of findings from the *Ohio Job Outlook to 2014* follows in Section IV. Finally, we outline some strategies for the future in Section V.

Through careful examination of the economic statistics in this publication, we hope that individuals, businesses, economic development corporations, labor and governmental organizations, educational institutions and all others interested in the economy and quality of life in Ohio will be able to draw a clearer picture of where we are to help inform policy on where we should be going. The Strickland Administration has set a vision in *Turnaround Ohio* with three critical implementation features: 1) set the leadership agenda of increased coordination among education and workforce and economic development, providing a cohesive and synergistic talent development system; 2) coordinate development of resources as part of industry sector initiatives which are sensitive to the needs of regional economies; and 3) use workforce information more strategically to link more closely with the talent development system and agenda.

Executive Summary

- Ohio's labor demographics are changing as the overall population ages. The baby boom cohort of workers is entering its sixties now and has already begun to exit the workforce. More acute shortages of skilled labor may occur in the coming years.

- Another effect of the graying of Ohio is the anticipated rise of employment in health care industries such as hospitals, clinics and retirement centers. These industries and the occupations needed to staff them are expected to have high demand.

- Nationwide, manufacturing employment has been in significant decline over the last six years. Ohio has been particularly hard hit with the loss of more than 200,000 manufacturing jobs since 2000. Ohio has a high concentration of employment in durable goods production which is more adversely affected during business downturns. In addition, restructuring in the automotive and related industries has resulted in major layoffs recently.

- Some of the decline in manufacturing employment may be attributed to increased labor productivity that enables firms to produce more output with fewer workers. These productivity changes mean that knowledge-based industries are most likely to offer the most employment growth and earnings potential. Postsecondary degree attainment will be the key to success in the coming years.

- Compared to neighboring states, Ohio ranks above only Michigan in experiencing a latent recovery from the 2001 recession. Within Ohio, three of the eight major metropolitan areas—Akron, Cincinnati-Middletown and Columbus—have recovered the jobs lost after 2000.

- Ohio's per capita income is higher than three neighboring states, but growth has been lagging the nation. The statewide poverty rate of 13.0 percent in 2005 was slightly lower than the national rate.

- About 23.3 percent of adults 25 or older have a bachelor's degree. Ohio is ranked 38th out of all fifty states and the District of Columbia. The share of Ohio adults with an advanced degree is 8.5 percent (ranked 30th). The level of educational attainment tends to be higher in more urbanized areas.

- Virtually all of the job growth projected to 2014 will be in service-providing industries. More than three out of every four annual openings will result from the need to replace workers who exit the labor force, usually upon retirement.

- Education beyond high school will generally be required for jobs growing faster than average. Employers will continue to need a highly literate workforce with critical thinking and communication-related skills growing in importance.

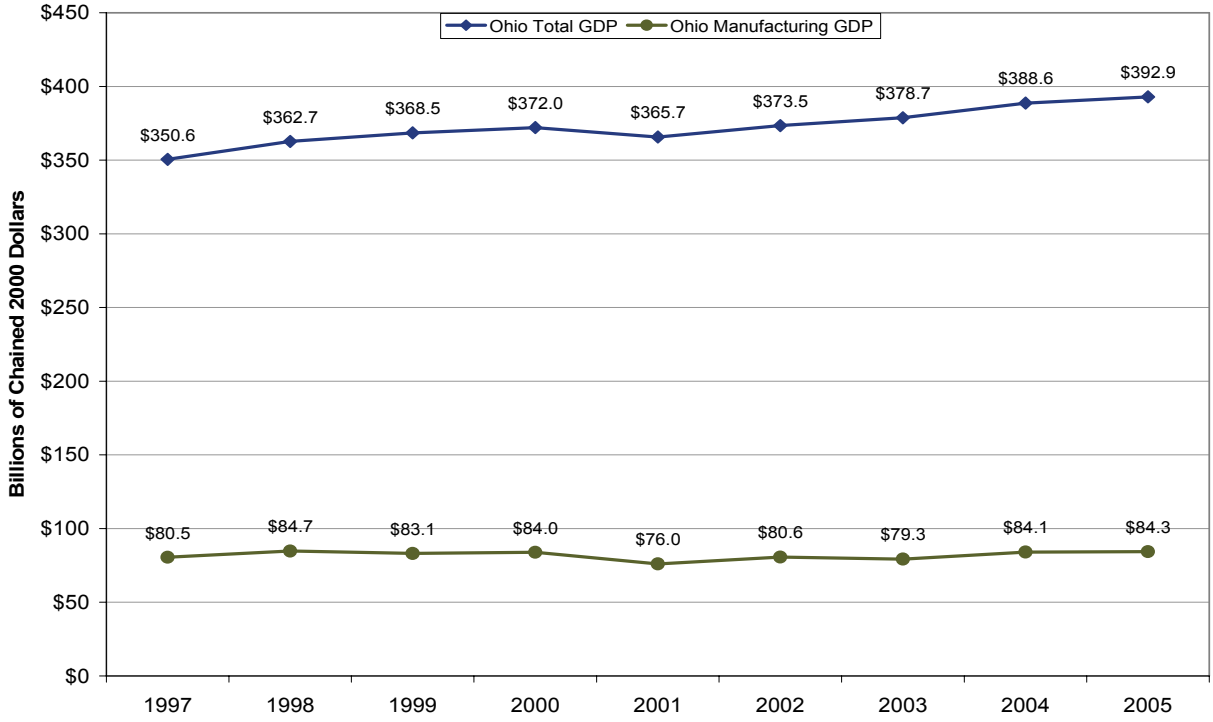
- There are several varying approaches for developing the workforce and improving the state's overall well being, provided economic and workforce development managers are cognizant that economies do not begin and end solely at political boundaries.

I. Economic Overview

- Real state GDP in Ohio has increased 12.1 percent from 1997 to 2005. Manufacturing GDP has remained essentially stable as measured in real dollars (4.7%).
- Ohio's population in 2006 was estimated at 11.48 million residents, though Ohio as a share of the total U.S. population has been shrinking.
- Ohio's overall population is growing older, the result of an aging baby boom generation.
- The Ohio labor force, aside from growing older, is growing more diverse with increasing participation by women and minorities.
- Unemployment rates in Ohio have not declined much during the current economic recovery and are still substantially higher than the national rate.

The State of Ohio is one of the larger economies in the United States with a state gross domestic product (GDP) estimated at $392.9 billion in real dollars for 2005, making it the seventh-largest state. If Ohio were a separate country, it would have the 26th largest economy in the world, behind the Philippines.[1] Figure 1 shows state GDP in 2000 dollars over the last economic cycle. Ohio's largest single sector is manufacturing, accounting for about one fifth of total state output in 2005. Note that manufacturing GDP has held

Figure 1: Ohio Gross Domestic Product, 1997-2005



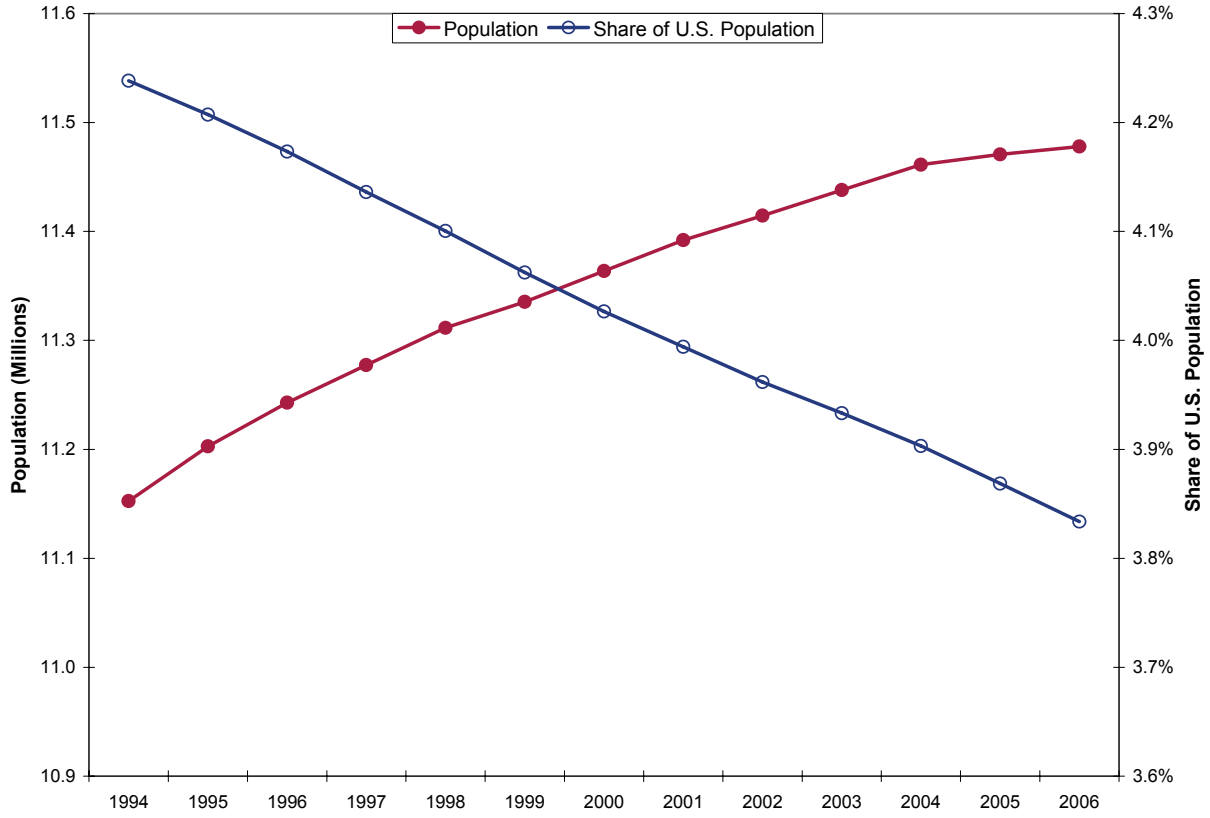
[1] Ohio Department of Development, 2006.

relatively stable during this period. In manufacturing, Ohio is the third largest state and leads in the production of fabricated metal products; electrical equipment and appliances; and plastics and rubber products. The large concentration in manufacturing also means that a greater share of Ohio workers are represented by organized labor—15.5 percent compared with 13.1 percent nationwide.[2] However, union presence in Ohio is declining along with manufacturing employment.

Ohio's dependence on manufacturing, especially durable goods, makes the state highly susceptible to economic downturns and large-scale changes in the global economy such as off-shoring. Ohio will continue to follow a nationwide trend of expanding employment in service-based industries.

Population. Ohio has the seventh-largest population of the fifty states, with a total population of approximately 11.48 million residents in 2006. Figure 2 below shows how Ohio's population has increased since 1994. The rate of population growth has slowed in recent years and will continue to grow at a slower rate than the rest of the country, partially due to faster growth in Southern and Western states. Ohio's population as a share of the United States has steadily declined during this period.

Figure 2: Population Growth in Ohio



One of the biggest demographic trends to affect the State of Ohio and the entire country in recent years has been the aging of the 'baby boom' generation—the cohort

[2] U.S. Bureau of Labor Statistics [BLS], 2007.

of approximately 75 million people born between 1946 and 1964. The baby boomers, by virtue of their sheer magnitude of numbers, have had several major effects on the economy over many decades, from high unemployment rates in the 1970s to projected labor shortages and social safety net shortfalls in the coming years.

Migration. Domestic migration—movement between states—is the most volatile component of change, but also the most interesting from the perspective of regional economies. It is likely a function of economic growth as workers follow job opportunities. Population in most states tends to continue to increase naturally as the number of births exceeds the number of deaths. The natural increase in Ohio's population from April 1, 2000 to April 1, 2006 was estimated by the Census Bureau to be about 263,000: 938,200 births less 675,200 deaths. Subtracting natural population growth from total net population change will yield approximate net migration. Thus Ohio experienced a net loss of 145,718 persons through migration between 2000 and 2006.

Patterns in Ohio migration compared with employment are shown in Figure 3 below. The 1980 and 1981-82 recessions hit Ohio very hard with high net out-migration, the second largest migratory population loss in state history, which finally began to subside by the end of the decade as Ohio employment recovered. This improvement carried over into the record economic expansion of the 1990s. During that time Ohio lost only 63,777 persons through migration. However, Ohio's loss of jobs so far this decade is beginning to take its toll once again in higher net out-migration.

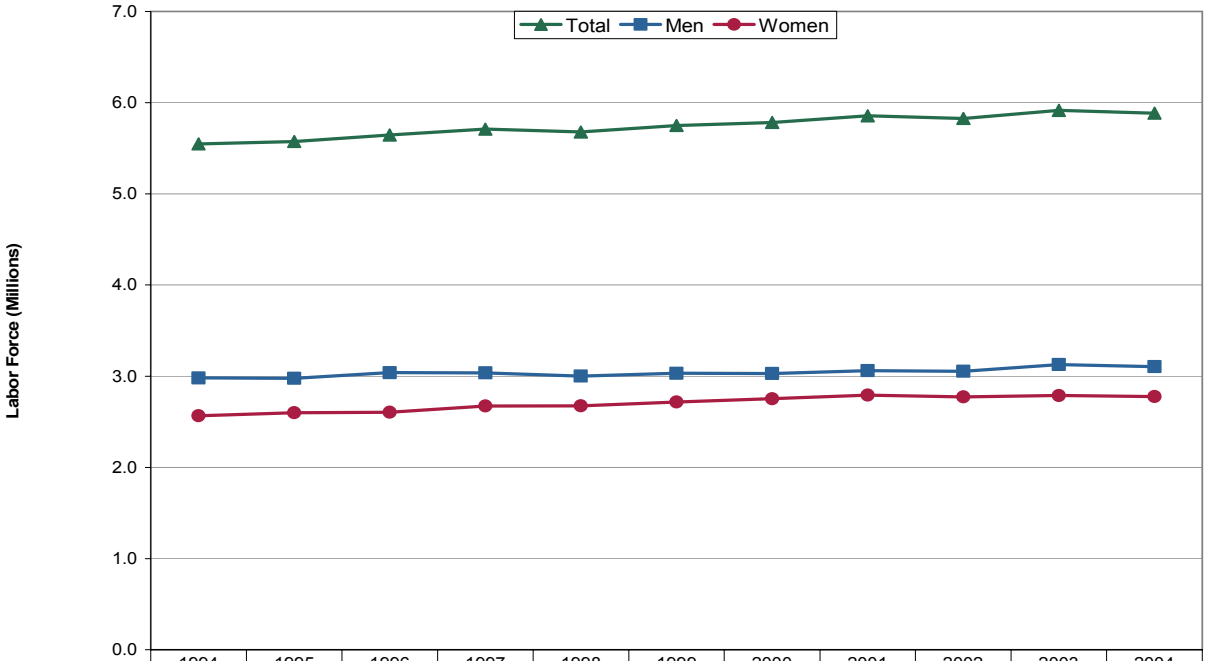
Figure 3: Ohio Population, Employment and Migration Comparisons, 1980-2006

Period	Population		Employment		Net Migration
	Net Change	Percent	Net Change	Percent	
1980-1990	49,485	0.5%	514,900	11.8%	-621,000
1990-2000	516,694	4.8%	742,400	15.2%	-63,777
2000-2006	114,197	1.0%	-183,400	-3.3%	-145,718

Labor Force Participation. Labor force participation is defined as the proportion of persons sixteen years and older and not institutionalized (e.g. in hospitals, prisons, etc.) who are either working or willing to work.[3] In 2004 there were approximately 5.9 million people in the Ohio labor force: 3.1 million men and 2.8 million women, as shown in Figure 4 on the next page. Figures 5 and 6 show labor market participation rates by gender and age in Ohio. The data show two notable trends. The first is the increasing share of women in the labor force with a 61.3 percent participation rate in 2004 compared with 56.8 percent in 1990. At the same time, participation rates among men have been decreasing slightly. The second is an overall aging trend in the labor force as the baby boom generation grows older and the following 'birth-dearth' cohort comes of age.[4] Participation rates for people aged 55 and older have increased in the last 15 years.

[3] BLS, 2001.
[4] Ohio Department of Job & Family Services [ODJFS], 2004.

Figure 4: Ohio Labor Force, 1994-2004



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	5.548	5.575	5.645	5.711	5.678	5.750	5.783	5.856	5.828	5.917	5.884
Men	2.981	2.976	3.040	3.037	3.002	3.032	3.029	3.062	3.055	3.128	3.105
Women	2.567	2.599	2.605	2.674	2.676	2.718	2.754	2.794	2.773	2.789	2.778

Figure 5: Labor Force Participation Rates by Gender

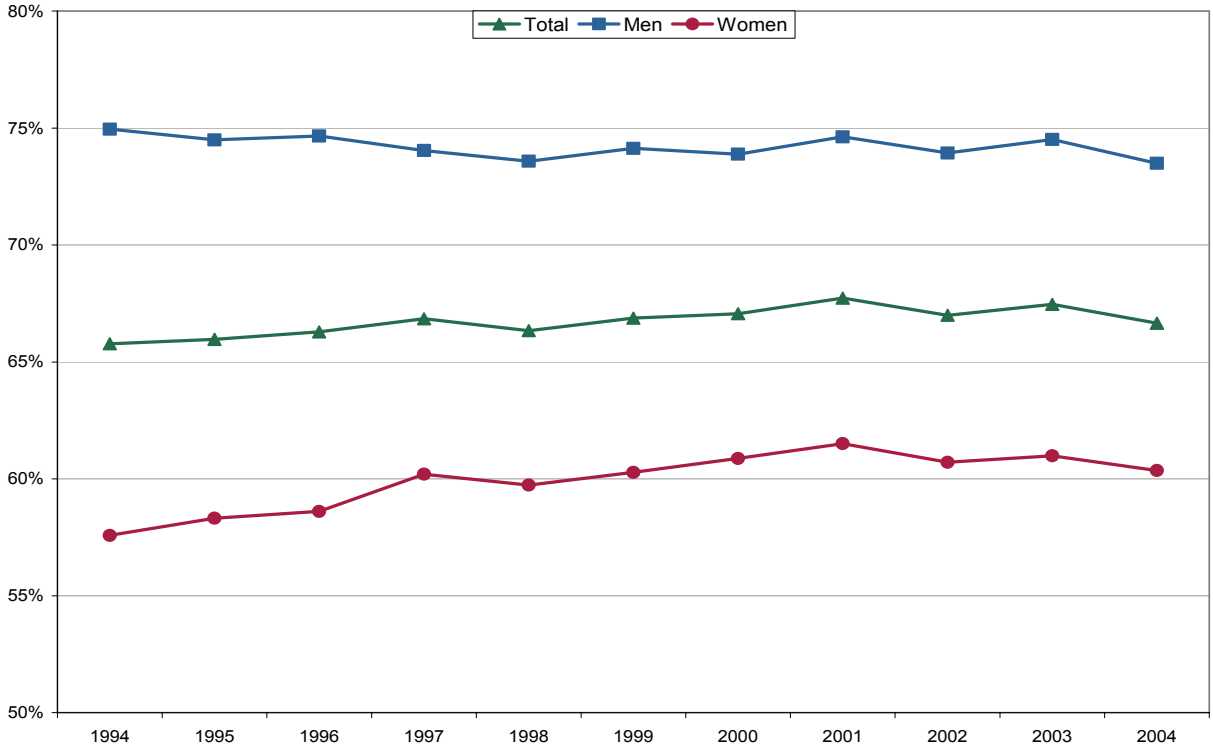
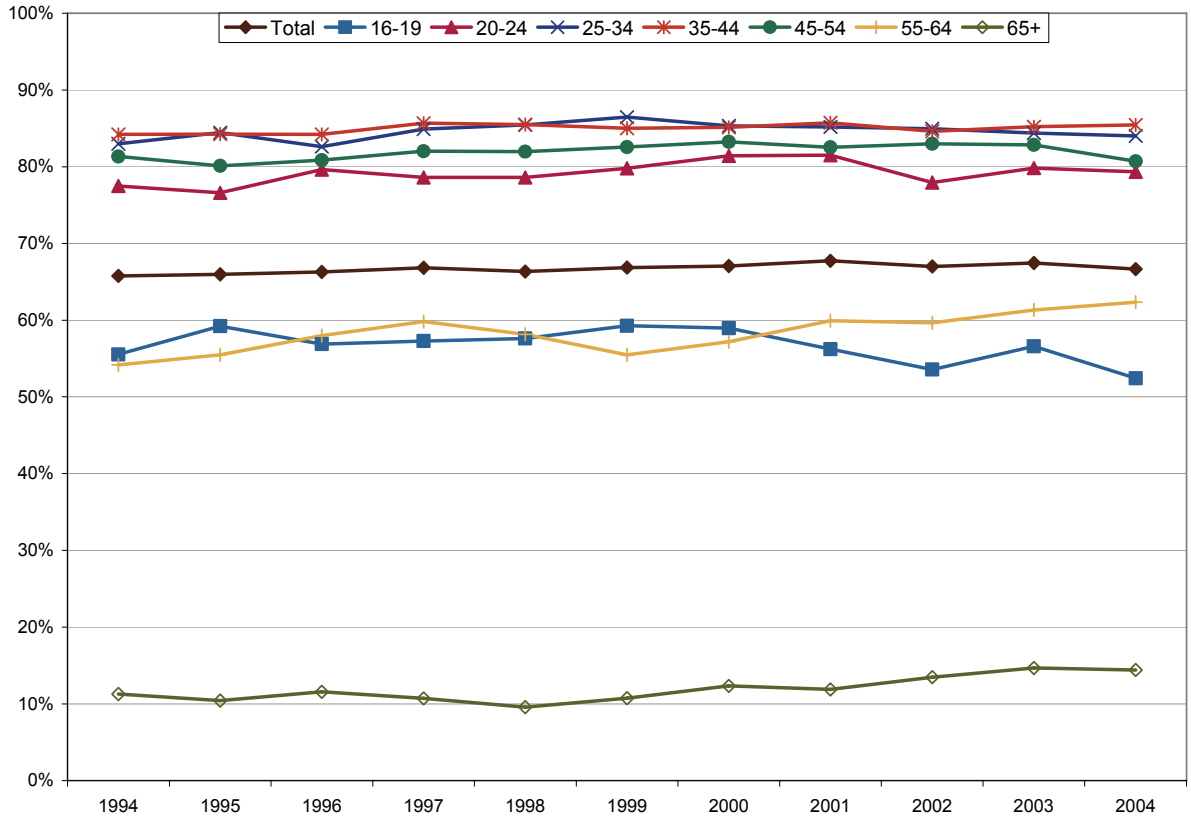


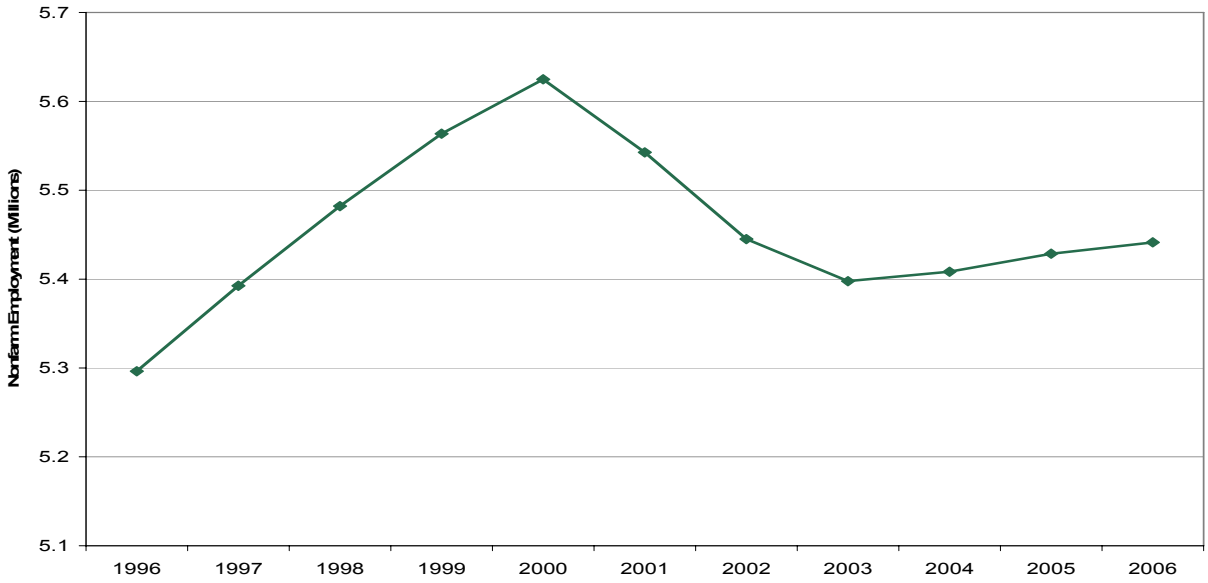
Figure 6: Labor Force Participation Rates by Age Group



As can be seen in Figure 6 above, labor force participation rates are highest for workers in their prime working years, generally from 20 to 54 years of age. Labor force participation is lowest for those 65 or older, but has been trending upward somewhat in recent years. Participation has also been rising lately for those 55 to 64 years old due to a variety of factors, including gradually older ages for eligibility for Social Security benefits. About half of young people (16-19 years of age) are in the labor force, most likely in part-time jobs while attending school.

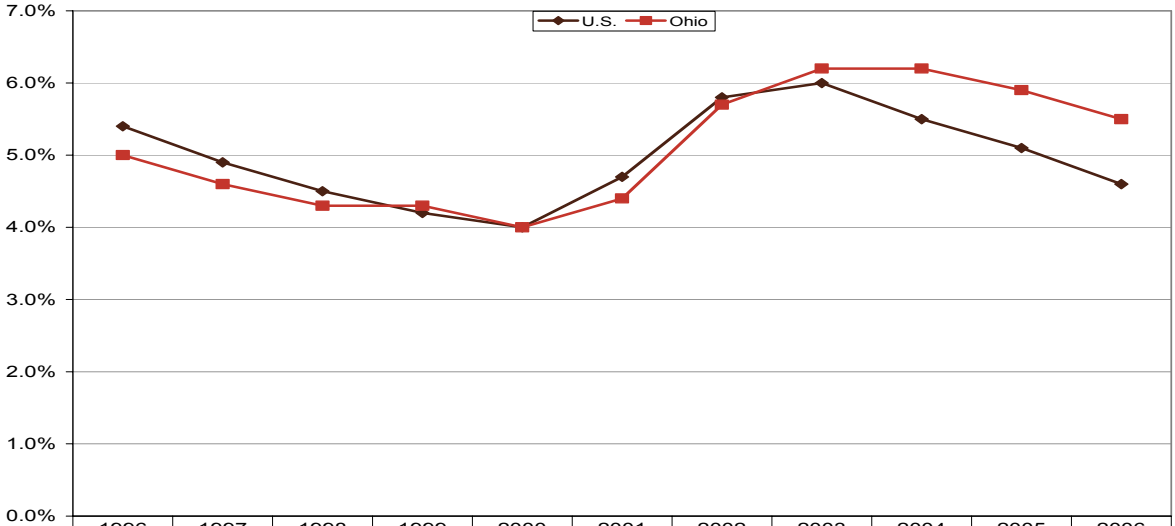
Employment Trends. Total nonfarm payroll employment has not recovered much since the 2001 recession. After climbing throughout the record economic expansion of the 1990s, employment rolls fell from 5.6 million in 2000 to 5.4 million in 2003 (-4.0%). The state economy had an increase of only about 40,000 net new jobs since then. Employment trends by industry are covered in greater detail in Section II.

Figure 7: Total Ohio Nonfarm Employment, 1996-2006



Unemployment Trends. Ohio's unemployment rate has declined only marginally during the current recovery and rates are still substantially higher than they were at their low point in 2000. Figure 8 shows statewide and nationwide unemployment rates over the last economic cycle. While Ohio's unemployment rate had often been slightly lower than the national rate, it has been higher in the last four years.

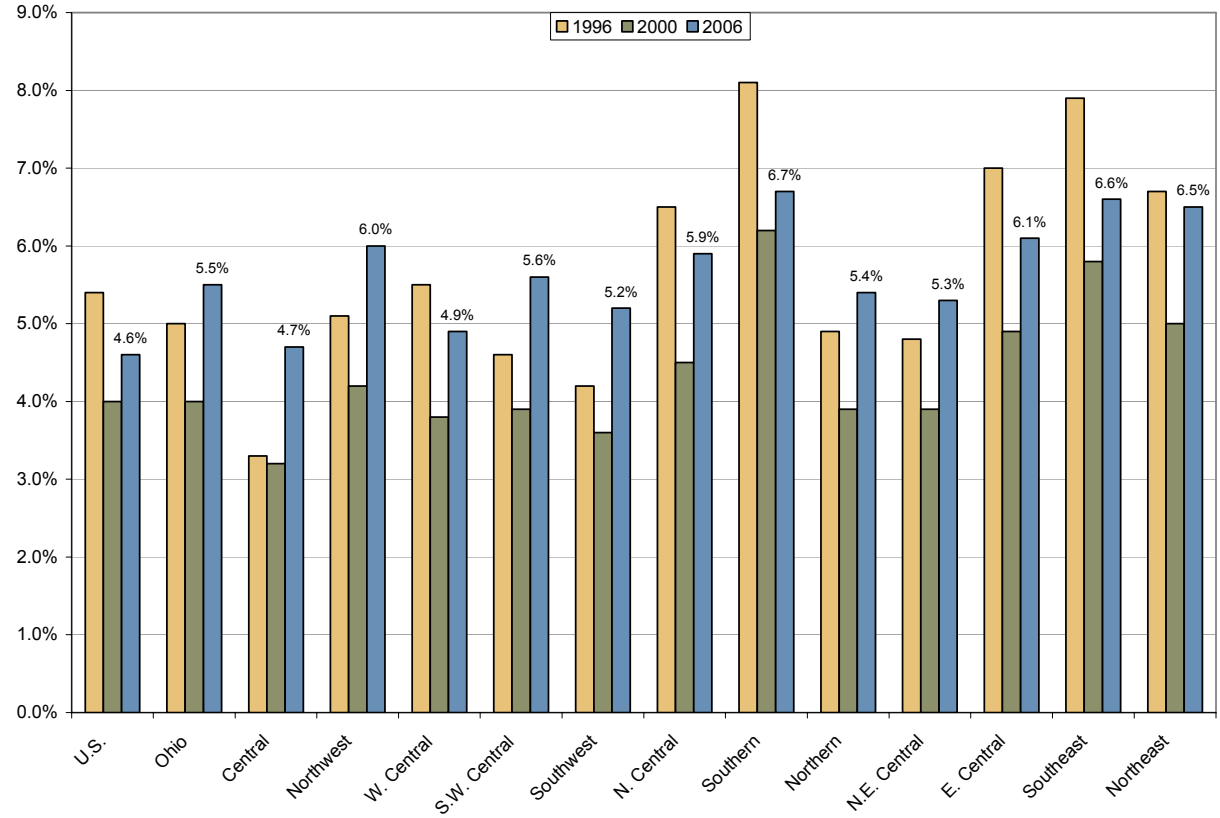
Figure 8: Unemployment Rates in Ohio and the U.S., 1996-2006



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
U.S.	5.4%	4.9%	4.5%	4.2%	4.0%	4.7%	5.8%	6.0%	5.5%	5.1%	4.6%
Ohio	5.0%	4.6%	4.3%	4.3%	4.0%	4.4%	5.7%	6.2%	6.2%	5.9%	5.5%

Figure 9 shows unemployment rates in each of Ohio's 12 Economic Development Regions (EDRs). A map of these EDRs is available in Appendix A. Many of the state's higher unemployment rates are associated with more rural regions, especially in the southern and eastern portions of Ohio. The Southern, East Central and Southeast EDRs comprise Ohio's Appalachian region,[5] an area that has suffered persistently poor economic conditions for several decades. The lowest unemployment rates have been in the Central EDR, which includes the Columbus area. All regions benefited from the economic expansion of the 1990s with lower unemployment rates in 2000 compared to 1996. Likewise, none of the regional labor markets have fully recovered from the last recession.

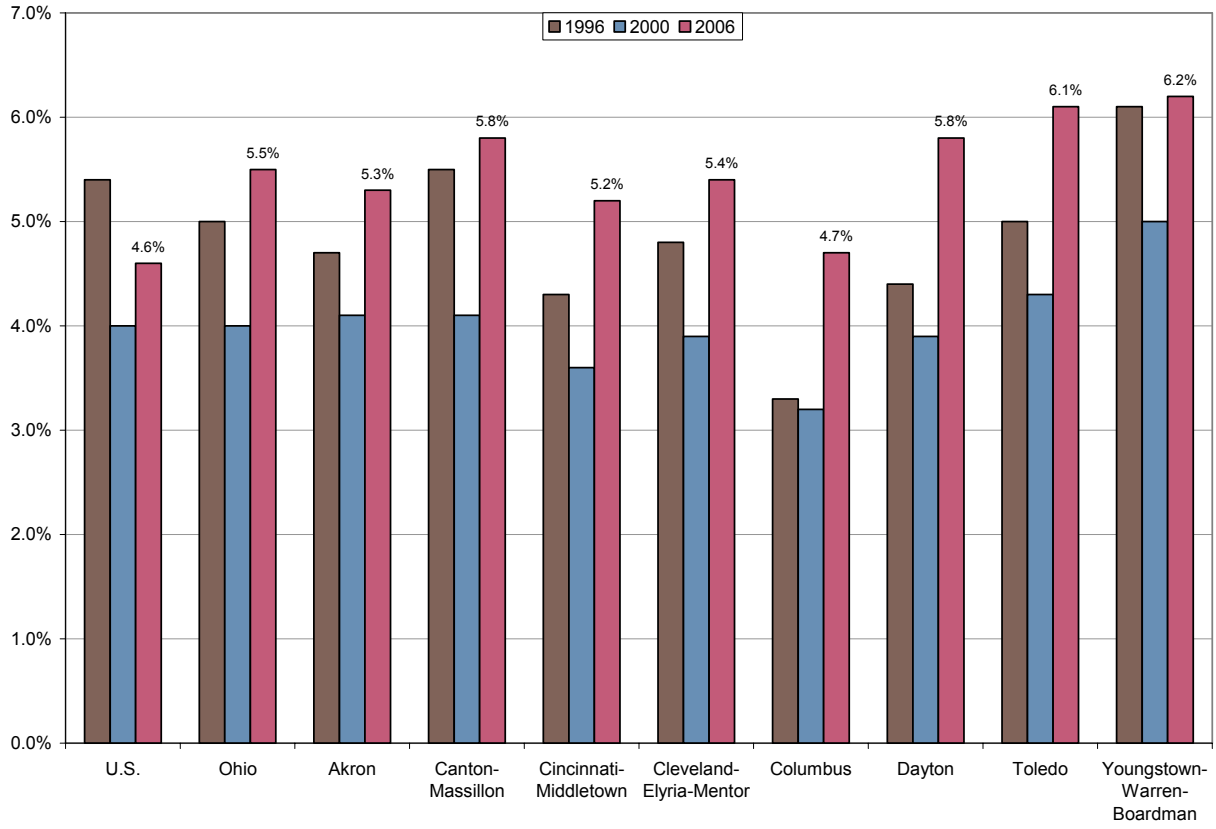
Figure 9: Unemployment Rates by Economic Development Region



[5] Clermont County, located in the Southwest EDR, is also technically an Appalachian County, though its closeness to the Cincinnati area has mitigated many of the economic hardships of the Appalachian region.

There are also 16 Metropolitan Statistical Areas (MSAs) either in Ohio or with counties in Ohio. See Appendix B for a map of all Ohio MSAs. For brevity, we will focus on the eight largest areas in the state. Unemployment figures for these MSAs are shown in Figure 10. Here, we can see most of the highest unemployment rates have been in cities with traditionally strong manufacturing employment bases: Youngstown, Toledo and Canton. All the major metropolitan areas saw a jump in unemployment rates in the last six years.

Figure 10: Unemployment Rates by Metropolitan Statistical Area



II. Industry Employment Trends

- Total Ohio nonfarm employment in 2006 was approximately 5.44 million. Because employment has been recovering very slowly the past three years, it is still 3.3 percent lower than the peak in 2000.

- Major industry sectors that had net employment gains since 2000 include education and health services (14.3%), especially health care; leisure and hospitality (3.7%); professional and business services (1.9%); and financial activities (0.7%). State and local government also had employment gains of 3.1 and 4.1 percent, respectively. State government employment growth was primarily in education.

- Industry sectors with lower employment levels than in 2000 include manufacturing (-22.0%); information (-17.3%); natural resources and mining (-10.1%); trade, transportation and utilities (-6.2%), especially retail trade; and construction (-6.1%).

- Ohio has generally fared worse in employment losses than other neighboring states except Michigan.

- The Akron, Cincinnati-Middletown and Columbus metropolitan statistical areas (MSAs) have recovered the jobs lost in the last recession. The other five major metropolitan areas whose employment has not yet recovered have higher concentrations of manufacturing employment.

Nationwide, employment is moving from goods-production towards service-providing industries. Manufacturing job losses in recent years have been driven by foreign competition, increased productivity and macroeconomic business cycles. Figure 11 on the next page shows Ohio employment in 2000 and 2006 by industry sector. Manufacturing is the largest single sector in Ohio in terms of employment, but it is also in steep decline, losing 22.0 percent of its workers since 2000.

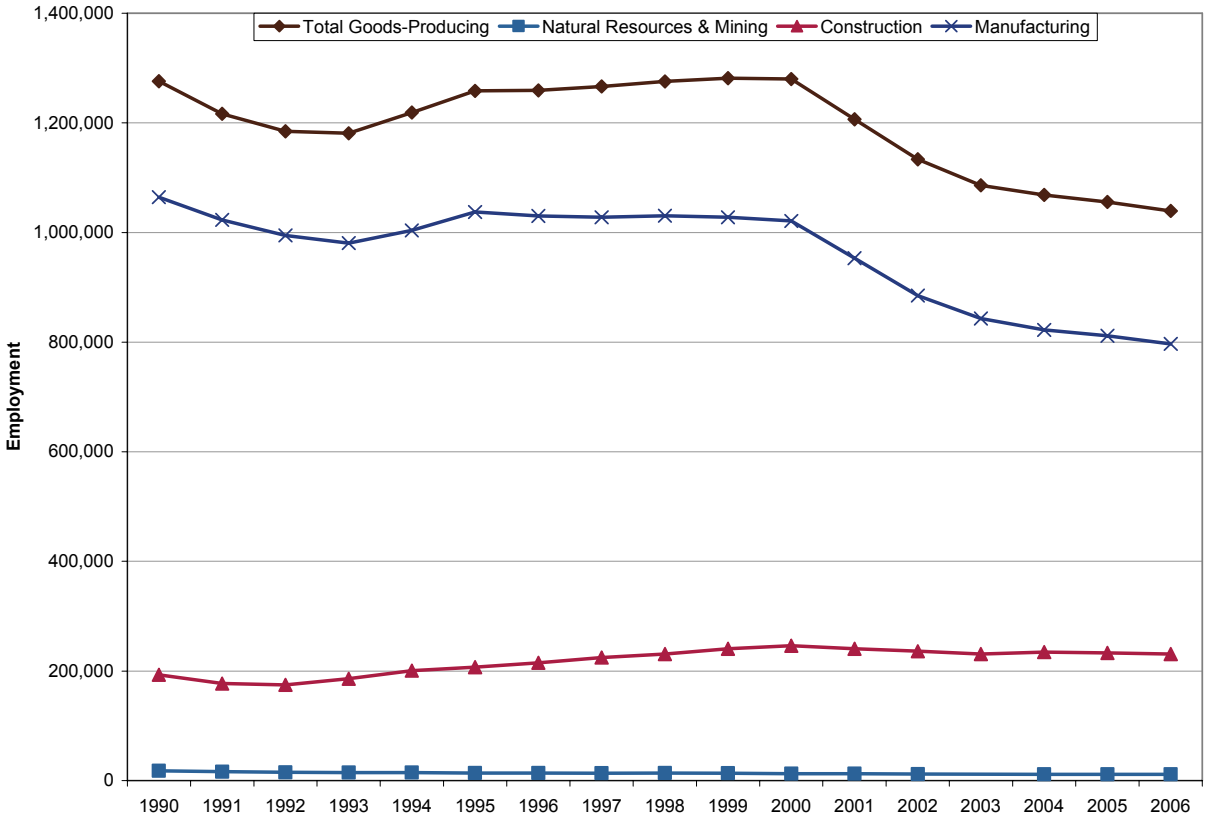
One large sector that has grown during this period is health care and social assistance, which includes hospitals and medical clinics. More than twelve percent of Ohio workers are employed in this field, having grown 15.3 percent in the last six years. This growth in health care has been driven largely by an aging population demanding more health services and the emergence of new medical technologies. Figures 12 and 13 show more detail on how these industry divisions have grown and declined in the last 15 years.

Figure 11: Ohio Nonfarm Employment Estimates, 2000 and 2006

Industry Division	2000 Employment	2006 Employment	Net Change	Percent Change	2006 Percent Distrib.
Total Nonfarm Employment	5,624,700	5,441,300	-183,400	-3.3%	100.0%
Total Goods-Producing	1,280,100	1,039,400	-240,700	-18.8%	19.1%
Natural Resources & Mining	12,900	11,600	-1,300	-10.1%	0.2%
Construction	246,100	231,100	-15,000	-6.1%	4.2%
Manufacturing	1,021,000	796,800	-224,200	-22.0%	14.6%
Total Service-Providing	4,344,600	4,401,900	57,300	1.3%	80.9%
Trade, Transportation & Utilities	1,115,300	1,046,400	-68,900	-6.2%	19.2%
Wholesale Trade	247,400	238,200	-9,200	-3.7%	4.4%
Retail Trade	671,600	604,300	-67,300	-10.0%	11.1%
Utilities	24,300	20,600	-3,700	-15.2%	0.4%
Transportation & Warehousing	172,000	183,300	11,300	6.6%	3.4%
Information	107,200	88,700	-18,500	-17.3%	1.6%
Financial Activities	305,200	307,300	2,100	0.7%	5.6%
Finance & Insurance	232,400	238,800	6,400	2.8%	4.4%
Real Estate & Rental & Leasing	72,800	68,500	-4,300	-5.9%	1.3%
Professional & Business Services	644,900	656,900	12,000	1.9%	12.1%
Professional & Technical Services	236,600	238,800	2,200	0.9%	4.4%
Management of Companies & Enterprises	82,200	101,700	19,500	23.7%	1.9%
Administrative & Waste Management	326,100	316,300	-9,800	-3.0%	5.8%
Educational & Health Services	680,300	777,600	97,300	14.3%	14.3%
Educational Services	89,800	96,600	6,800	7.6%	1.8%
Health Care & Social Assistance	590,500	680,900	90,400	15.3%	12.5%
Leisure & Hospitality	483,300	501,300	18,000	3.7%	9.2%
Arts, Entertainment & Recreation	70,100	66,000	-4,100	-5.8%	1.2%
Accommodation & Food Services	413,200	435,300	22,100	5.3%	8.0%
Other Services	223,300	222,900	-400	-0.2%	4.1%
Government	785,100	800,900	15,800	2.0%	14.7%
Federal Government	87,200	76,400	-10,800	-12.4%	1.4%
State Government	163,700	168,700	5,000	3.1%	3.1%
Local Government	534,100	555,800	21,700	4.1%	10.2%

Based on CES estimates. Columns may not total due to rounding.

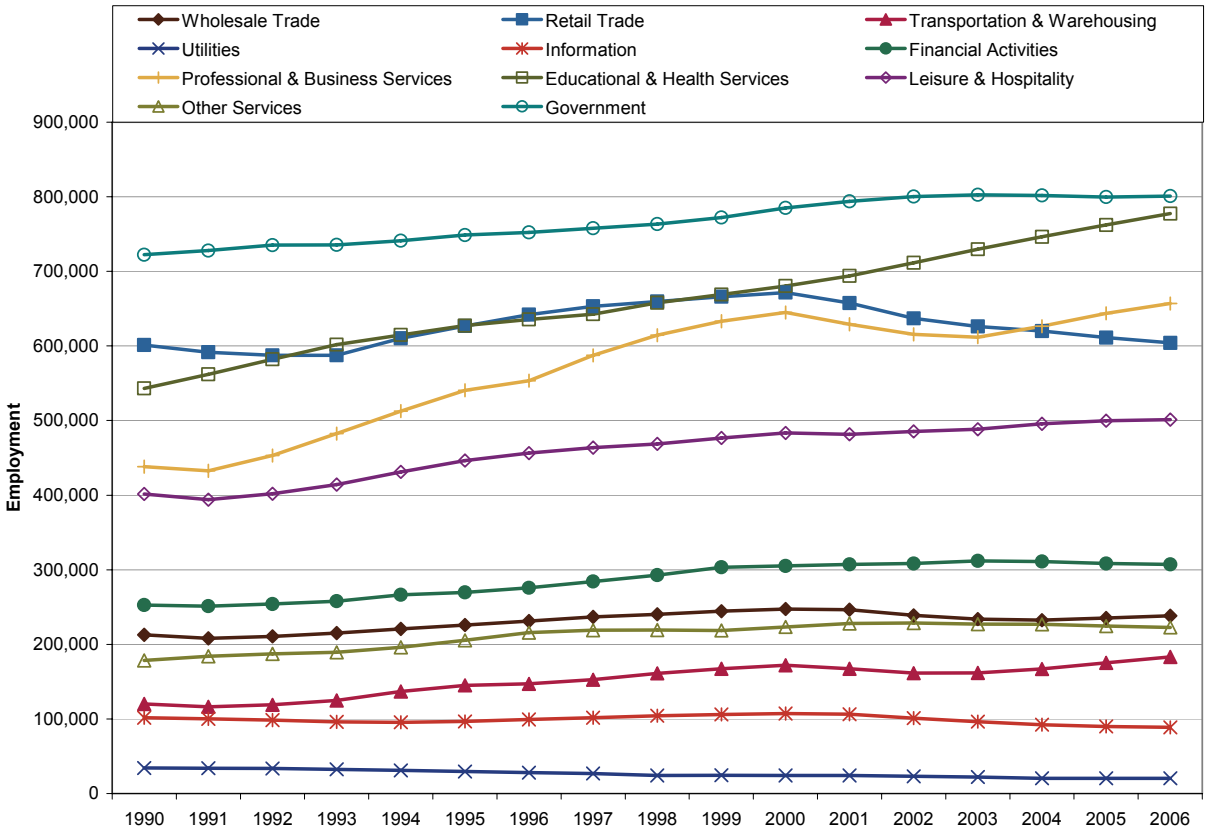
Figure 12: Goods-Producing Industry Employment, 1990-2006



Goods production includes manufacturing, construction and natural resources and mining. These statistics generally do not include farmers, self-employed workers and others not covered by unemployment insurance. Employment fared well during the record economic expansion of the 1990s. Manufacturing, however, was hit hard by the last recession and continues to struggle with ongoing restructuring in automotive and related industries.

The most notable change in goods-producing industries has been the significant decline of manufacturing employment from 2000 to present. During this time span, manufacturing industries shed over 224,000 workers. The construction and natural resources sectors, while considerably smaller, have held relatively steady in their employment levels. From 1990 to 2006, construction employment grew 19.6 percent.

Figure 13: Service-Providing Industry Employment, 1990-2006

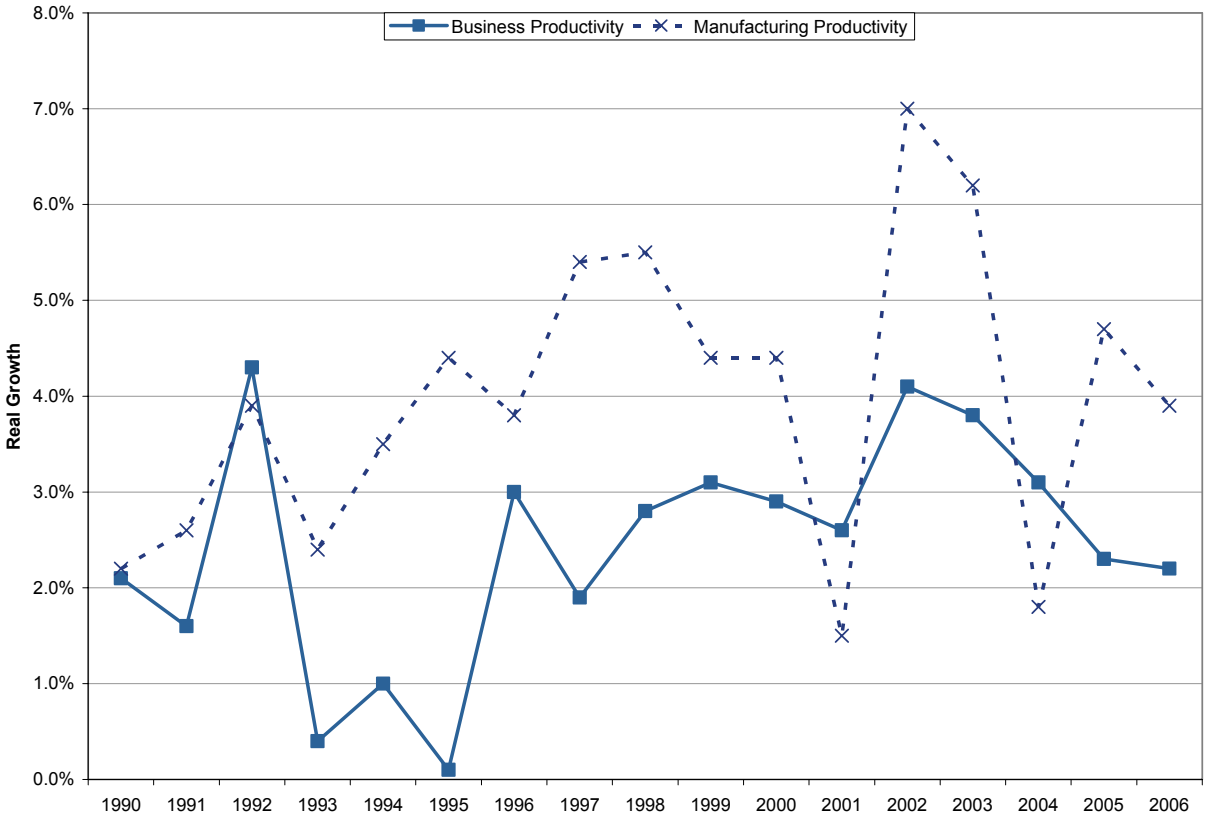


Many service-providing industries have enjoyed significant job growth in the last fifteen years. Included among these have been educational and health services, including hospitals, clinics and private schools; leisure and hospitality, which includes restaurants, hotels and certain recreational facilities; and professional and business services such as law and accounting firms, corporate offices and temporary employment agencies. The only service-providing sector to see a significant decline since 2001 has been retail trade. Nearly all the employment gains from 1990 to 2000 were lost in the last six years. It is not surprising that this sector is sensitive to business cycle fluctuations, but it is somewhat unexpected that employment has not yet begun to recover.

Business cycle effects are also apparent in several other sectors. Employment in professional and business services fell with the onset of the 2001 recession. The information sector also suffered losses. Wholesale trade and transportation and warehousing are continuing to recover. Government, which includes federal, state and local agencies, has held fairly steady the past five years. More than half of the government employment shown here represents state and local education.

Effects of Increased Productivity. Labor productivity—firms' output divided by the number of man-hours needed to create that output—is almost always increasing as new technologies and improved production processes emerge. In addition, productivity may reach different levels in different industries. Figure 14 below shows that manufacturing in particular has had strong productivity gains in the last fifteen years. This is part of the reason why manufacturing employment has been declining in Ohio.

Figure 14: Business and Manufacturing Productivity Growth, 1990-2006



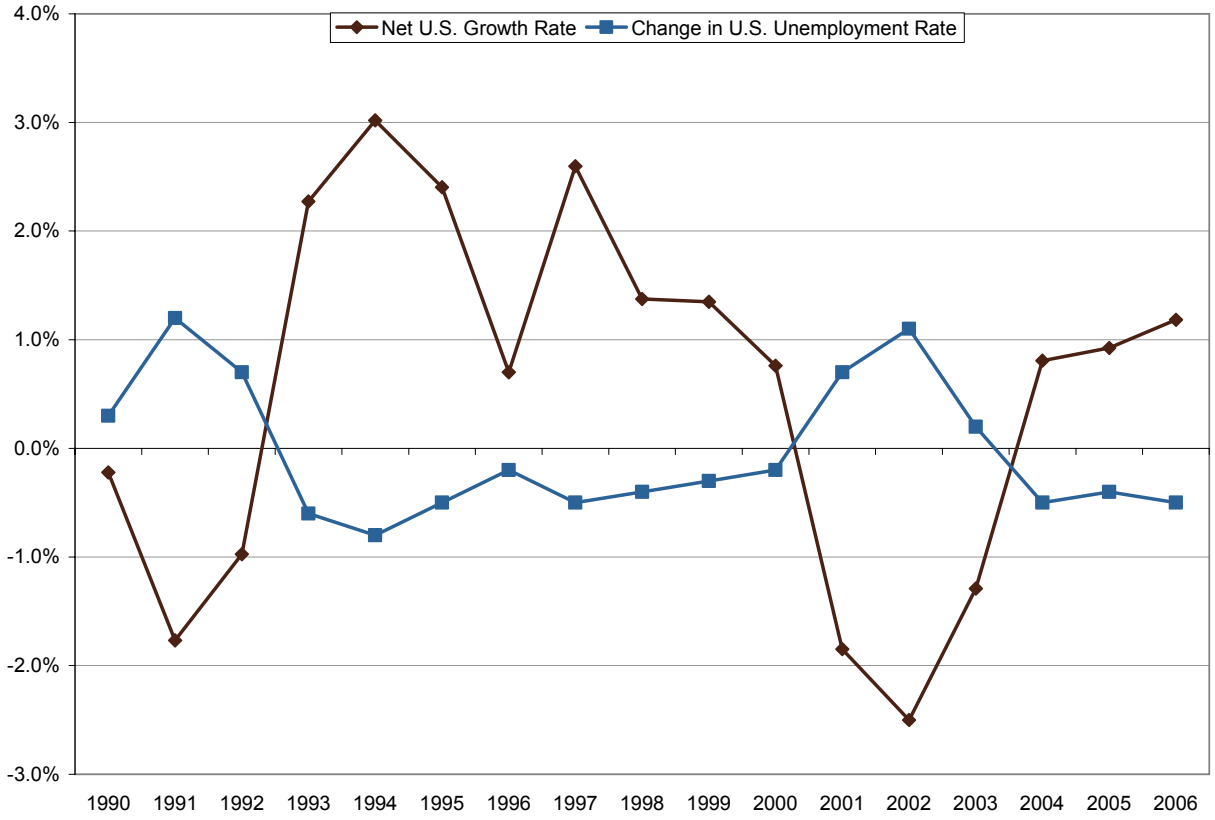
As mentioned earlier, real state GDP in 2005 was approximately $392.9 billion, an increase of 5.6 percent from 2000. In order to help explain why this recovery has not generated many new jobs, we have created a measure of the "net growth" rate: growth in real U.S. GDP minus productivity growth. Figure 15 below shows how this figure is derived. Figure 16 on the next page shows a comparison of the net U.S. growth rate with changes in the unemployment rate—a clear inverse relationship.

Figure 15: U.S. Labor Productivity & Real U.S. GDP Growth Rates, 1990-2006[6]

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Real GDP Growth	1.9%	-0.2%	3.3%	2.7%	4.0%	2.5%	3.7%	4.5%	4.2%	4.4%	3.7%	0.8%	1.6%	2.5%	3.9%	3.2%	3.4%
-Productivity Growth	2.1%	1.6%	4.3%	0.4%	1.0%	0.1%	3.0%	1.9%	2.8%	3.1%	2.9%	2.6%	4.1%	3.8%	3.1%	2.3%	2.2%
=Net Growth Rate	-0.2%	-1.8%	-1.0%	2.3%	3.0%	2.4%	0.7%	2.6%	1.4%	1.3%	0.8%	-1.8%	-2.5%	-1.3%	0.8%	0.9%	1.2%

[6] Growth in GDP is in chained 2000 dollars. Labor productivity is measured in real output per labor hour.

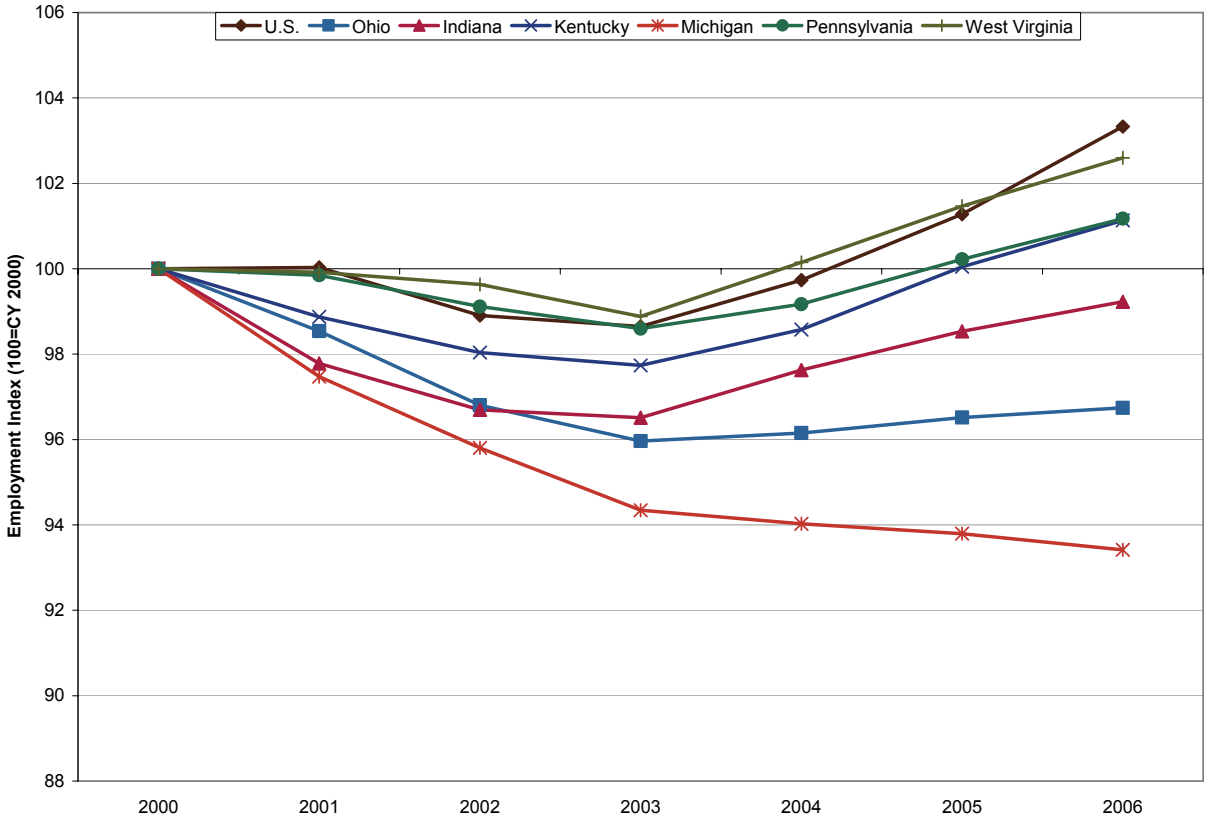
Figure 16: Net GDP Growth Rates and Changes in Unemployment Rates, 1990-2006



When growth in output is higher than productivity increases, the unemployment rate usually falls as firms require more employees to meet demand, as occurred for much of the 1990s. However, from 2001 through 2003, real GDP growth rates were quite low while U.S. labor productivity increased as firms shed workers. It was not until the GDP growth rate (i.e., real demand for goods and services) exceeded improvements in productivity that the labor market began to improve in 2004.

Comparisons with Neighboring States. Ohio's nonfarm employment levels, indexed to 2000, are compared with other bordering states and the United States in Figure 17 below. In this region, West Virginia had the best recovery after the 2001 recession and is today at about 103 percent of its 2000 employment level. Pennsylvania and Kentucky have also fully recovered. Three states in this region have not yet fully recovered former employment levels: Indiana, Michigan and Ohio. Michigan in particular has not seen any recovery and continues to lose jobs. Difficulties in recovering jobs during this period in Michigan and Ohio stem from large manufacturing employment levels heavily concentrated in automotive and related industries. Major restructuring in these industries is contributing to the current slow pace of recovery. Comparisons of neighboring states' manufacturing employment trends are shown on the following page.

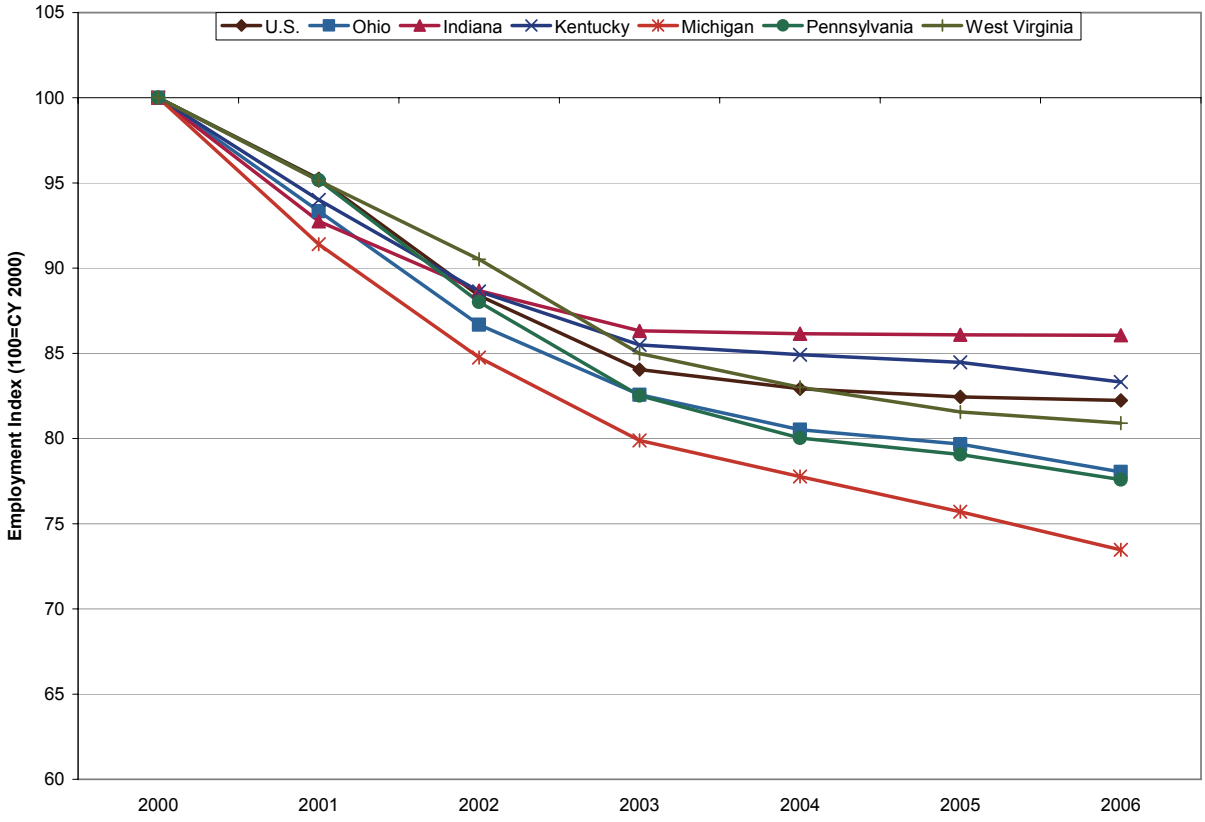
Figure 17: Total Nonfarm Employment in Ohio and Neighboring States



All of the states in this region have experienced significant losses in manufacturing employment in the last six years and none of the states have had any real recovery in this sector. Industry trends such as productivity gains (as explained in the preceding section) and restructuring have contributed to this decline. Michigan, with its heavy reliance on the auto industry, had the most manufacturing job losses. In Indiana, manufacturing employment levels stabilized in 2003 once the recovery began, though it is still well below the 2000 level.

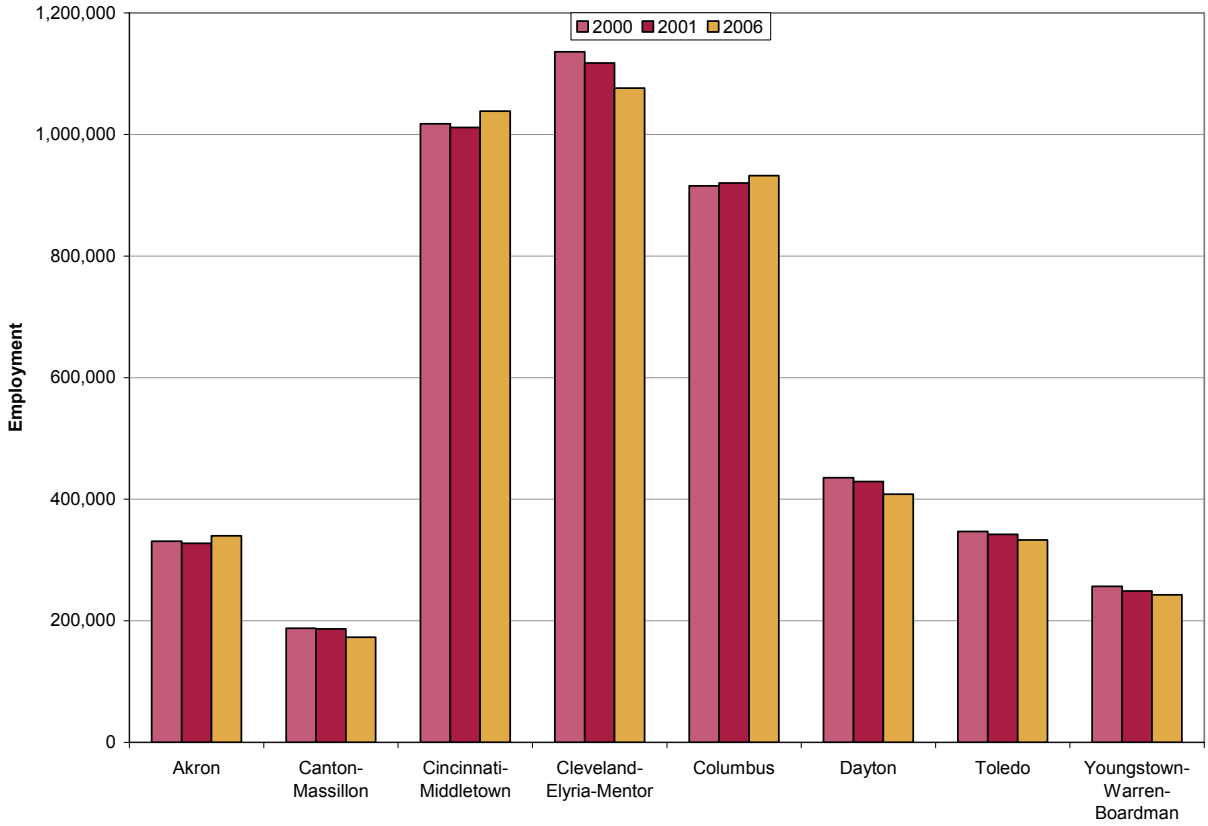
The profiles of manufacturing trends for states in our region are not that much different from what has occurred across the nation. U.S. manufacturing employment has held steady the past few years, but remains at only about 82 percent of the 2000 level.

Figure 18: Manufacturing Employment in Ohio and Neighboring States



Employment in Ohio's Major Metropolitan Areas. Figure 19 below shows employment levels in 2000, 2001 and 2006. Each of the state's major metropolitan areas had declining employment over the course of the last business cycle, although the Columbus MSA did not have a drop in average annual employment until 2002. Three out of the eight areas shown here have recovered the jobs lost after 2000: Akron, Cincinnati-Middletown and Columbus. Based on annual average data, all except the Dayton MSA had begun recovering jobs by 2005. Akron and Cincinnati began to see gains in 2003 and Columbus in 2004.

Figure 19: Total Nonfarm Employment by Metropolitan Statistical Area



Columbus' employment grew 1.8 percent from 2000 to 2006. Akron had the state's strongest job growth by 2006: 2.7 percent. The Cincinnati-Middletown area had the most absolute job growth with 17,900 positions created (2.1%). All other major metropolitan areas still had lower employment in 2006 than 2000. The Cleveland-Elyria-Mentor area had the biggest net job loss at 59,900 (-5.3%). The Canton-Massillon area had the largest relative job loss: -7.9 percent.

With the exception of Akron, which has relatively more employment in nondurable goods production, progress in recovering jobs has been faster the lower the concentration in manufacturing. This is not surprising, since the demand for durable goods usually drops the most when a recession hits.

III. Measures of Economic Health & Well-Being

- Ohio's annual compound rate of growth of per capita income was 4.0 percent from 1995 to 2006. This was slower growth than in most neighboring states and compared to the nation.

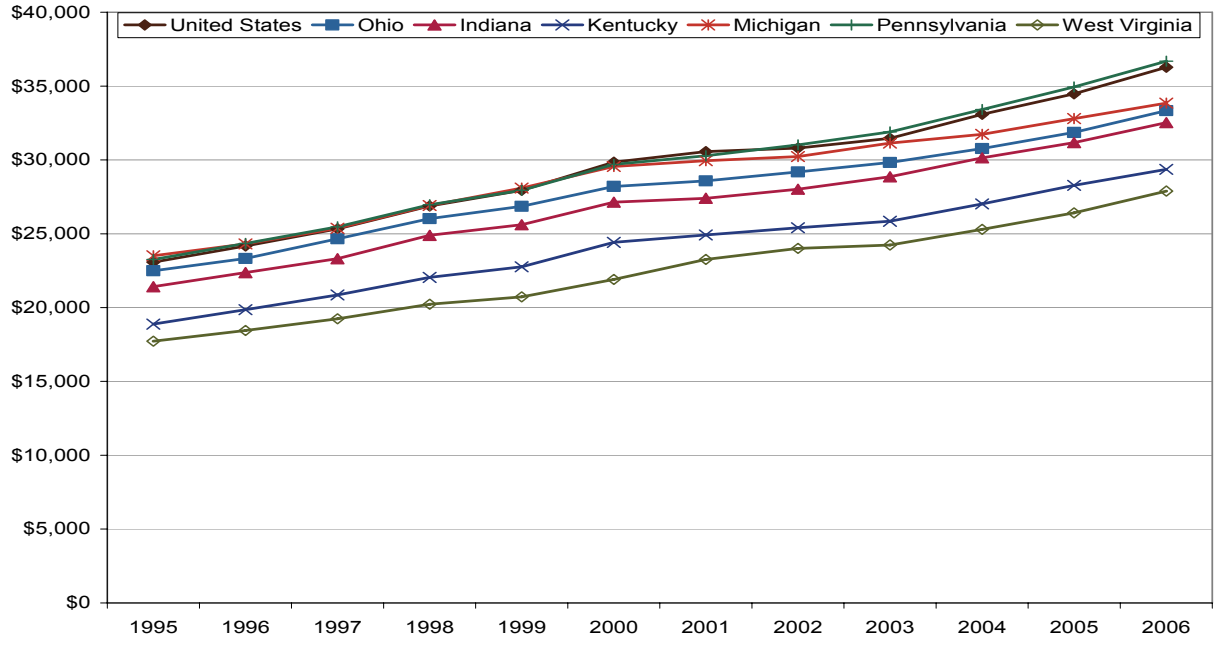
- The statewide poverty rate in 2005 was 13.0 percent, slightly lower than the national rate of 13.3 percent. Kentucky, Michigan and West Virginia had higher poverty levels.

- About 23.3 percent of all adults 25 or older statewide have a bachelor's degree. The overall level of educational attainment tends to be higher in more urbanized areas.

Traditionally, job growth and unemployment have been the primary measures of economic well-being. However, in an economy such as Ohio's with a stable population and increasing national and international competition, it pays to look at alternative gauges of economic health. We will examine three additional indicators that have been strongly correlated with net job growth in the last ten years: per capita income, poverty rates and educational attainment.

Per Capita Income. Per capita income is derived by dividing an area's total personal income by its population and is a good comparative measure of wealth. Figure 20 below shows income levels in Ohio and neighboring states over the last decade. Throughout this period, Ohio has exhibited relatively high per capita incomes in this region, though it still lags behind the nation as a whole. Ohio per capita income in 2006 was $33,338, compared with $32,526 in Indiana, $29,352 in Kentucky, $33,847 in Michigan, $36,680 in Pennsylvania and $27,897 in West Virginia.

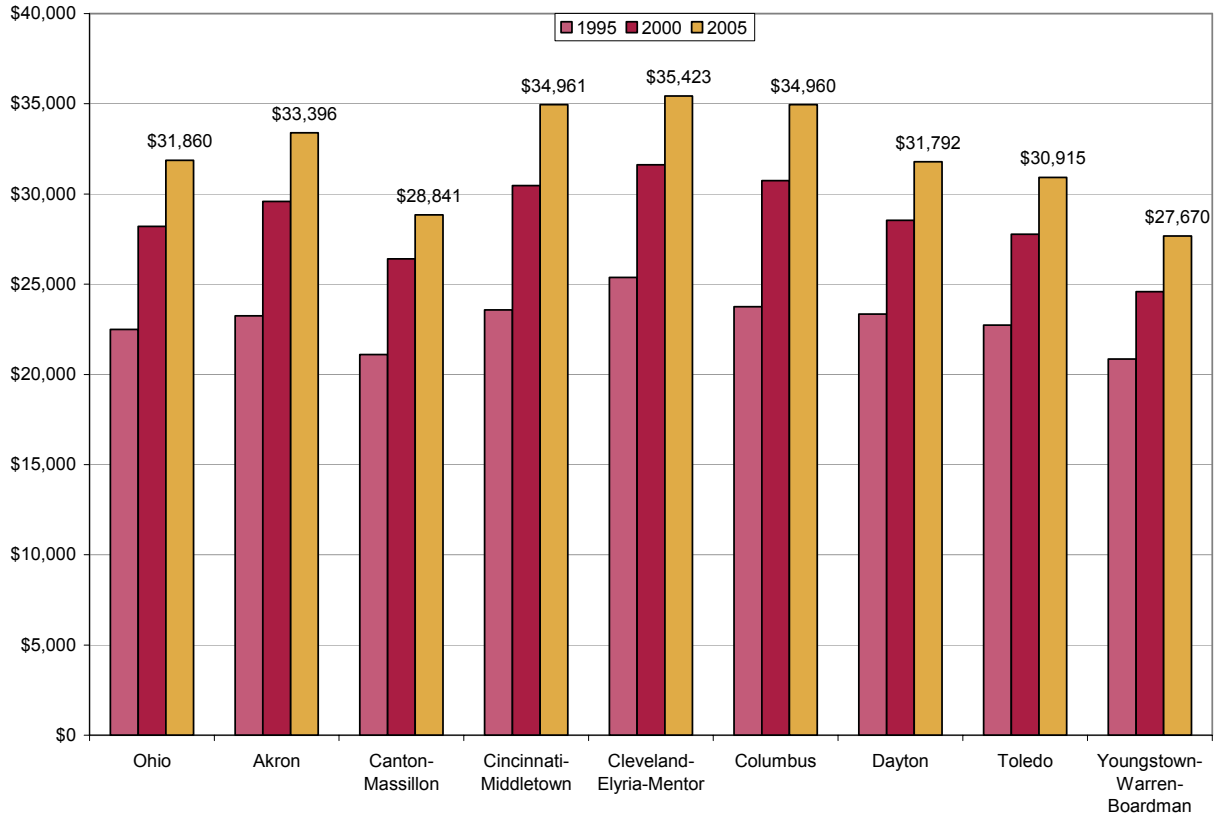
Figure 20: Per Capita Income in Ohio and Neighboring States, 1995-2006



Ohio exhibited a slower rate of income growth than most nearby states. The statewide annual compound rate of growth was 4.0 percent from 1995 to 2006. For comparison, Indiana grew 4.3 percent; Kentucky, 4.5 percent; Michigan, 3.7 percent; Pennsylvania, 4.7 percent; West Virginia, 4.6 percent; and 4.6 percent nationally during that same period.

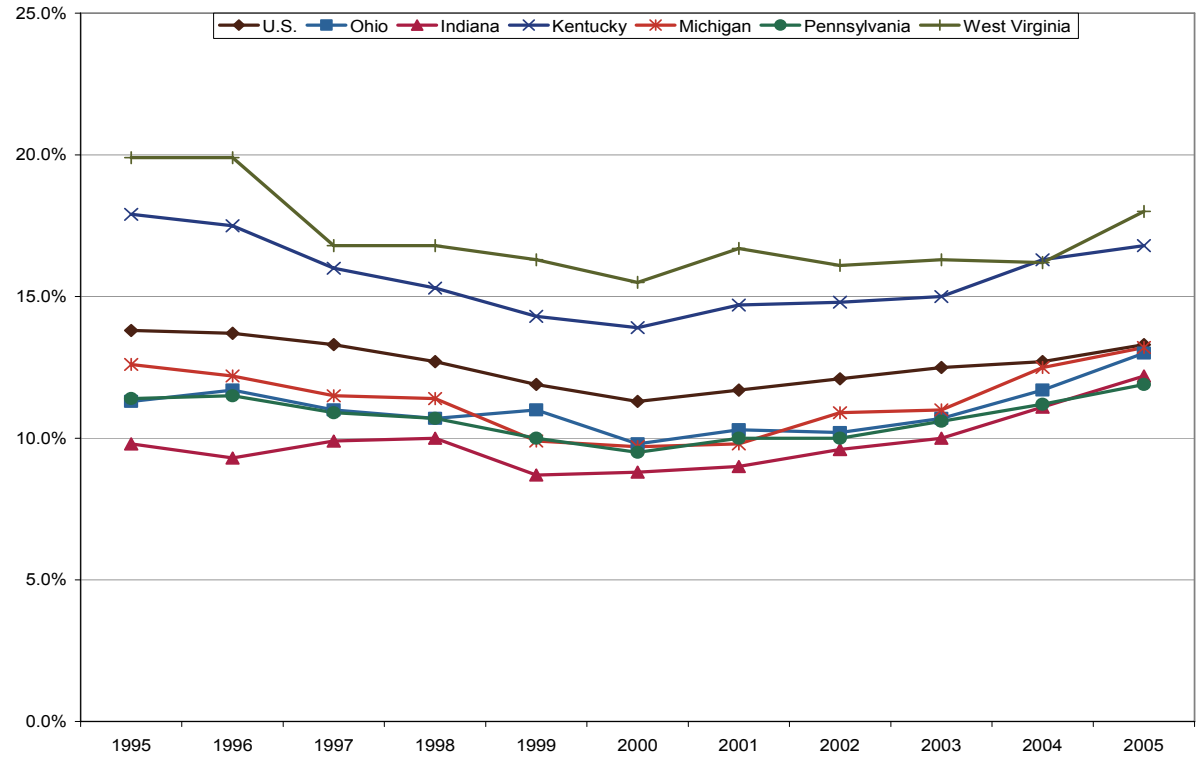
Within the state, there was significant variation in income levels across the major metropolitan areas. Ohio's three largest metropolitan areas—Cincinnati, Cleveland and Columbus—had the state's three highest per capita incomes. Akron was the only other MSA with a per capita income above the state average. Urban areas tend to have higher income levels than rural areas. Figure 21 below shows income levels in each of the major metropolitan areas.

Figure 21: Per Capita Income by Metropolitan Statistical Area



Poverty Rates. Another common measure to compare a state's economic health is the poverty rate—the percentage of people in an area living in a household earning less than a defined threshold income level. In 2005, that level was $19,971 for a household of four people.[7] Figure 22 below shows poverty rates over the last ten years for the U.S., Ohio and neighboring states. Poverty rates declined during the record economic expansion of the 1990s, but have continued to rise since the recession in 2001. This region generally had a lower poverty rate than the rest of the region except for Kentucky and West Virginia. Ohio's poverty rate has increased in recent years, reaching 13.0 percent in 2005, nearing the national rate of 13.3 percent.

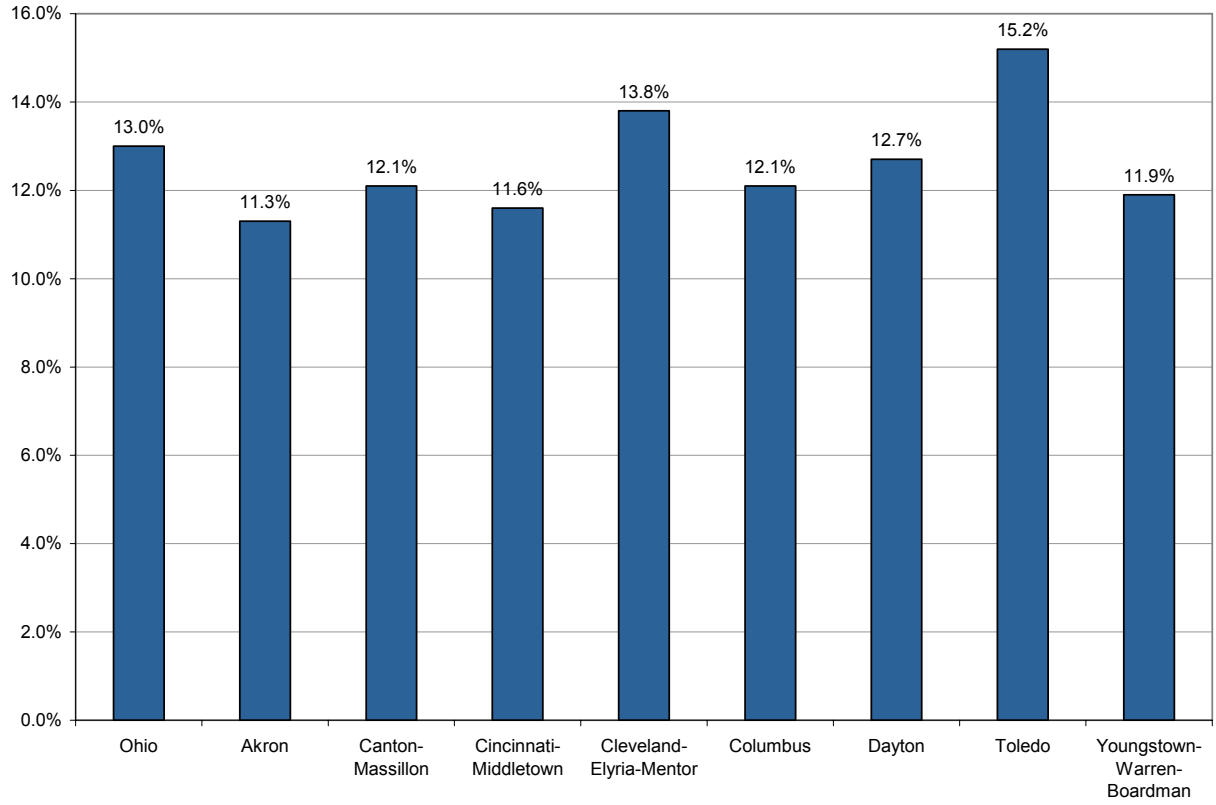
Figure 22: Poverty Rates, 1995-2005



[7] U.S. Census Bureau, 2006d.

Figure 23 below shows poverty rates in each of Ohio's major metropolitan areas while the map in Appendix C shows 2004 poverty levels by county. While the Toledo MSA has a higher poverty rate than the Cleveland metropolitan area, the City of Cleveland proper has the highest poverty rate of any major city in the country: 32.4 percent.[8] As in many American cities, this has been largely caused by residents with greater means leaving the central city for nearby suburbs. In Cleveland, the decline of high-paying manufacturing jobs for people with little specialized training has also been a factor.

Figure 23: Poverty Rates by Metropolitan Statistical Area, 2005

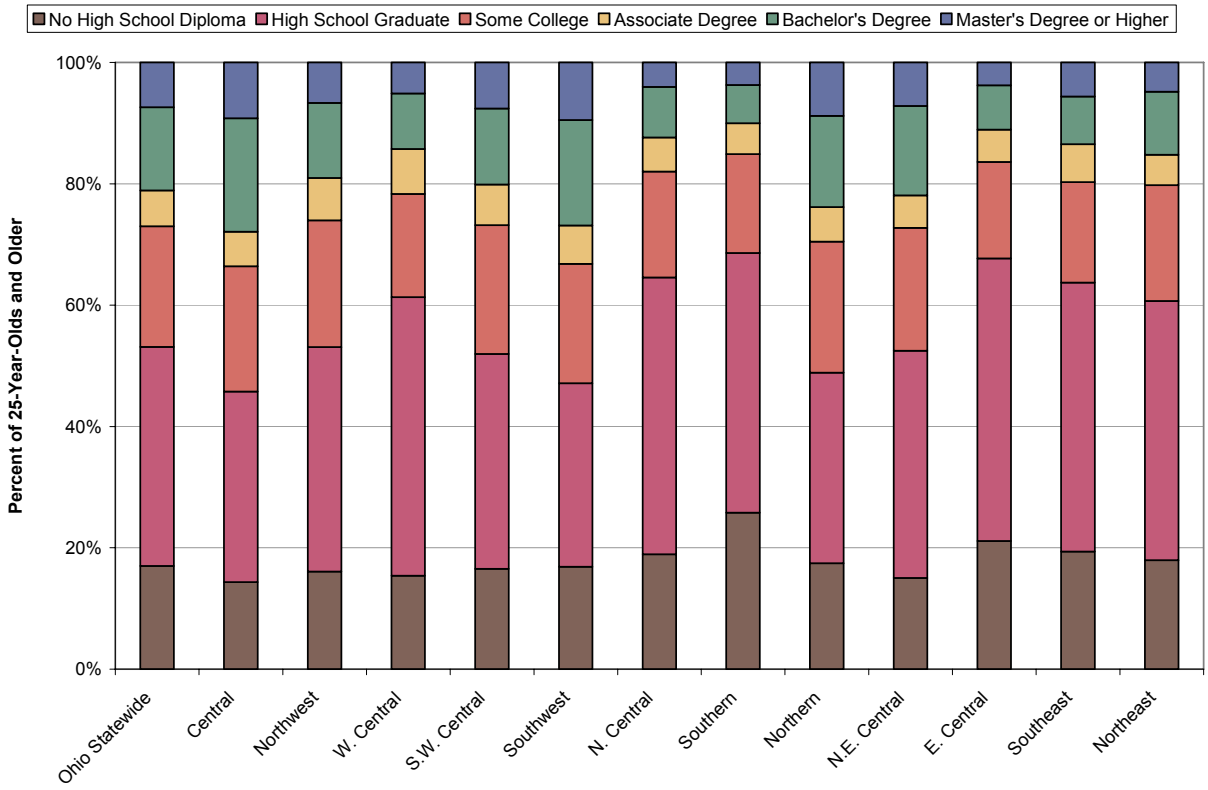


A map showing county poverty rates is shown in Appendix D. At the county level, poverty rates in 2004 (the most recent county data available) ranged from a low of 5.0 percent in Delaware County to a high of 20.2 percent in Athens County. Athens County's comparably high poverty rate may be due in part to its large student population. Scioto County had the second-highest rate at 18.9 percent. The median county poverty level was 10.8 percent. Most of the state's higher county poverty rates were focused around the State of Ohio's Appalachian region. Persistent poverty has been a long-term problem for this part of the country.[9]

[8] Schweitzer & Rudick, 2007.
[9] Ziliak, 2007.

Educational Attainment. Studies have shown strong correlations between an area's economic well-being and overall educational levels. Education or training beyond high school is usually necessary to secure a higher-paying job. Proportions of adults 25 and older attaining various levels of traditional education are shown in Figure 24 below for Ohio's twelve Economic Development Regions, using data from the 2000 decennial census.

Figure 24: Education Levels by Economic Development Region, 2000



Statewide, approximately 27.0 percent of all adults had some postsecondary degree. The Central Ohio EDR had the highest postsecondary attainment (33.6%) and the highest proportion of adults with at least a high school diploma (85.6%). Southwest Ohio had the largest proportion of adults with a master's degree or better (9.5%). Generally, EDRs corresponding to urban areas, especially Ohio's three largest cities, tend to have higher levels of education. The Southern Ohio EDR had the highest proportion without a high school diploma. Please see Appendix A for a map of Ohio's EDRs.

More recent data from the 2005 American Community Survey indicates that about 23.3 percent of all adults 25 and older in Ohio have a bachelor's degree or better, compared with 27.2 percent nationwide.[10] Ohio is ranked 38th out of the 50 states and the District of Columbia in this measure. The share of Ohio adults with an advanced degree is 8.5 percent (ranked 30th), compared with 10.0 percent nationwide.[11]

[10] U.S. Census Bureau, 2006c.
[11] U.S. Census Bureau, 2006b.

IV. An Outlook to 2014

- Two long-term trends will continue: women will continue to participate in the labor force in greater numbers and the overall labor force will continue to age as the baby boom generation grows older.

- By 2014, more than one out of five labor force participants will be 55 or older and about 1.3 million will be 45-54 years old. The challenge will be to meet employers' demand for skilled workers as the baby boom generation retires and to train workers for new technologies.

- Over the 2004-2014 period, the Ohio economy is projected to create about 425,000 new jobs, mostly in the service-providing industries. The two fastest-growing major industries will be professional and business services (19.7%) and education and health services (19.2%). The fastest-growing single industry is projected to be community care facilities for the elderly (51.0%); four out of the top six growth industries will be in health care.

- The two fastest-growing occupational groups will be professional and related (14.4%) and service occupations (12.9%). The fastest growing occupation is projected to be network systems and data communication analysts (47.3%). Most of the fastest growing occupations are computer or health-related.

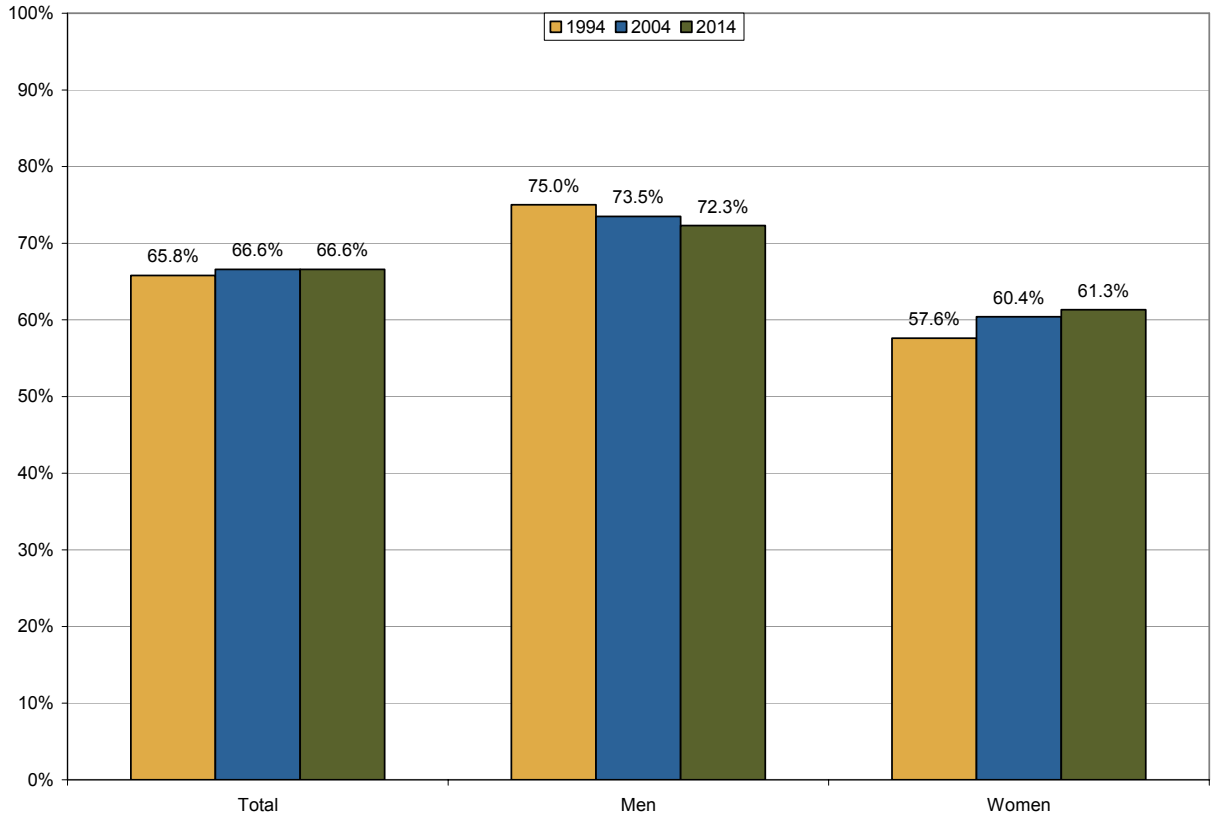
- The economy will provide jobs for workers at all educational levels, but those with more education and training will enjoy better opportunities.

The Bureau of Labor Market Information (LMI) has been developing projections for the Ohio labor market for several decades. The most recent set of publications was released in December 2006 and projected employment demand through 2014 statewide and for each of Ohio's major metropolitan areas. A brief summary follows in this section.

Labor Force Demographics. The two factors that combine to determine Ohio's labor force are the working-age population and the labor force participation rate (i.e., the percent of individuals in the population that is working or looking for work). The supply of workers in Ohio is projected to increase by nearly 250,000 by 2014 because of an increase in both of these factors. Ohio's working-age population is expected to increase by about 370,000 between 2004 and 2014. However, most of those 65 and older do not work. Although there will be more elderly workers in that age group, there will also be a larger number of retirees.

Figure 25 on the next page examines labor force participation rates. Total labor force participation will remain stable at 66.6 percent in 2014. Women's participation will climb 0.9 points to 61.3 percent—a 3.7-point climb since 1994—while men's participation will fall 1.2 points to 72.3 percent—a 2.7-point decline since 1994.

Figure 25: Labor Force Participation Rates by Gender, Projected



Although women will become more active in the workplace in the coming years, they will continue to comprise a minority of the workforce through 2014. Figure 26 below shows that between 2004 and 2014, women's portion of the workforce will grow only about 0.3 percentage points to 47.5 percent, compared to men's 52.5 percent.

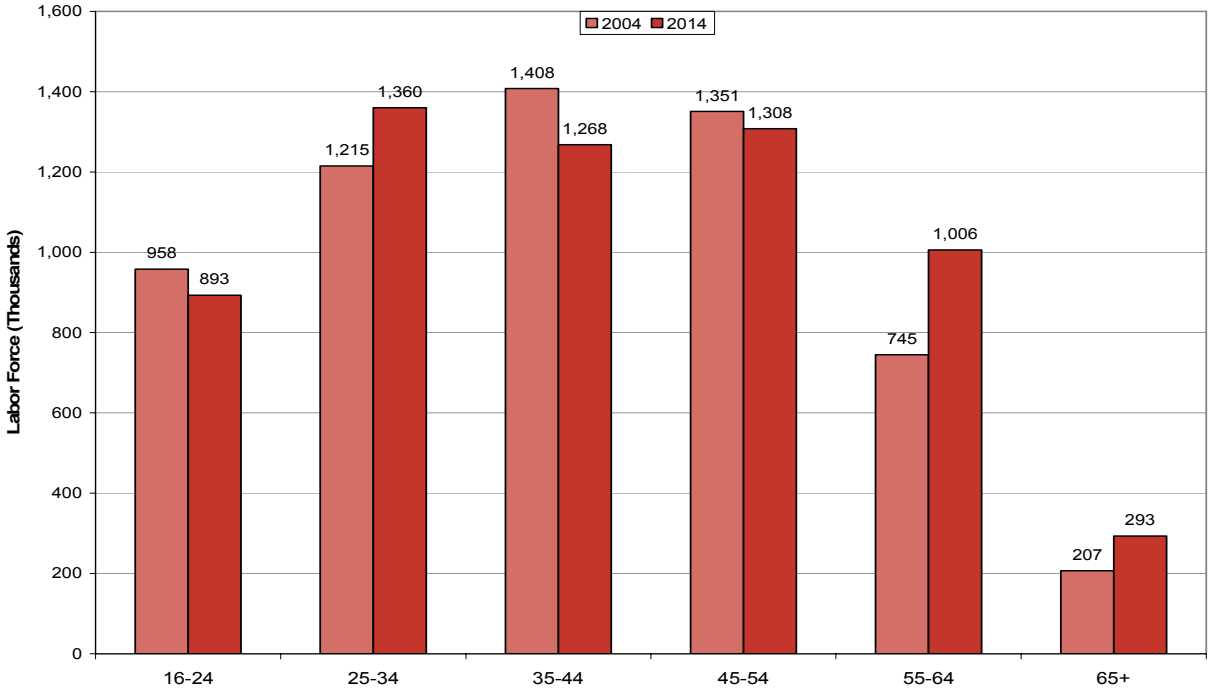
Figure 26: Projected Labor Force Gender Demographics

	Civilian Noninstitutional Population 16 and Over	Civilian Labor Force	Labor Force Participation Rate	Share of Labor Force
1994				
Total	**8,435,000**	**5,548,000**	**65.8%**	**100.0%**
Men	3,977,000	2,981,000	75.0%	53.7%
Women	4,458,000	2,567,000	57.6%	46.3%
2004				
Total	**8,828,000**	**5,884,000**	**66.6%**	**100.0%**
Men	4,225,000	3,105,000	73.5%	52.8%
Women	4,603,000	2,778,000	60.4%	47.2%
2014				
Total	**9,197,000**	**6,128,000**	**66.6%**	**100.0%**
Men	4,446,000	3,216,000	72.3%	52.5%
Women	4,751,000	2,912,000	61.3%	47.5%

Data for 1994 and 2004 are from the Geographic Profile of Employment and Unemployment. Data for 2014 are from the Ohio Bureau of Labor Market Information.

The aging workforce is shown in Figure 27. By 2014, nearly 1.3 million labor force participants will be 55 or older—over one-fifth of the total labor force. In 2004, this segment comprised only 16.2 percent. Although about two-thirds of the 55-64 age group in 2004 are expected to be working in 2014, about 345,000 are expected to leave the labor force. More than three out of every four job openings in the coming years are expected to be replacement hires. Workforce development must be proactive and have strategies in place to manage the needs of Ohio's graying labor force before they become critical.

Figure 27: Labor Force by Age Group, Projected



Employment Outlook by Industry. Over the 2004-2014 period, the Ohio economy is projected to create about 425,000 net new jobs. Virtually all of the expected job growth will be in service-providing industries. The only goods-producing industry expected to post a net gain of jobs during this period is construction, growing 10.6 percent. Among service-providing industries the biggest gains will be in education and health services, which includes hospitals, clinics and private schools (142,000 net new jobs) and professional and business services, which includes law and accounting firms, corporate offices and administrative support (123,000 net new jobs).

Figure 28: Employment Projections by Major Industry

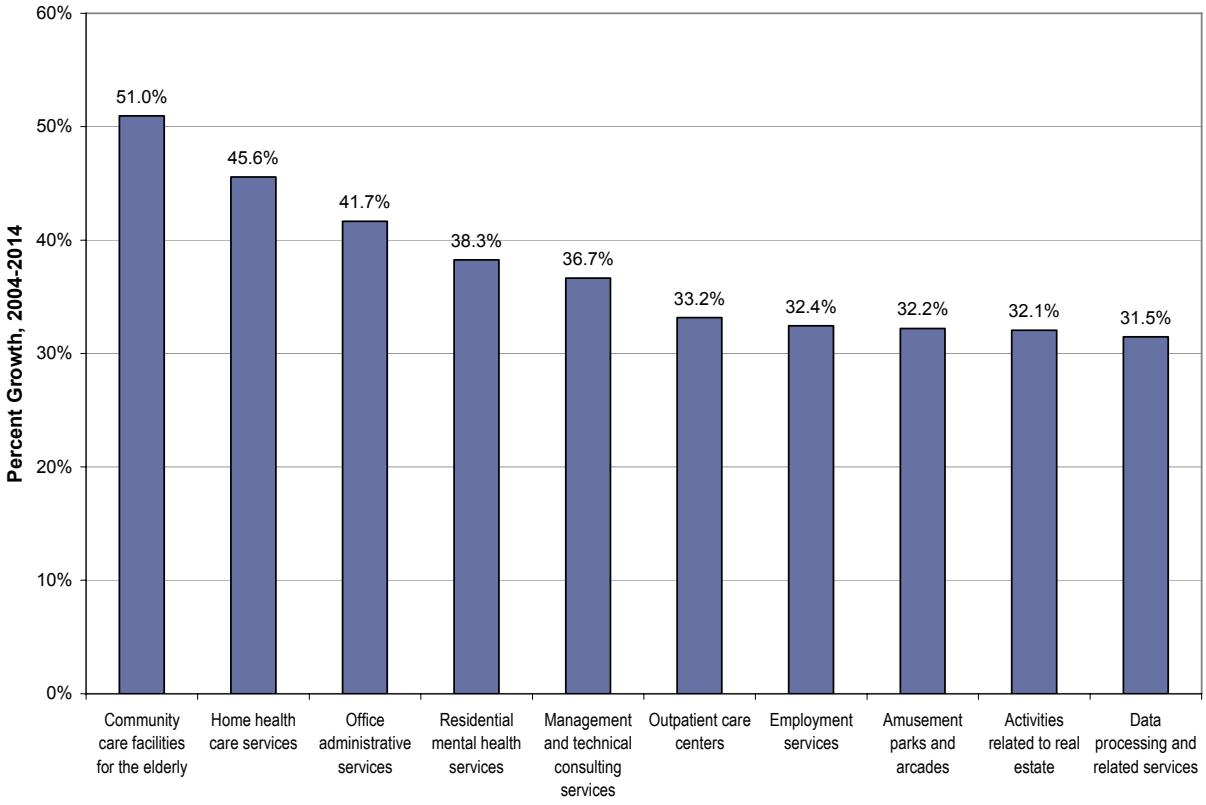
Industry Division	2004 Employment	2014 Projected Employment	Net Change 2004-2014	Percent Change 2004-2014
Total, All Industries	**5,822,100**	**6,247,900**	**425,800**	**7.3%**
Goods-Producing Industries	**1,159,500**	**1,097,500**	**-62,000**	**-5.3%**
Natural Resources & Mining	100,800	91,700	-9,100	-9.0%
Construction	234,700	259,500	24,800	10.6%
Manufacturing	824,000	746,300	-77,700	-9.4%
Service-Providing Industries	**4,288,600**	**4,775,200**	**486,600**	**11.3%**
Trade, Transportation & Utilities	1,039,400	1,104,000	64,600	6.2%
Information	92,800	97,700	4,900	5.3%
Financial Activities	312,100	334,500	22,400	7.2%
Professional & Business Services	624,600	747,600	123,000	19.7%
Education & Health Services	740,200	882,200	142,000	19.2%
Leisure & Hospitality	495,600	556,500	60,900	12.3%
Other Services	228,200	250,100	21,900	9.6%
Government	755,700	802,700	47,000	6.2%
Self-Employed, Private Household & Unpaid Family Workers	**374,000**	**375,200**	**1,200**	**0.3%**

Large numbers of jobs are also projected in leisure and hospitality, primarily food services; government, principally in education; and trade, transportation and utilities. Financial activities and other services are each projected to add more than 20,000 new jobs by 2014.

In Ohio, two-thirds of manufacturing employment is in production of durable goods, like machinery, motor vehicles and steel. Ohio also has a higher concentration of employment in manufacturing than most other states. The downside to having generally high paying manufacturing jobs is that they are more negatively impacted by business downturns. With the latest announcements of downsizing and plant closings in the motor vehicle and parts industries, Ohio manufacturing employment is projected to continue ratcheting downward.

At a more detailed level, community care facilities for the elderly is projected to be the fastest-growing individual industry during this period (51.0%). The number of industries shown in Figure 29 in health care underscores this major industry's importance. Demand for health services will be driven by the growth of the elderly population combined with new emerging medical technologies.

Figure 29: Industries with High Projected Growth Rates



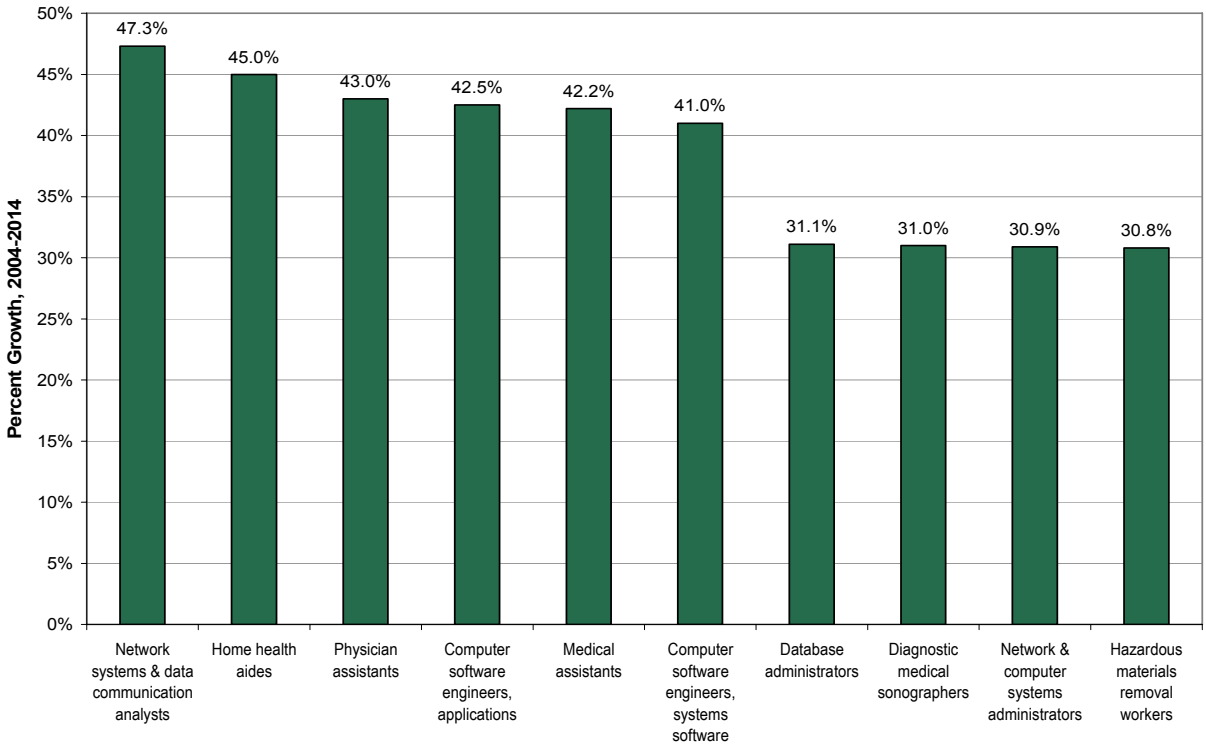
Employment Outlook by Occupation. Employment is expected to grow 7.3 percent between 2004 and 2014 with about 190,000 annual openings. Most job openings, about three-fourths, will result from the need to replace workers who exit the labor force, usually upon retirement. Because production occupations are mainly concentrated in goods-producing industries, this group is expected to lose 5.7 percent of its employment during this period. The fastest growing groups are projected to be professional and related occupations (14.4%) and service occupations (12.9%).

Figure 30: Employment Projections by Occupational Group

Occupational Group	2004 Employment	2014 Projected Employment	Net Change	Percent Change	Total Annual Openings
Total, All Occupations	**5,822,100**	**6,247,900**	**425,800**	**7.3%**	**190,089**
Management, Business and Financial	565,000	615,300	50,300	8.9%	15,253
Professional and Related	1,047,930	1,198,620	150,690	14.4%	35,645
Service	1,120,460	1,265,550	145,090	12.9%	46,520
Sales and Related	603,970	637,530	33,560	5.6%	23,504
Office and Administrative Support	924,840	934,360	9,520	1.0%	25,538
Farming, Fishing and Forestry	14,900	14,810	-90	-0.6%	429
Construction and Extraction	259,180	284,070	24,890	9.6%	7,507
Installation, Maintenance and Repair	237,530	252,100	14,570	6.1%	7,051
Production	591,730	557,770	-33,960	-5.7%	14,711
Transportation and Material Moving	456,540	487,800	31,260	6.8%	13,936

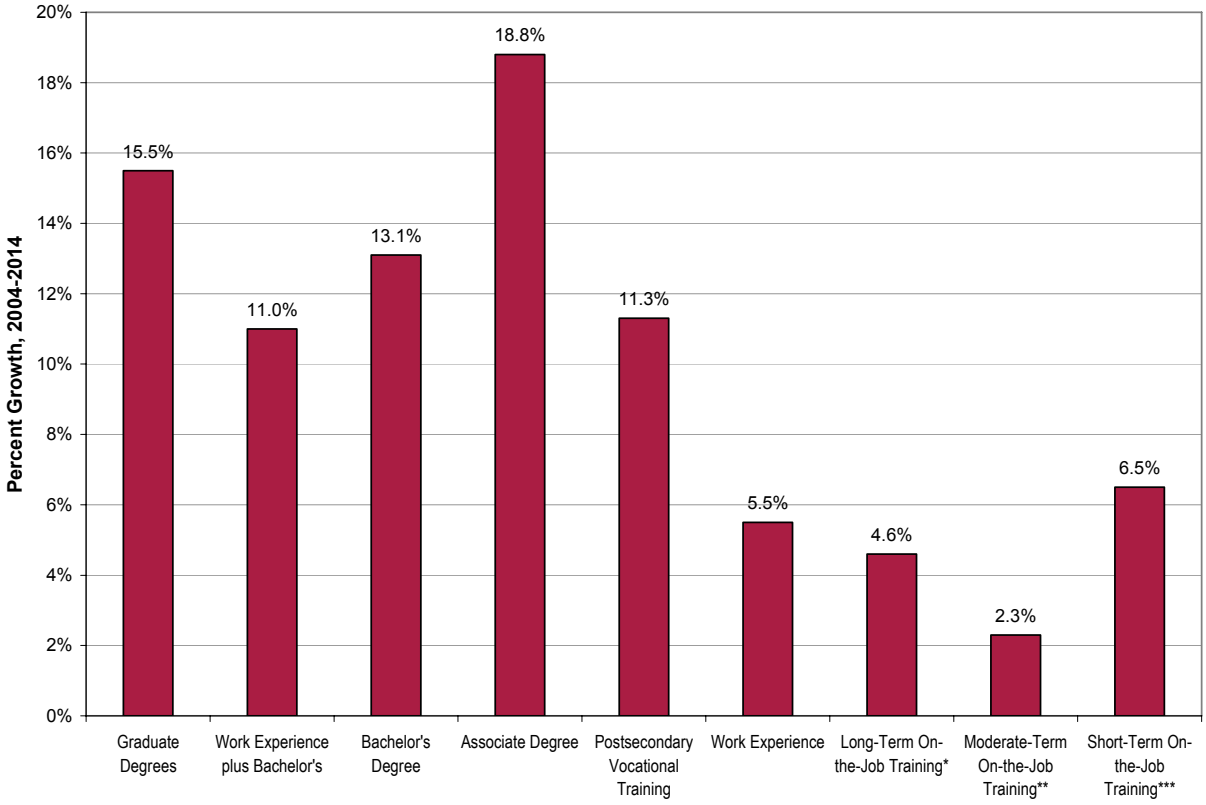
The fastest growing individual occupation, shown in Figure 31, is projected to be network system and data communication analysts (47.3%). Most of the top occupations are computer or health-related.

Figure 31: Occupations with High Projected Growth Rates



Education, Training and Skills Needs. While the Ohio economy will be able to provide jobs for workers at all educational levels, individuals with more education or training will enjoy better job opportunities. Occupational growth in all education and training categories expected to grow more than ten percent require at least some postsecondary education.

Figure 32: Employment Growth by Education and Training Levels, Projected[12]



Recently completed skills-based projections to 2014 add additional insight into what will be needed in the workplace in the next ten years. There are 35 skills that have been identified as potentially related to a job by the Occupational Information Network (O*NET) system. Skills are learned capabilities that allow workers to master and perform the specific activities of their jobs. On average, each occupation has about five skills associated with it. For additional details on how the skills-based projections analysis was conducted, please refer to the Technical Notes at the end of this report.

Figure 33 on the next page lists fifteen of the most important skills and gives several importance measures for both Ohio and the United States. The first, supply rank, ranks the skills based on how many of today's jobs require proficiency in each skill. Percent demand gives the percentage of average annual openings that will require a skill, with higher percentages indicating stronger demand. The gap index is the projected

[12] *Long-Term On-the-Job Training is more than twelve months of combined experience and training.
**Moderate-Term On-the-Job Training is between one and twelve months of combined experience and training.
***Short-Term On-the-Job Training is less than one month of combined experience and training.

difference between the available supply of a skill and its demand, standardized to a range of 0 to 100. Skills with higher skills-gap indices may require greater focus in training programs and policy to meet projected demand. Finally, the replacement index is the proportion of projected annual openings requiring a given skill that will arise to replace exiting workers (e.g. through dismissals, retirements, disabilities, etc.) rather than to fill a new position. Demand for skills with higher replacement indices may be tempered with poor employment growth.

Figure 33: Skills Projections for Ohio and the United States, 2004-2014

Skill	Ohio				United States			
	Supply Rank	Percent Demand	Gap Index	Repl. Index	Supply Rank	Percent Demand	Gap Index	Repl. Index
Reading Comprehension	1	48.3%	100	65	1	50.3%	100	55
Active Listening	2	46.6%	97	67	2	49.5%	97	57
Critical Thinking	3	41.9%	94	65	3	44.5%	94	55
Speaking	4	38.4%	91	64	4	40.9%	91	54
Coordination	6	36.8%	89	63	6	38.6%	89	54
Active Learning	5	37.4%	86	65	5	38.5%	86	55
Monitoring	7	34.3%	83	64	7	35.9%	83	54
Writing	9	33.6%	80	64	8	35.8%	80	54
Instructing	8	34.1%	77	64	9	34.9%	77	54
Time Management	10	31.6%	74	64	10	33.1%	74	54
Learning Strategies	11	31.3%	71	64	11	32.6%	71	54
Social Perceptiveness	12	28.6%	69	63	12	30.5%	69	53
Service Orientation	13	25.4%	66	62	13	26.4%	66	52
Judgment and Decision Making	14	23.6%	63	63	14	24.2%	63	54
Persuasion	15	22.2%	60	64	15	23.3%	60	54

The top 15 skills, as ranked by the Gap Index for Ohio. See Technical Notes for details.

Both in Ohio and the United States, a highly literate workforce will be crucial in the coming years: reading comprehension will be required in roughly half of all openings during this period and is expected to have the largest gap between available supply and demand. The presence of active listening, speaking, writing, instructing and persuasion in the top fifteen indicate the importance of communication-related skills for Ohio and for the nation.

The average replacement index across all 35 skill groups in Ohio is about 64, compared with only 54 across the United States. This is another indicator that Ohio employment may be expected to grow more slowly in the coming years and that most openings will be to replace exiting workers.

The projected decline of production occupations from 2004 to 2014 is reflected in the absence of any production-related skills in the top fifteen. Bear in mind, also, that many of the more specific skills were not included in this list because they would be important to a smaller number of occupations and thus rank below the top fifteen. Technology design, systems analysis and programming are examples of skills which are important to the economy, but which represent a smaller share of the skills matrix.

V. Strategies for the Future

This report has identified a number of key workforce development issues:

- The graying of Ohio's labor force and the associated high replacement needs and skill demands within the workforce system.
- Ohio's population growth has slowed in recent years and will continue to grow slower than the rest of the country. Ohio's loss of jobs so far this decade is beginning to take its toll in higher net out-migration.
- Ohio is experiencing structural shifts in the manufacturing sector, especially in the auto and auto related sectors, extending the "jobless recovery" while also altering the occupational staffing patterns and skills mix of manufacturing industries.
- At the same time, service sector industries have high growth sectors, most notably health care and social assistance, that have high demand for skilled workers.
- While most attention has focused on job destruction in recent years, especially in manufacturing, research shows Ohio's biggest concern is the lack of job creation.[13]
- Skills-based analysis points to the need for a highly literate workforce with more critical thinking and communication-related skills required in the future.

The economy has dual needs. One need is to address the safety net and transitional issues for persons affected by industry sectors that are declining. There is also a need to meet the workforce needs of the knowledge economy and skill demands of emerging technologies. This is happening in an environment of an aging workforce and an economy of high replacement demands with increasing competition for a limited work force. This requires an investment in talent development so more focus will have to be placed on education, training and recruitment of skilled personnel.

Workforce Development has a wealth of economic and workforce information from historical trends, recent business cycle impacts and long-term employment demand projections. Despite this, it is often a daunting task to decide how best to apply scarce resources to achieve workforce or economic development.

There is also a tendency to think of one's own locality and drive the scrutiny of data and analysis down to the most micro level. Unfortunately, the reality is that the health of any one community has less to do with the specifics of the immediate jurisdiction-specific area than with the economic patterns and dynamics of the larger workforce region of which it is a part.[14] Economies and their constituents of workers and businesses do not constrain themselves to specific political or jurisdictional boundaries. Thus strategies for the future must recognize that economic or workforce development cannot be so constrained either.

[13] Lee & Rudick, 2006.
[14] Cortright & Reamer, 1998.

Solution 1: High Employment Prospects. This is a common and fairly traditional form of analysis. The focus is to identify either industries or occupations where wages are relatively high and where there is also a corresponding moderate-to-high degree of demand. The demand component is usually based on projections of employment growth and replacement needs by industry and/or occupation. Workforce and economic development initiatives would be targeted toward these industries and to providing the career guidance and training necessary to support expected business employment demand. Examples of this approach with industries are included in the "Demographic, Labor Force and Industry Trends: Economic Development Region" reports from 2002, viewable at http://lmi.state.oh.us/EDR/EDR_Trends.htm. See also the *Occupational Trends: Ohio's Hot Jobs* pamphlet at http://lmi.state.oh.us/PROJ/Projections/Ohio/OccupationalTrends.pdf or the *Buckeye Top Fifty* at http://lmi.state.oh.us/proj/projections/ohio/Buckeye50.pdf to see this approach. Analysis can also be done by training or educational level to identify high prospect career guidance or training investments for each educational level.

Solution 2: Exports. This approach focuses on export industries as the major factor in the economic dynamism and well-being of a region or area. Rather than just circulating wealth within a local community, exporting products and services bring additional wealth into the community. High-growth export industries bring in additional support industries and attract labor to the area. This wealth also spurs general service-sector growth. An example would be Microsoft's impact on the economy of the State of Washington or Central Ohio's experiences with Honda.

Solution 3: Industry/Occupational Clusters. A cluster approach looks for underlying commonalities, such as field of knowledge, research area, structural links between industries or occupations or overall community need. It has the appeal of designing workforce and economic development initiatives which service or assist an entire cluster and usually has greater community base and appeal. Also, clusters are generally more intuitive than those based on formal industry or occupational coding structures. An example might be the *Industry Profiles* available at http://lmi.state.oh.us/research/profiles/All_Profiles.pdf or *What's in a Word? Maybe Your Next Job!* at http://lmi.state.oh.us/research/WhatsInaWord.pdf.

Solution 4: Entrepreneurship. This approach adheres to the concept that information and knowledge industries are the driving force of the contemporary economy and the area in which the U.S. is best able to compete in an increasingly global economy. The focus is on research and technology-intensive industries and encouraging research and innovation to capture the promise of new technologies for the benefit of our economy. It usually promotes a high skill or high wage emphasis to competitive advantage. The Third Frontier initiative is an example.

Solution 5: Proven Survivors. Analysis under this model is one of assessing what industries or occupations have grown or been resilient through economic downturns. If they grow through or come back strongly after business cycles, the theory is that these industries and occupations are demand-driven and well-tuned to a free market economy. This approach is appealing for its "recession proof" theme and basis on past history.

Solution 6: Wealth. Usually used in tandem with one of the other models (especially export), this model has a distinct emphasis on wealth creation rather than just job creation. The main goal is to drive the wealth of the region by focusing on industries or occupations demonstrating the highest wages. In short, it is the *kinds* of jobs and businesses that are important instead of just the number of them. The intended outcome is to change income patterns.

Solution 7: Special Populations or Geographies. This model follows the classic role of government to assist people or areas which have hardship or are outside the mainstream economy and have been somehow left behind. For individuals (the classic example is the recently incarcerated), this may address skill development, family needs or behavioral changes. For regions (such as Appalachia), this may include infrastructure improvements and business attraction efforts. This may also involve special services during business downsizing or closing, such as work done by the BLMI and Rapid Response offices to assist laid-off workers around the state.

The appropriate model to use may vary depending on the specific circumstances. There are many facets to the economy and the relative strengths and weaknesses of each will help the observant policymaker set a productive course towards economic and workforce development. To proceed further requires organizational underpinnings of the workforce system. The Strickland Administration has laid out a plan for the talent development system with key features outlined below.

First, a leadership agenda has been set at the state level for increased coordination among education and workforce and economic development, providing a cohesive and synergistic talent development system. This is exemplified by the recommendation to establish a cabinet-level Talent Council focused on integrating and coordinating an education, workforce and economic development agenda for talent development with the Governor's Workforce Policy Advisory Board Office.

Second, the state is working to redesign and expand rapid response services. This includes establishing a Rapid Response Strike Force to avoid business contractions or closures as well as early assistance and increased training for transitioning workers.

Third, establish workers assessment and credentialing to meet the skills needed in the workforce. This is exemplified by SkillsLink, WorkKeys and manufacturing credentialing initiatives.

Fourth, establish an Ohio Regional Industry Sector Initiative (the Ohio Skills Bank Initiative) that encourages employers; economic and workforce development; and education and training organizations to form alliances. The two goals will be to meet talent development needs of industries and to advance the employment and job quality of the low-skilled, unemployed and underemployed workers.

Fifth, establish a focused effort to provide training to growth industries, possibly through an Ohio Workforce Guarantee to businesses that workers will have the needed skills. The goal is to grow and attract more growth industries for the state.

Sixth, make the WORKFORCE 411 Centers more business-friendly through a workforce system branding initiative and creation of a specific Business Services Program.

Seventh, establish a demand/data-driven mode of operation for these and other initiatives. Identify and use performance measures as a guide to program development and incentives.

The mission of the Office of Workforce Development and the Bureau of Labor Market Information is not simply to provide data, but to help provide solutions that support these workforce development goals and outcomes. In keeping with this goal, OWD maintains a wide array of information and analysis at the LMI Classic website at http://lmi.state.oh.us, as well as a variety of data at the Ohio Workforce Informer website at http://www.OhioWorkforceInformer.org. Additional contact information is available at http://lmi.state.oh.us/QuestionsAboutData.htm.

Technical Notes

All industry employment figures are from the *Current Employment Survey* (CES) by the U.S. Bureau of Labor Statistics (BLS). The CES is a joint survey by federal and state agencies of business establishments to estimate number of employees, hours worked and earnings. Data are available at http://www.bls.gov/sae/home.htm. Employees are counted by place of employment and not residence. Industry classifications were made using the North American Industry Classification System (NAICS) from the U.S. Office of Management and Budget. A list of all NAICS codes and definitions is available at http://www.census.gov/epcd/naics02/naicod02.htm. 2006 figures are preliminary only and subject to change.

Estimates for state and national real GDP are from the U.S. Bureau of Economic Analysis (BEA), deflated to 2000 dollars using a chained deflator. This means that GDP components may not necessarily be summative. GDP data are available at http://www.bea.gov/national/nipaweb/Index.asp and http://www.bea.gov/regional/gsp/. Productivity estimates are from the Major Sector Productivity and Costs program by BLS at http://www.bls.gov/lpc/home.htm.

Personal income estimates, including per capita income, are from the BEA and include all sources of income (e.g. wages, investment income, government transfers, etc.). Data are available at http://www.bea.gov/regional/spi/.

Unemployment and labor force estimates are from the Local Area Unemployment Statistics (LAUS) program, a joint program by the BLS and BLMI to determine unemployment at the local level. Data are available at http://www.bls.gov/lau/home.htm.

Employment projections for Ohio, by industry and occupation, are from the *Ohio Job Outlook* by the Ohio Bureau of Labor Market Information, published biannually. In addition to statewide projections, projections by MSA and EDR are available to 2014 and 2012, respectively. Projections are available at http://lmi.state.oh.us/proj/OhioJobOutlook.htm. Industry classifications are modified slightly from NAICS to accommodate the projection models. Occupations are classified by Standard Occupational Classifications (SOC). A list of all SOC codes and definitions is available at http://www.bls.gov/soc/socguide.htm.

Population and demographic estimates, including poverty, age and educational distributions are from the U.S. Census Bureau. Population estimates are available at http://ohioworkforceinformer.org/cgi/dataanalysis/AreaSelection.asp?tableName=Populatn. Poverty figures through 2004 are at http://www.census.gov/hhes/www/saipe/county.html. 2005 figures are from the American Community Survey but do not include data at the county level. Educational figures for EDRs were tabulated at http://www.odod.state.oh.us/research/files/s0.htm while state rankings are from the 2005 American Community Survey.

Skills-based projections were developed using the Skills-Based Projections web-based software by the State Projections Workgroup. Occupational employment estimates and projections were taken directly from the *Ohio Job Outlook to 2014*. Knowledge and skills were classified using O*NET—a matching of SOC-like occupations with typically required knowledge, skills and abilities. Skill-occupation matchings were included in the analysis if the skill was deemed important to the occupation (an importance score of 3 out of 5) and a moderate proficiency level was needed (a level score of 4 out of 7). A detailed content model is available online at http://www.onetcenter.org/dl_files/ContentModel_DetailedDesc.pdf.

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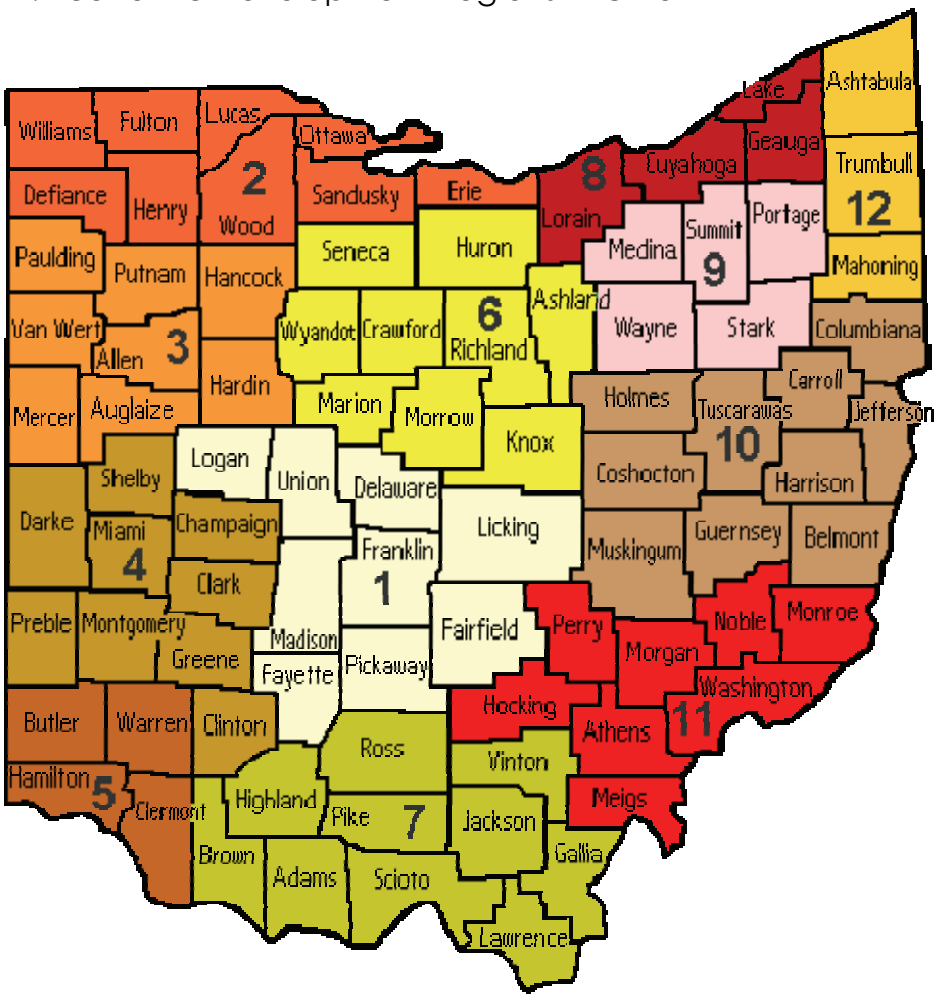
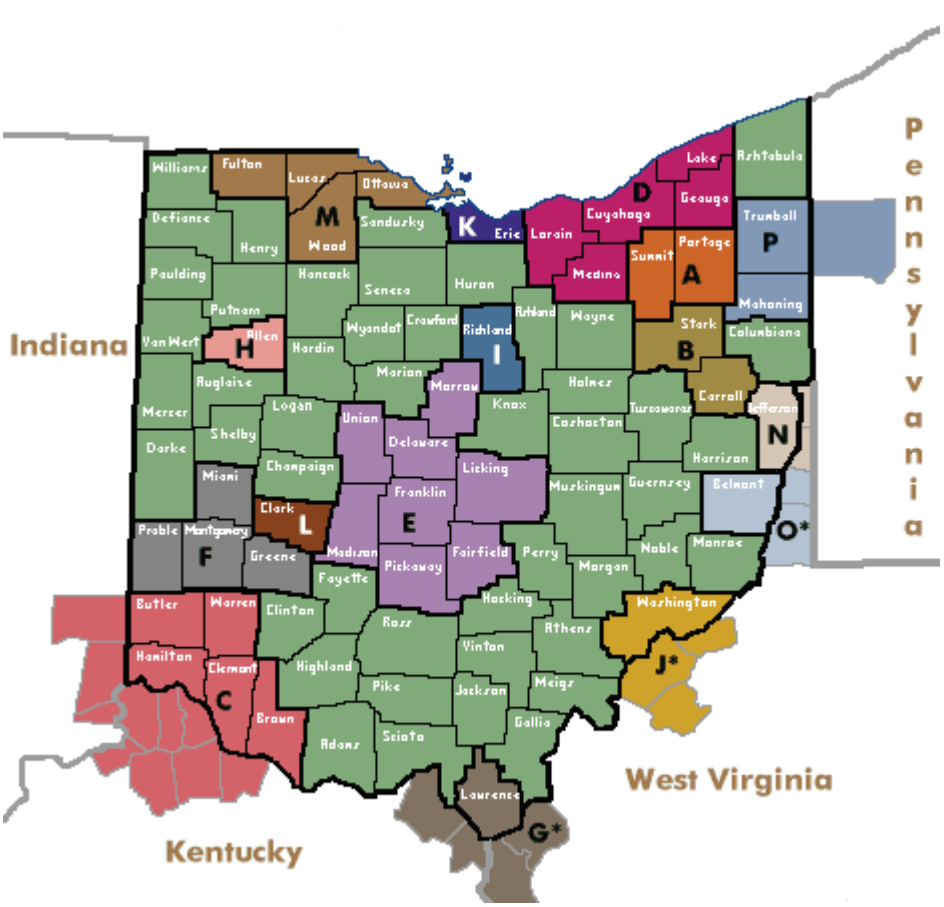
Appendix A: Economic Development Regions in Ohio



1. **Central Ohio**: Delaware, Fairfield, Fayette, Franklin, Licking, Logan, Madison and Union Counties
2. **Northwest Ohio**: Defiance, Erie, Fulton, Henry, Lucas, Ottawa, Sandusky, Williams and Wood Counties
3. **West Central Ohio**: Allen, Auglaize, Hancock, Hardin, Mercer, Paulding, Putnam and Van Wert Counties
4. **Southwest Central Ohio**: Champaign, Clark, Clinton, Darke, Greene, Miami, Montgomery, Preble and Shelby Counties
5. **Southwest Ohio**: Butler, Clermont, Hamilton and Warren Counties
6. **North Central Ohio**: Ashland, Crawford, Huron, Knox, Marion, Morrow, Richland, Seneca and Wyandot Counties
7. **Southern Ohio**: Adams, Brown, Gallia, Highland, Jackson, Lawrence, Ross, Scioto and Vinton Counties
8. **Northern Ohio**: Cuyahoga, Geauga, Lake and Lorain Counties
9. **Northeast Central Ohio**: Medina, Portage, Stark, Summit and Wayne Counties
10. **East Central Ohio**: Belmont, Carroll, Columbiana, Coshocton, Harrison, Holmes, Jefferson, Muskingum and Tuscarawas Counties
11. **Southeast Ohio**: Athens, Hocking, Meigs, Monroe, Morgan, Noble, Perry and Washington Counties
12. **Northeast Ohio**: Ashland, Mahoning and Trumbull Counties

Appendix B: Metropolitan Statistical Areas in Ohio



A. **Akron MSA:** Portage and Summit Counties.

B. **Canton-Massillon MSA:** Carroll and Stark Counties.

C. **Cincinnati-Middletown MSA:** Brown, Butler, Clermont, Hamilton and Warren Counties in Ohio; Dearborn, Franklin and Ohio Counties in Indiana; and Boone, Bracken, Campbell, Gallatin, Grant, Kenton and Pendleton Counties in Kentucky.

D. **Cleveland-Elyria-Mentor MSA:** Cuyahoga, Geauga, Lake, Lorain and Medina Counties.

E. **Columbus MSA:** Delaware, Fairfield, Franklin, Licking, Madison, Morrow, Pickaway and Union Counties

F. **Dayton MSA:** Greene, Miami, Montgomery and Preble Counties

G. **Huntington-Ashland MSA*:** Cabell and Wayne Counties in West Virginia; Boyd and Greenup Counties in Kentucky; and Lawrence County in Ohio.

H. **Lima MSA:** Allen County.

I. **Mansfield MSA:** Richland County.

J. **Parkersburg-Marietta-Vienna MSA*:** Pleasants, Wirt and Wood Counties in West Virginia and Washington County in Ohio.

K. **Sandusky MSA:** Erie County.

L. **Springfield MSA:** Clark County.

M. **Toledo MSA:** Fulton, Lucas, Ottawa and Wood Counties.

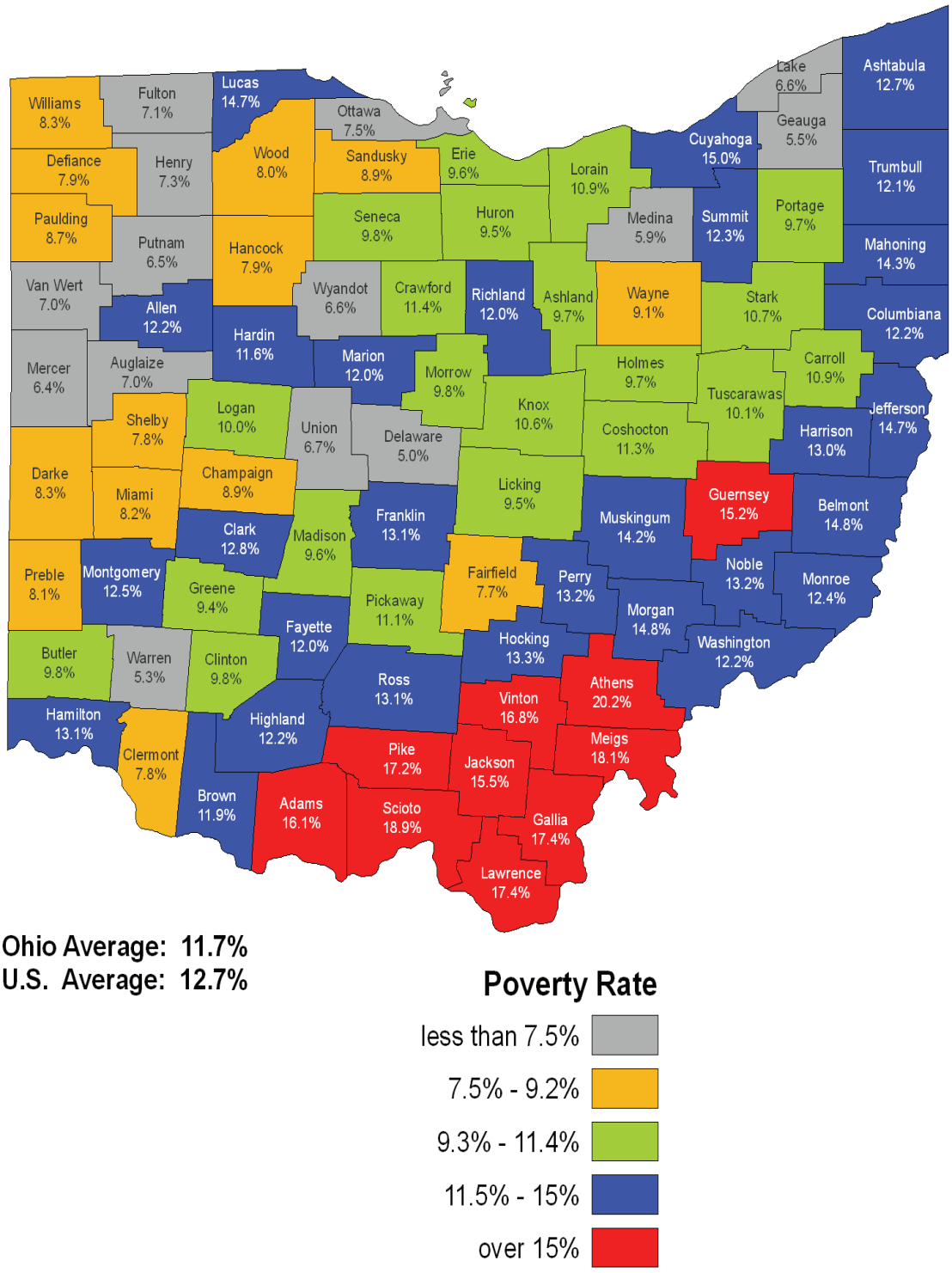
N. **Weirton-Steubenville MSA:** Jefferson County in Ohio and Brooke and Hancock Counties in West Virginia.

O. **Wheeling MSA*:** Marshall and Ohio Counties in West Virginia and Belmont County in Ohio.

P. **Youngstown-Warren-Boardman MSA:** Mahoning and Trumbull Counties in Ohio and Mercer County in Pennsylvania.

*Statistical Areas in other states that include Ohio counties.

Appendix C: Poverty Rates by County, 2004



Note: These figures may include institutional populations.
Source: U.S. Census Bureau. 2004 American Community Survey.

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State of Ohio
Department of Job and Family Services
Office of Workforce Development
Bureau of Labor Market Information

Ted Strickland, Governor
Helen Jones-Kelley, Director

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