



# Technical Memorandum No. 1

## Section 2.2 Economic Trends Analysis



Prepared for:  
OHIO DEPARTMENT OF  
TRANSPORTATION

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## 2.2 Economic Trends Analysis

This section outlines Ohio's current economic profile in the context of key economic drivers of growth and their relevance to the movement of goods in and through the state. Along with the rest of the nation, Ohio was hit hard during the 2008 financial crisis though current data trends show a pattern of recovery for the state, particularly in Ohio's premier growth industries. Other factors contributing to prospects for growth include recent investments in multimodal freight infrastructure such as the CSX North Baltimore intermodal facility and the Bellevue Norfolk Southern rail yard (1). Additionally, Ohio's lower business tax rates (2) – compared to surrounding states – and strategically placed Foreign Trade Zones (3) are attractive elements for business development growth in the state.

The following analysis examines current economic trends and provides maps of Ohio's economic geography based on major industry clusters. The industries selected are those identified by the Jobs Ohio program as targets for the promotion of business development in key growth areas. The analysis highlights each industry's reliance on the state's freight system and the industrial growth it will need to support. The industries are:

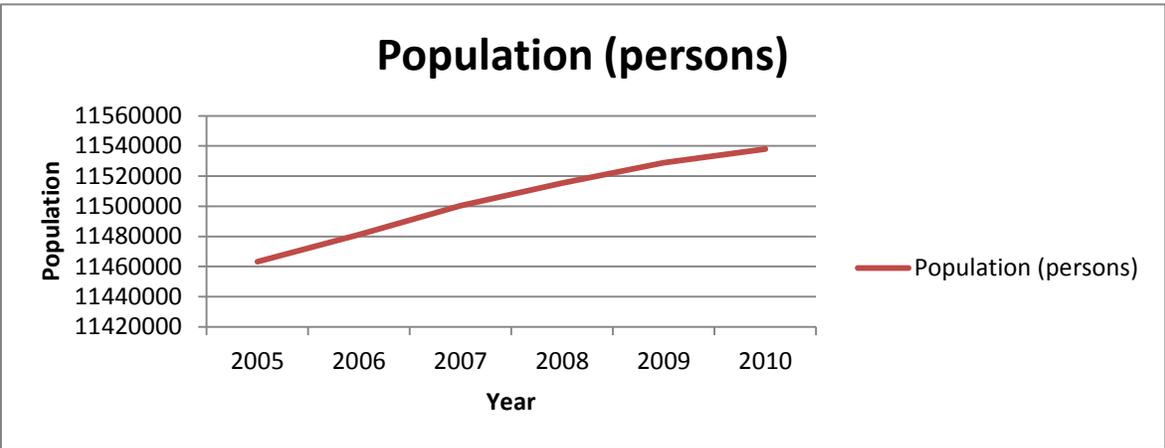
- Aerospace and Aviation
- Automotive
- Banking and Insurance – Financial Services
- BioHealth
- Consumer Goods Headquarters
- Energy
- Food Processing
- Information Services & Software
- Polymers & Chemicals
- Advanced Manufacturing
- Information Technology
- Logistics
- Research and Development

The remainder of this report is structured as follows: the next subsection covers general indicators for the state of Ohio as a whole then discusses a breakdown of each CSA (Combined Statistical Area) region. The remaining subsections explore the contributions of individual target industries, with a brief description provided for each industry along with data analysis of indicators for employment and Gross State Product (GSP). GSP is the state counterpart similar to Gross Domestic Product (GDP) for a nation – the Bureau of Economic Analysis's (BEA) main measure of U.S. output. Thus, GSP is derived from the sum of each industry's GDP in a state. In concept, industry GSP (also known as value added) is the difference between its gross output (*e.g.*, sales or receipts) minus its intermediate inputs (*e.g.*, consumption of goods). Finally, some conclusions are drawn examining the link between Ohio's freight infrastructure system and the state's opportunity for future growth in these target industries.

### 2.2.1 Ohio Indicators

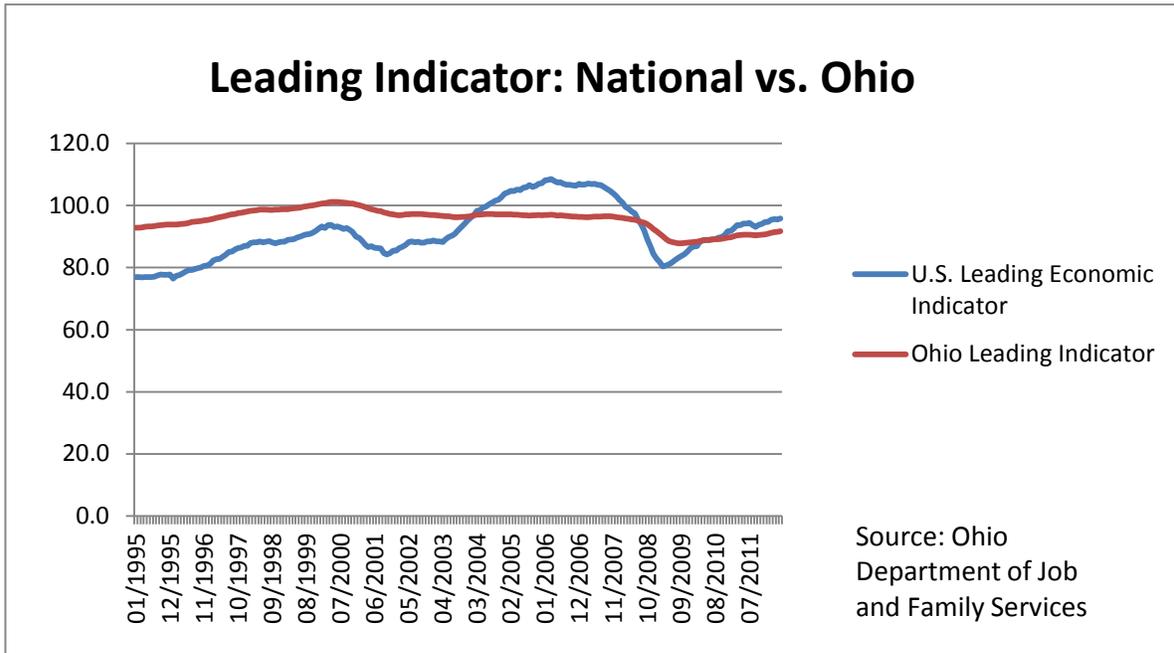
Many Ohio economic indicators dropped after the 2008 financial crisis followed by modest recovery beginning in 2009. Per the U.S. Census, Ohio’s population is holding steady and estimated at just over 11.5 million people in 2011 (see Figure 2-1 for 2005 to 2010 BEA actual values). Population for the state as a whole has risen since 2005. Based on data from the Ohio Department of Job and Family Services, Ohio’s Leading Indicators (a composite index based on a six component data series utilizing seasonally adjusted employment values to anticipate changes in the local economy) rose 0.2 percent to 91.7 in May 2012 and suggests that employment in the state will continue to grow at a modest rate. This value is slightly under the national value at 95.8 percent which indicates modest growth for the nation as a whole (Figure 2-2).

Figure 2-1: Ohio Population Trends



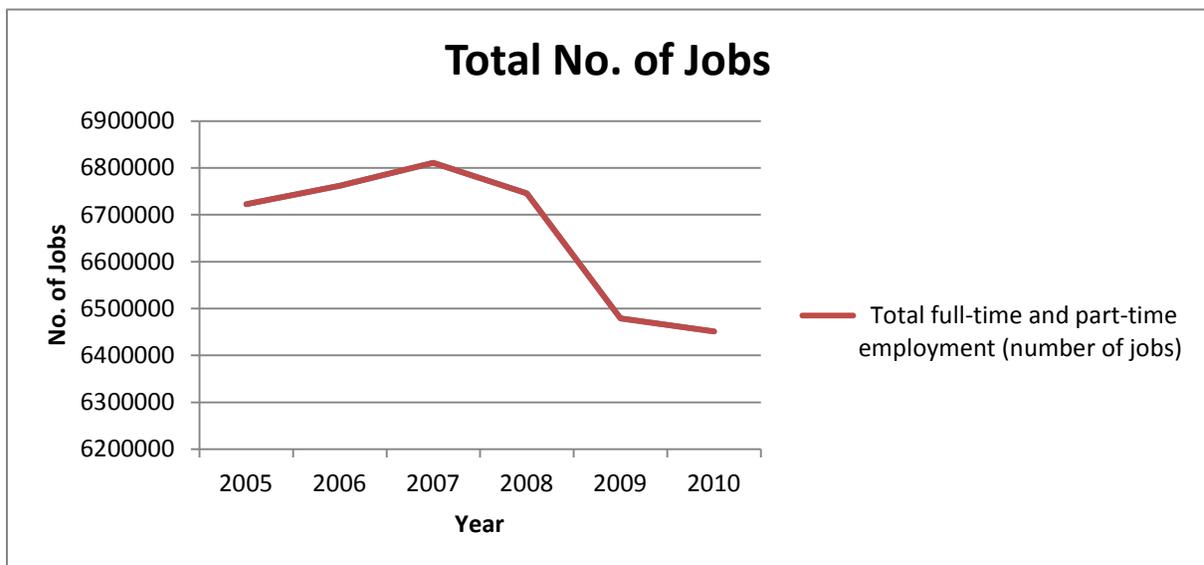
Source: BEA

Figure 2-2: Leading Indicators



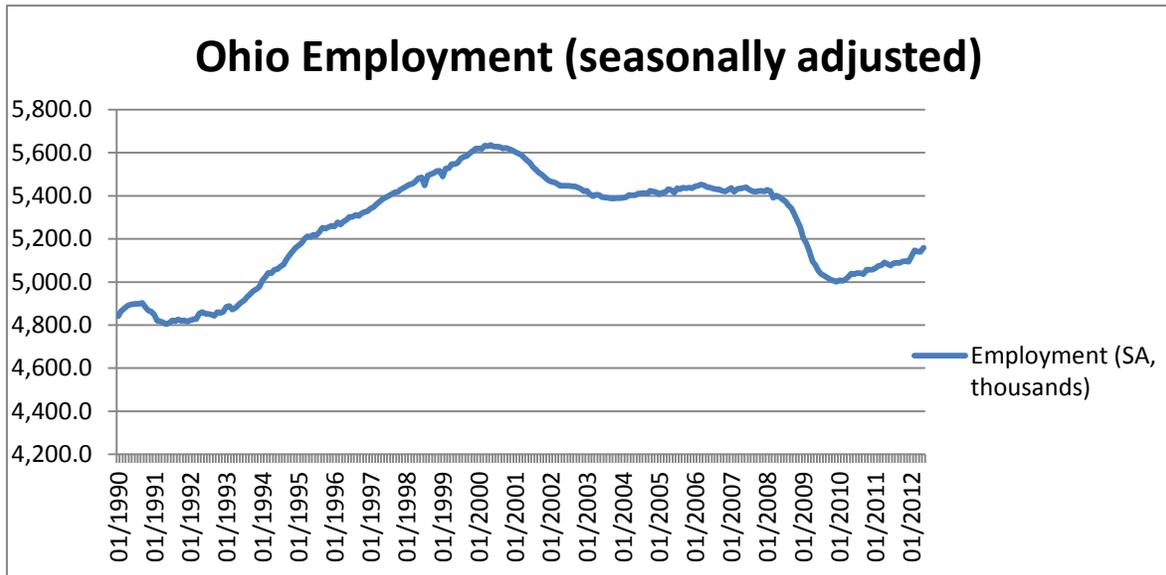
Jobs in Ohio fell after the financial crisis (Figure 2-3) with over 300,000 jobs lost from 2007 through 2010. During 2010 improvements become evident through trends in the seasonally adjusted Ohio employment indicators (Figure 2-4).

Figure 2-3: Ohio Jobs 2005 - 2010



Source: BEA

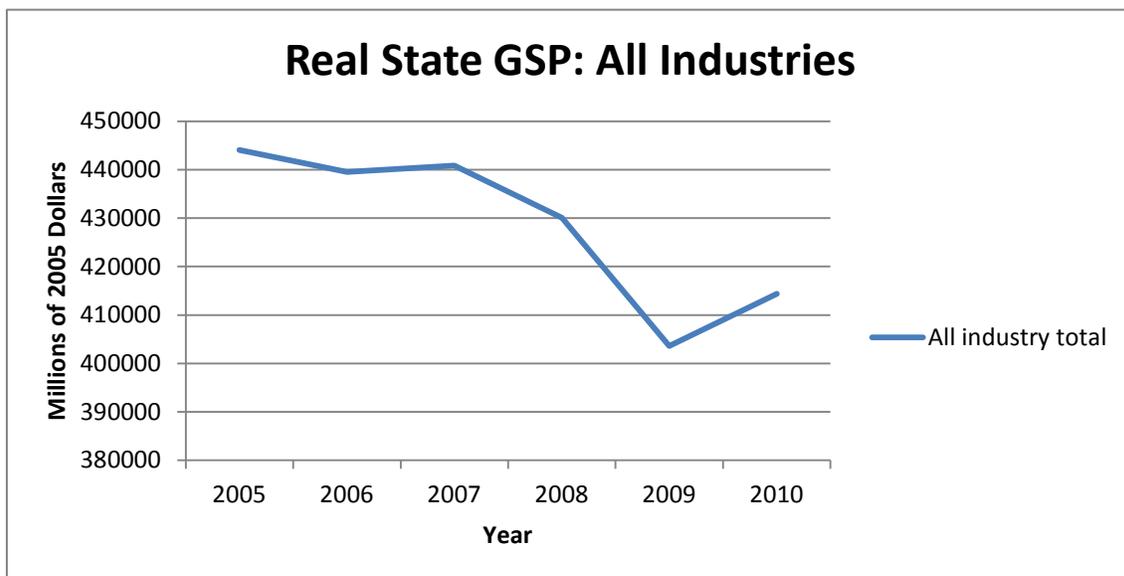
Figure 2-4: Seasonally Adjusted Employment Trends 1990-2011



Source: BEA

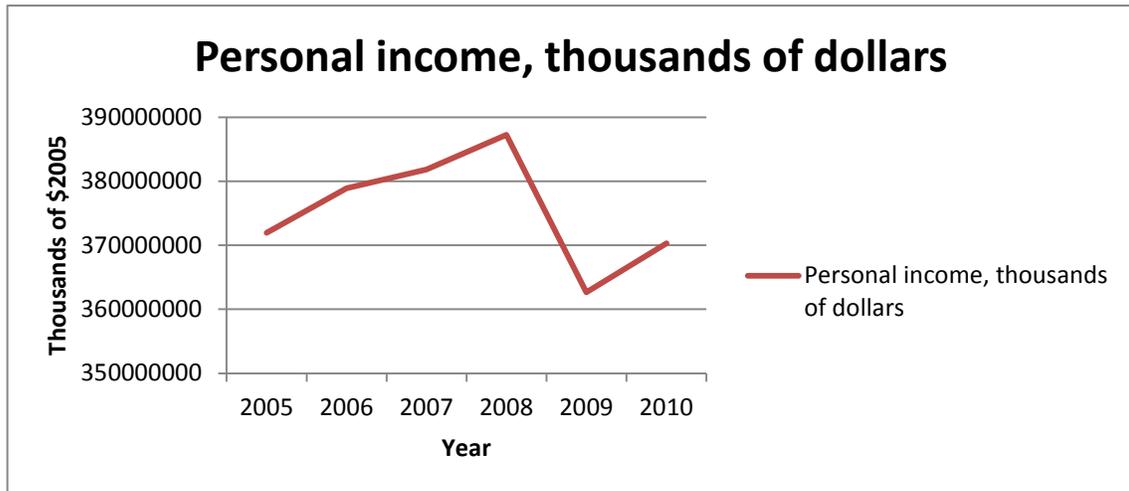
During 2009, improvements become apparent in the data for the sum of all industries in the state (Figure 2-5). Further evidence of recovery is found in the increasing levels of average personal income (Figure 2-6), wage and salary disbursements (Figure 2-7) as well as in average earnings per job (Figure 2-8).

Figure 2-5: Ohio GSP Trends 2005 - 2010



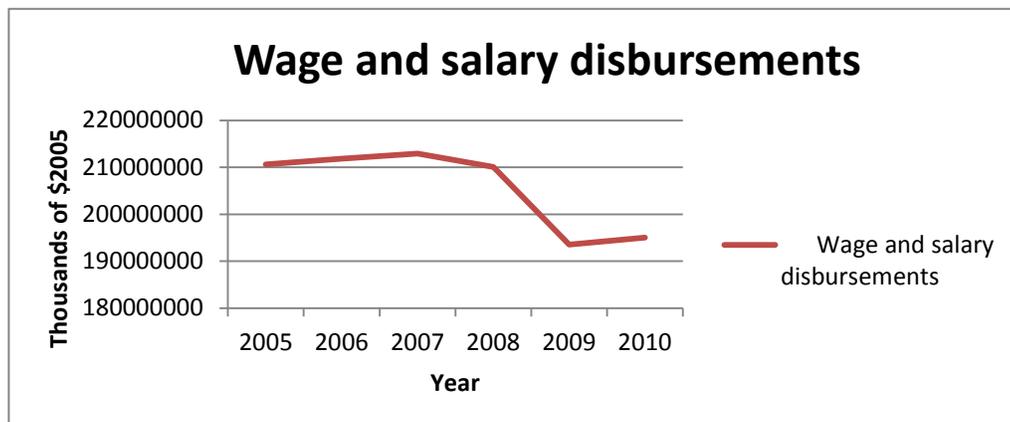
Source: BEA

Figure 2-6: Ohio Personal Income 2005 - 2010



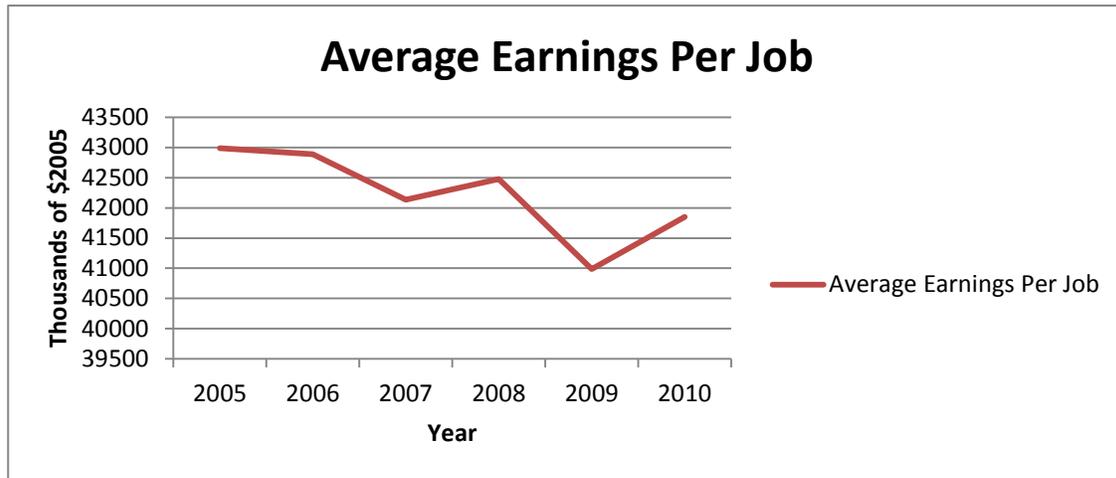
Source: BEA

Figure 2-7: Total Annual Wage and Salary Disbursements 2005 - 2010



Source: BEA

Figure 2-8: Ohio Average Earnings per Job 2005 - 2010



Source: BEA

Overall, the state experienced a drop in indicators across the board in conjunction with the 2008 financial crisis. Recovery began in 2009, as evidenced by data trends in earnings, GSP and jobs in 2010.

### 2.2.2 Ohio CSA Indicators

Ohio accounted for 3.38% of U.S. Personal Income in 2010 with Ohio's metropolitan areas contributing 2.84% and the non-metro areas 0.54%. Similarly, in terms of unemployment insurance compensation, Ohio accounted for 3.37% of the U.S. total for unemployment insurance payments in 2010. The metro/non-metro division is 2.66% and 0.71% respectively.

Dividing the state into its Combined Statistical Areas (CSAs), of which the Census Bureau lists 9 regions, provides further insight into the distribution of income, employment and other important economic factors. The 9 CSAs are as follows:

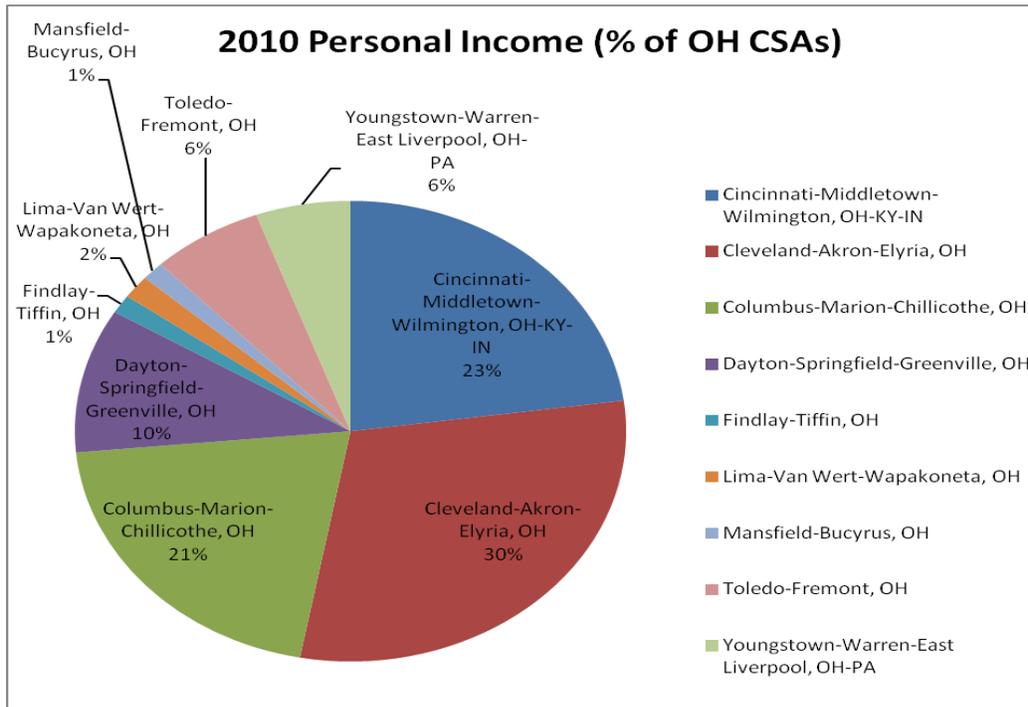
- Cleveland-Akron-Elyria
- Columbus-Marion-Chillicothe
- Cincinnati-Middletown-Wilmington (OH-IN-KY)
- Dayton-Springfield-Greenville
- Toledo-Fremont
- Youngstown-Warren-East Liverpool (OH-PA)
- Lima-Van Wert-Wapakoneta
- Mansfield-Bucyrus
- Findlay-Tiffin

In 2010, these 9 CSAs accounted for 3.1% of US Personal Income and ~92% of Ohio's Personal Income. The distribution is presented in Figure 2-9, below. As is readily seen from Figure 2-9, nearly 85% of all Ohio personal income lies in the Cleveland, Cincinnati, Columbus and Dayton statistical

areas for the year 2010. Figure 2-10 displays the unemployment insurance payment percentages for each of the 9 CSAs. In terms of their percentages, they each approximately follow the percentage of personal income.

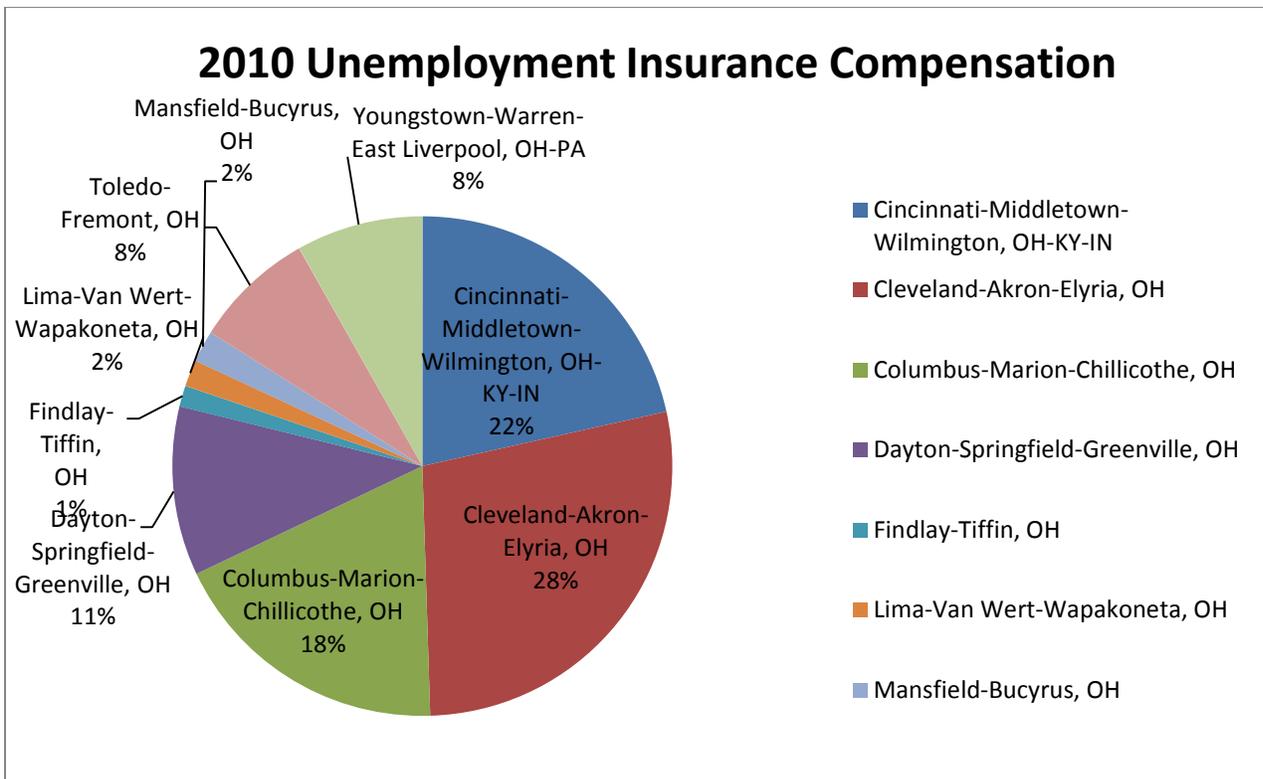
The following subsections are meant to provide an overview of the major locational drivers of economic activity, categorized by the 9 CSAs. The data comes from the Bureau of Economic Analysis' (BEA) Regional Economic Information System (REIS) and is intended to provide an understanding of the spatial distribution of the economic activity in the state. The data display trends from 2005 to the latest available and most current data year of 2010. The majority of all industrial activity takes place and trades rank among 3 of the 9 CSAs – namely Cleveland, Columbus and Cincinnati; Dayton, Toledo and Youngstown typically follow in rank. This picture is found repeatedly regardless of the industry in focus. The state has three main agglomerations (Cleveland, Cincinnati and Columbus) with a healthy mix of economic activity. However, all experienced significant contraction in the wake of the recession of 2008. There is little data available past 2010, so the extent of the recovery process that the state has experienced in 2011 and the first half of 2012 remains unseen; however, the results of the time trends are promising when looking at the relatively modest recovery experienced in 2009 and 2010. The aggregate numbers available for the more recent time periods still point to a new and lower sustainable level of economic activity; whether the state will meet or beat the national levels remains to be seen. Finally, the time horizon of all trend data is 2005-2010, thus if a peak is said to have occurred, it is only within the scope of the time horizon (2005 – 2010).

Figure 2-9: CSA Personal Income



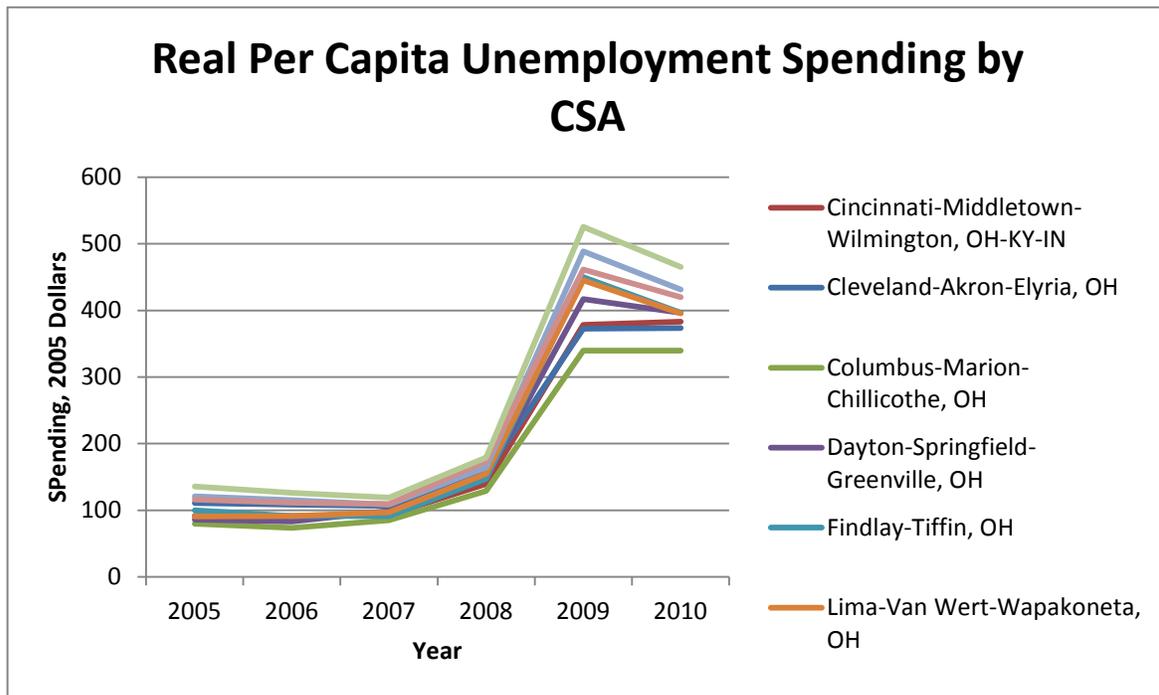
Source: BEA

Figure 2-10: CSA Unemployment Insurance Compensation



Source: BEA

Figure 2-11: Per Capita Unemployment Spending by CSA



Source: BEA

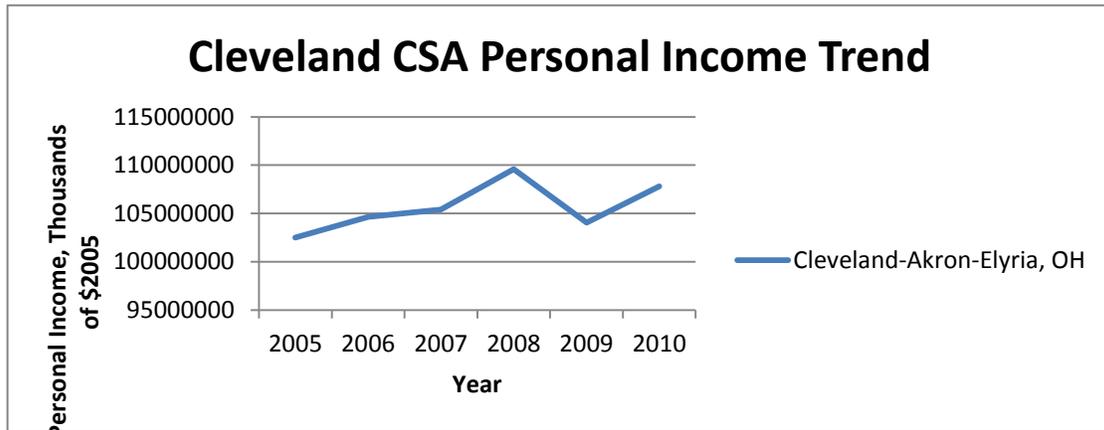
### CLEVELAND CSA

The Cleveland-Akron-Elyria CSA is completely contained in the state of Ohio and includes the counties of Cuyahoga, Lorain, Lake, Medina, Geauga, Summit, Portage and Ashtabula. It is the state's largest



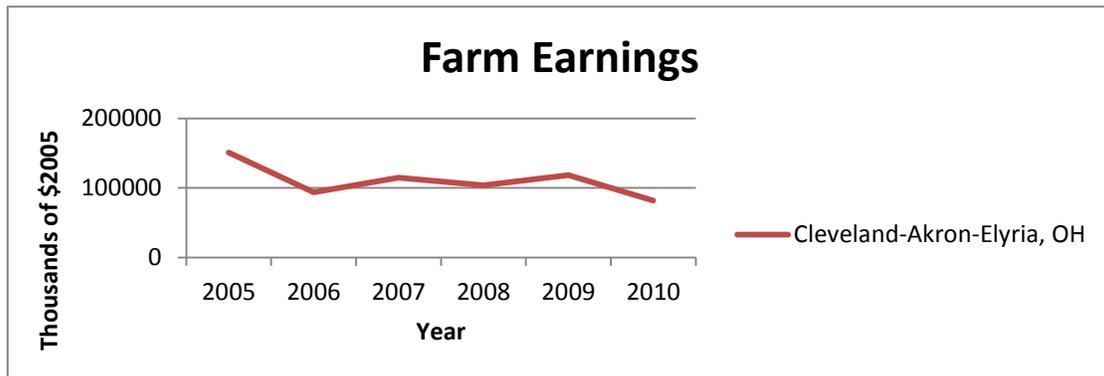
metropolitan area in terms of population. The 2010 Census counts the CSA at 2,879,875 people. Personal Income levels, while hit hard in the 2008 recession, have risen back to early 2008 levels in 2010. The CSA provides approximately 26% of the state's jobs, at 1,691,624, the lowest level for the CSA since before 2005. Average earnings are the highest they have been (in real terms) at \$50,296 (in 2010 dollars). The area has lost nearly 100,000 jobs since its peak of 1.8 million jobs in 2007. Cleveland area personal income levels for 2010 contributed 0.92% to total US personal income – by far the wealthiest portion of the state. 2010 per capita unemployment insurance benefits are 2<sup>nd</sup> lowest in the state among CSAs at \$396 per person.

Figure 2-12: Personal Income Cleveland CSA



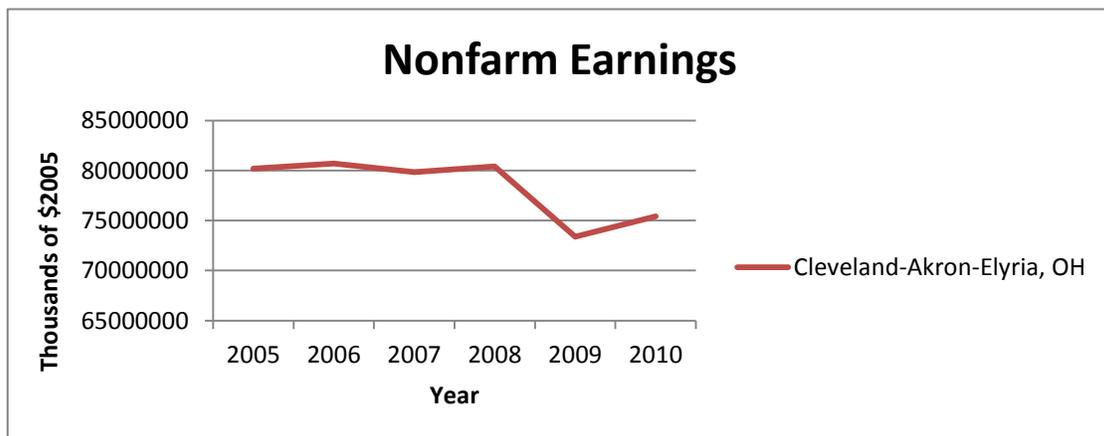
Source: BEA

Figure 2-13: Farm Earnings Cleveland CSA



Source: BEA

Figure 2-14: Nonfarm Earnings Cleveland CSA



Source: BEA

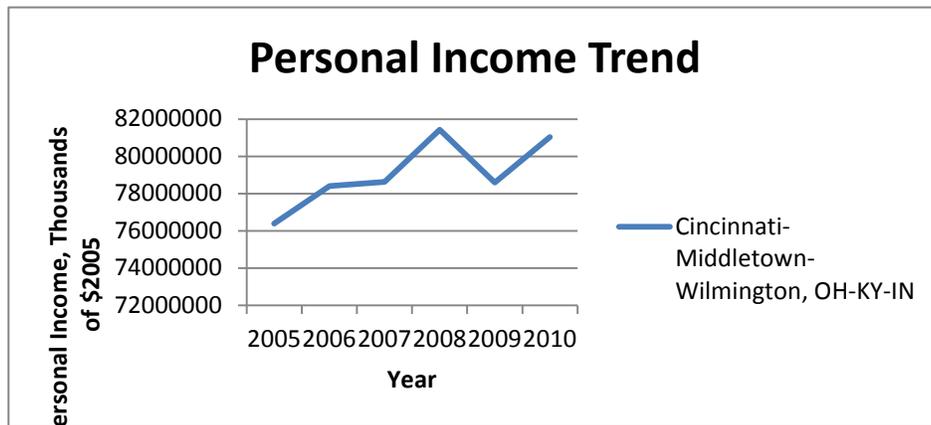
**CINCINNATI CSA**

The Cincinnati – Middletown – Wilmington Combined Statistical Area includes counties in the states of Ohio, Kentucky and Indiana and as of 2010 included 2,174,318 persons (US Census Bureau). It is

Ohio’s 2<sup>nd</sup> largest metro area. 2010 per capita income is estimated to be \$39,499 and the CSA provided an estimated 1,265,416 full and part time jobs in 2010 (~20% of Ohio’s employment for the year). The 2010 average earning per job was \$49,523 and has risen above the 2005 level for average earning per job in the area. Personal Income levels have nearly recovered to the peak experienced in 2008. The CSA includes 15 counties, 5 of which are Ohio based. The Cincinnati CSA constitutes 0.7% of the US total personal income levels in 2010 (2<sup>nd</sup> highest in the state for the year). It had the states 3<sup>rd</sup> lowest per capita unemployment insurance benefit payments in 2010, at \$406 spent per person.

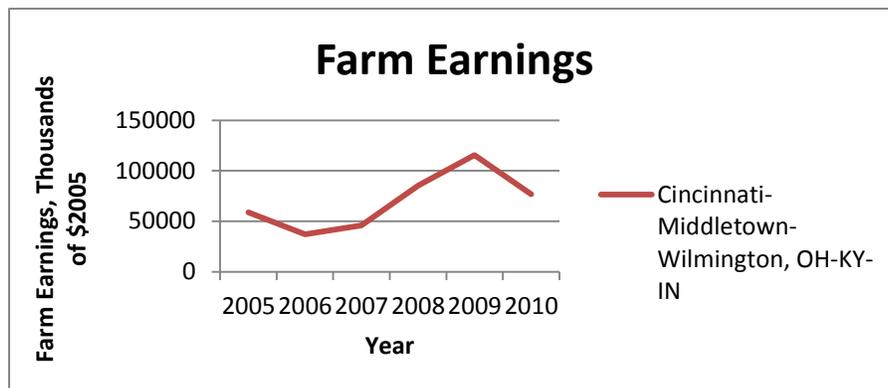


Figure 2-15: Personal Income Cincinnati CSA



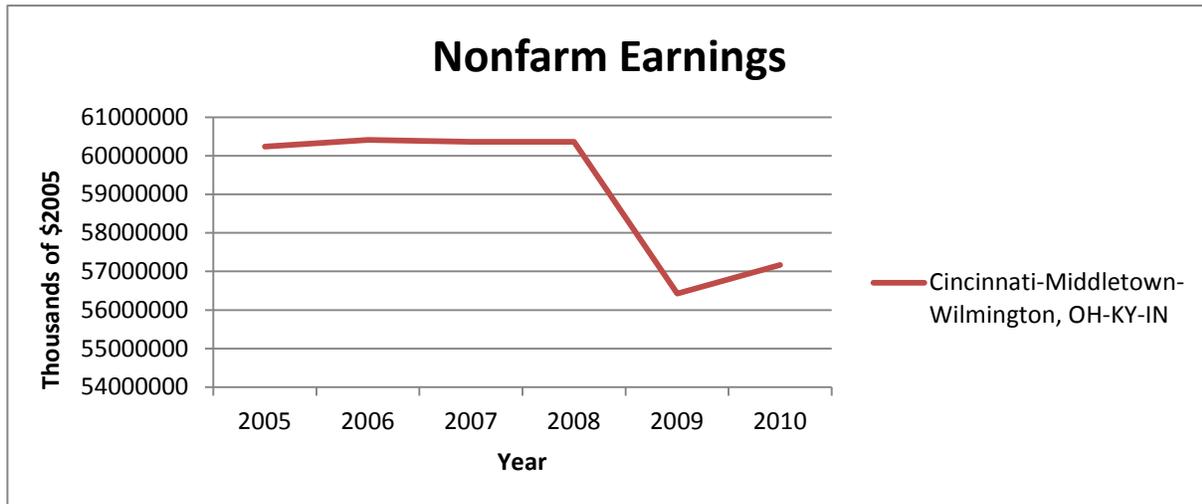
Source: BEA

Figure 2-16: Farm Earnings Cincinnati CSA



Source: BEA

Figure 2-17: Nonfarm Earnings Cincinnati CSA



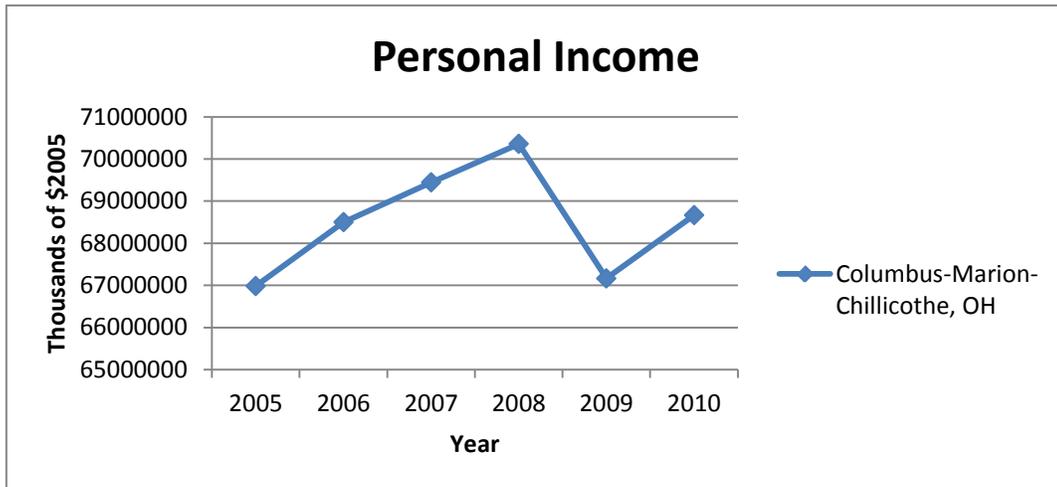
Source: BEA

### COLUMBUS CSA

The Columbus-Marion-Chillicothe OH CSA is centered on the state capital of Columbus. It is the 3<sup>rd</sup> largest metropolitan area in the state with a 2010 population count of 2,075,270 people. It ranks 3<sup>rd</sup> in terms of state personal income levels, contributing 0.63% of the US total in 2010. Columbus has the state's largest cluster of financial service activity, with an estimated 100,000+ jobs in the area in 2010. All Jobs Ohio target industries have a considerable presence in the metro area. It is also the state's largest metropolitan area by land size (area) and number of municipalities (it contains 13 Ohio counties). Columbus CSA has the state's lowest per capita unemployment insurance benefits spending of \$360 per person in 2010.

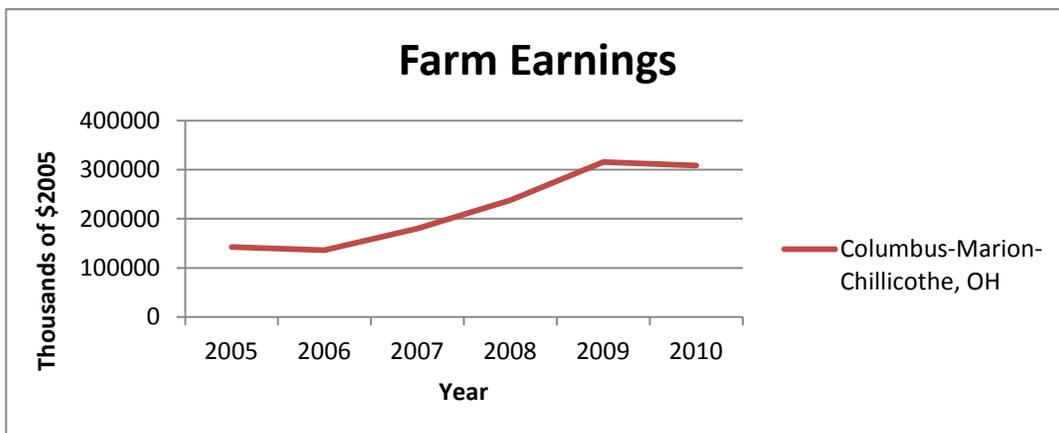


Figure 2-18: Personal Income Columbus CSA



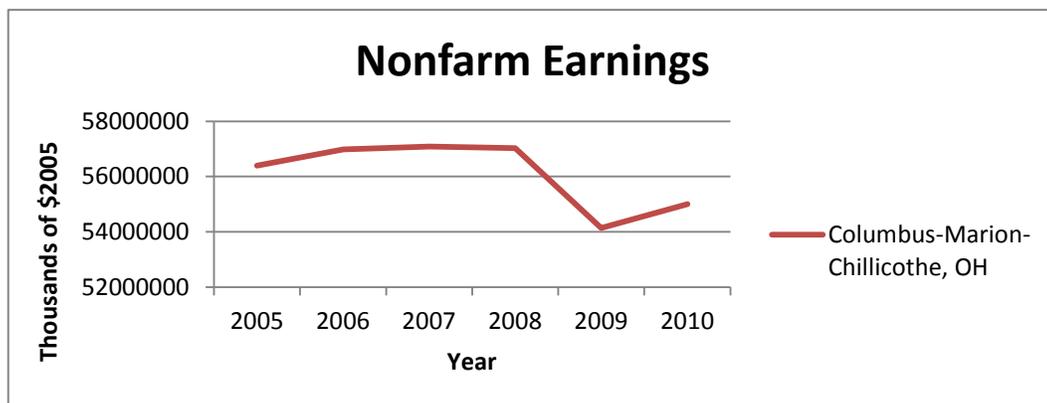
Source: BEA

Figure 2-19: Farm Earnings Columbus CSA



Source: BEA

Figure 2-20: Nonfarm Earnings Columbus CSA



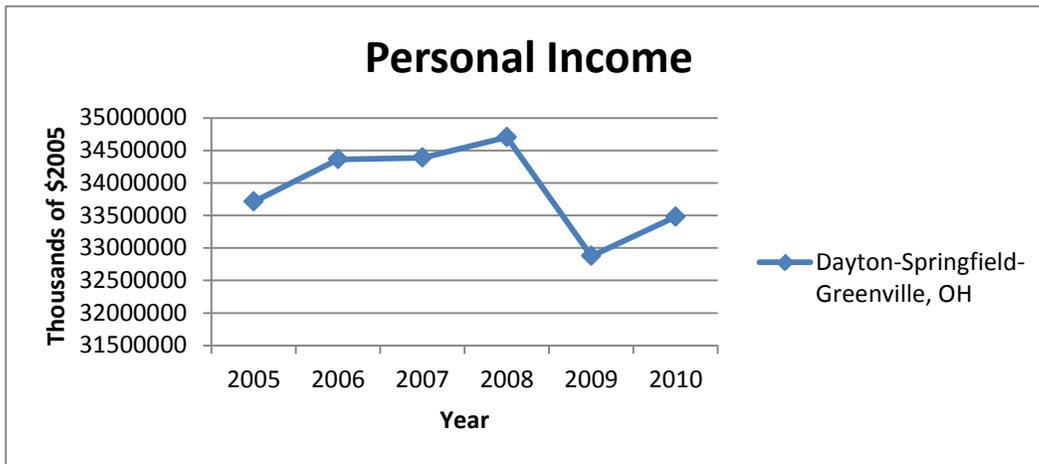
Source: BEA

**DAYTON CSA**



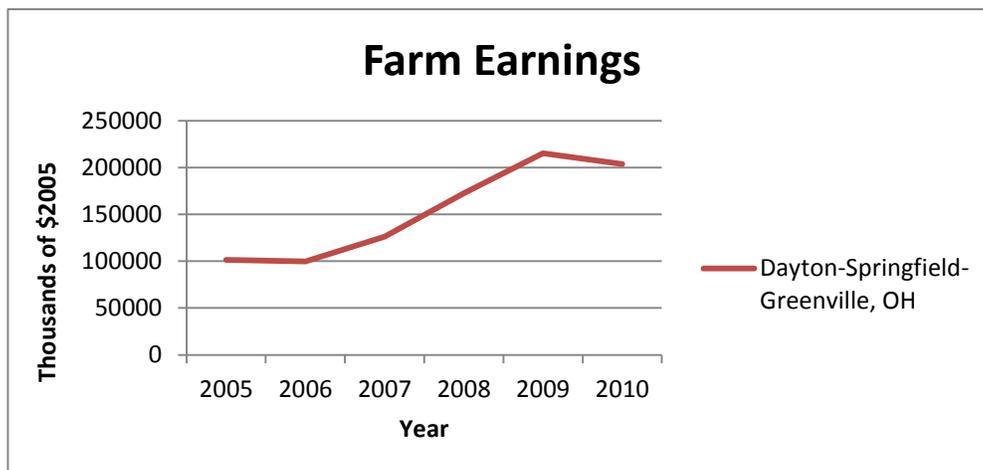
The Dayton-Springfield-Greenville CSA contains 7 counties north of Cincinnati. It is the fourth largest metro area in the state by population; with 1,073,340 persons in 2010. 2010 personal income (PI) was 4<sup>th</sup> in the state among CSA's, contributing 0.31% of the US PI levels. There were 568,671 full and part time jobs in 2010 in the CSA, down about 40,000 jobs from its 2005 peak. Per capita unemployment benefits totaled \$420 in 2010. Average earnings per job were \$46,337 in 2010 and represent the highest level for the CSA over the course of the study period.

**Figure 2-21: Personal Income Dayton CSA**



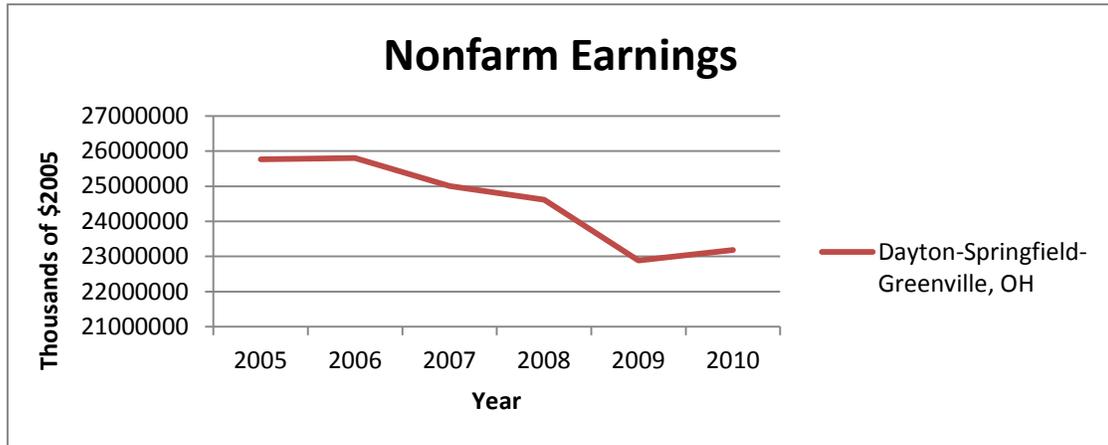
Source: BEA

**Figure 2-22: Farm Earnings Dayton CSA**



Source: BEA

Figure 2-23: Nonfarm Earnings Dayton CSA



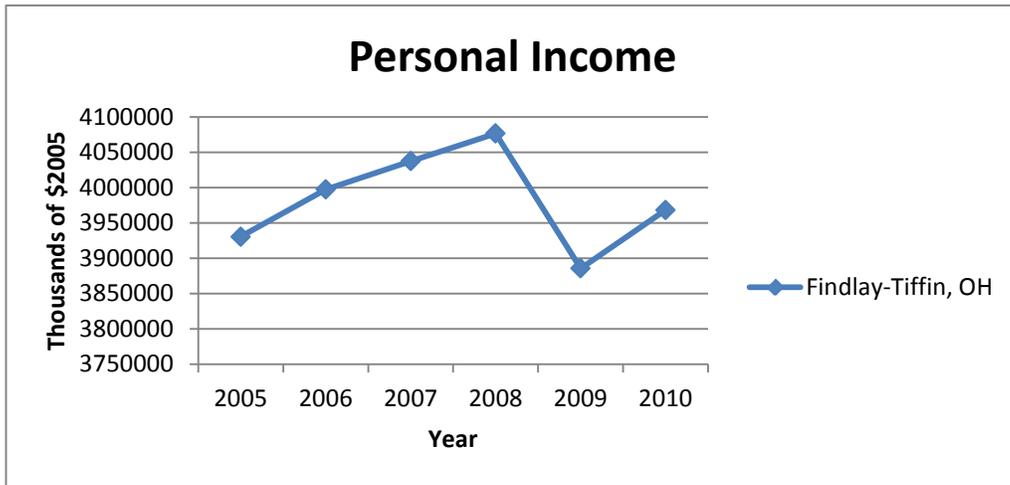
Source: BEA

### FINDLAY-TIFFIN CSA



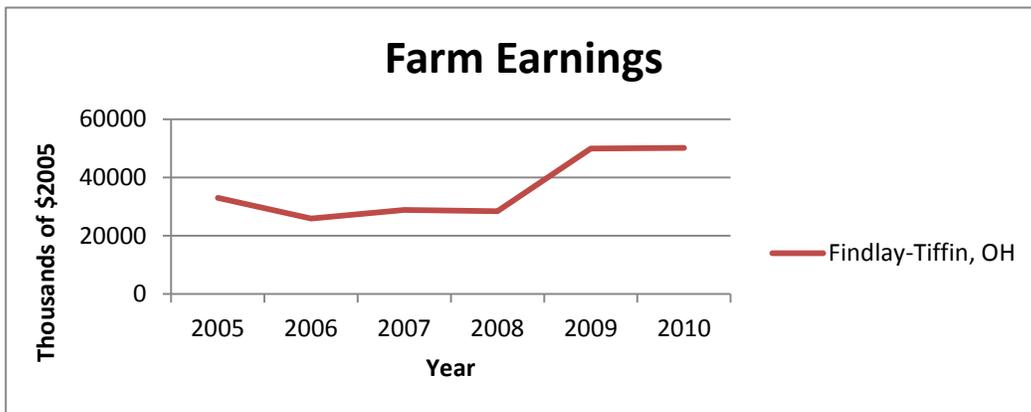
Tiffin-Findlay CSA consists of Hancock & Seneca counties. It had a population of 131,375 in 2010 with a per capita income of \$34,035. The average earnings per job in 2010 were \$42,392. The CSA per capita spending on unemployment compensation benefits in 2010 was \$420. There were 77,124 jobs in 2010 in the CSA. In terms of personal income, the Findlay-Tiffin CSA experienced a quick recovery from the recession in 2008, with a growth rate from 2009-2010 among the highest in the state.

Figure 2-24: Personal Income Findlay-Tiffin CSA



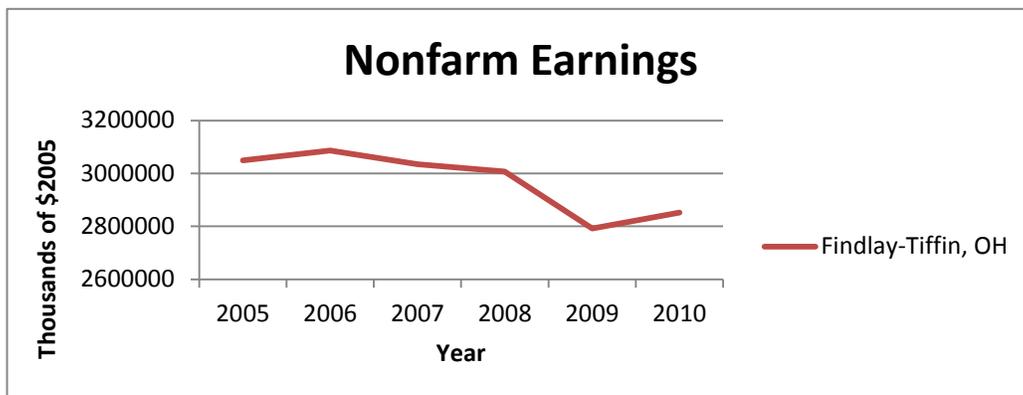
Source: BEA

Figure 2-25: Farm Earnings Findlay-Tiffin CSA



Source: BEA

Figure 2-26: Nonfarm Earnings Findlay-Tiffin CSA



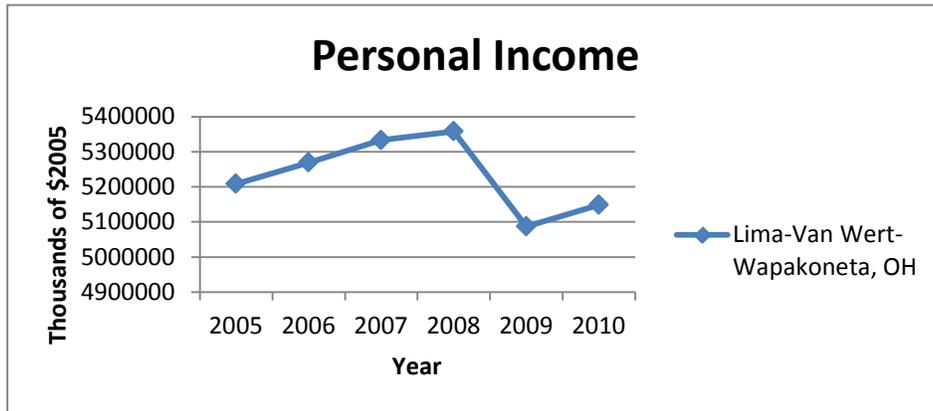
Source: BEA

**LIMA-VAN WERT-WAPAKONETA CSA**



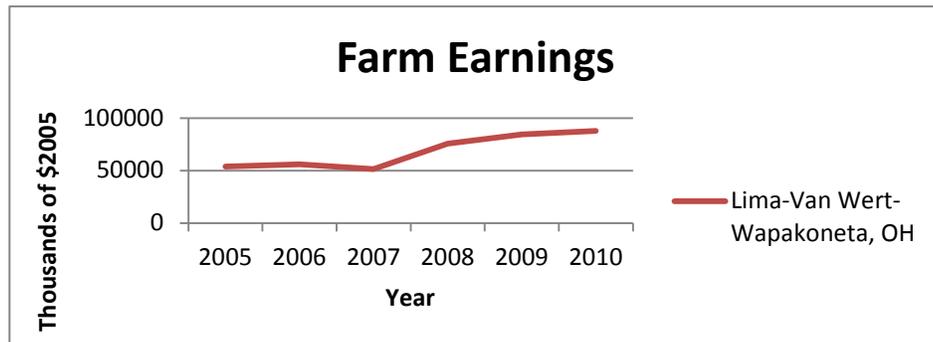
The Lima-Van Wert-Wapakoneta CSA lies along I-75 and contains the counties of Allen, Auglaize and Van Wert. Per capita income was \$32,073 in 2010, with a population of 180,884 persons. The average earnings per job were \$41,850 and represent the highest figure for the area throughout the study period. Per capita unemployment benefits in 2010 were \$419.

**Figure 2-27: Personal Income Lima-Van Wert-Wapakoneta CSA**



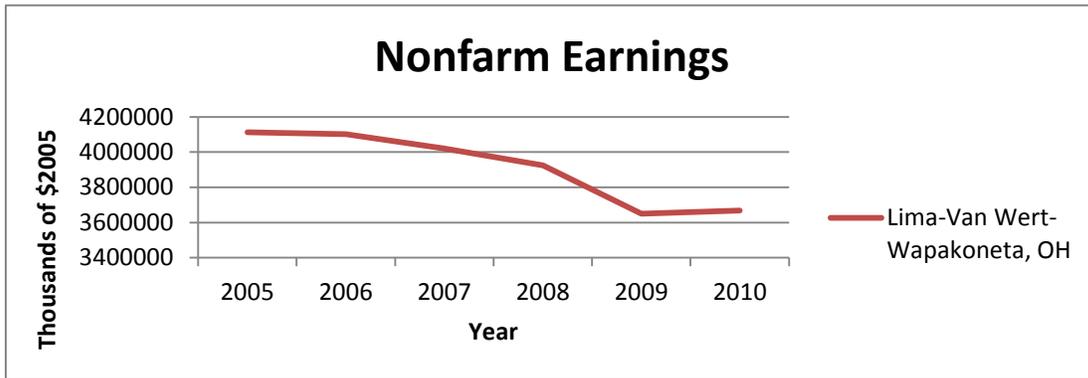
Source: BEA

**Figure 2-28: Farm Earnings Lima-Van Wert-Wapakoneta CSA**



Source: BEA

Figure 2-29: Nonfarm Earnings Lima-Van Wert-Wapakoneta CSA



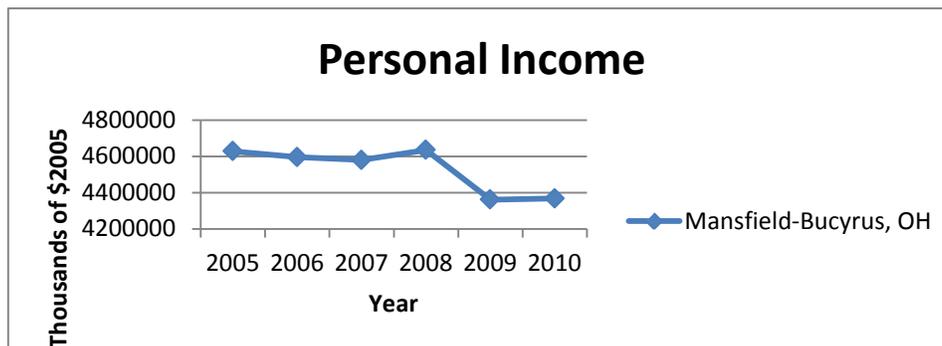
Source: BEA

**MANSFIELD-BUCYRUS CSA**



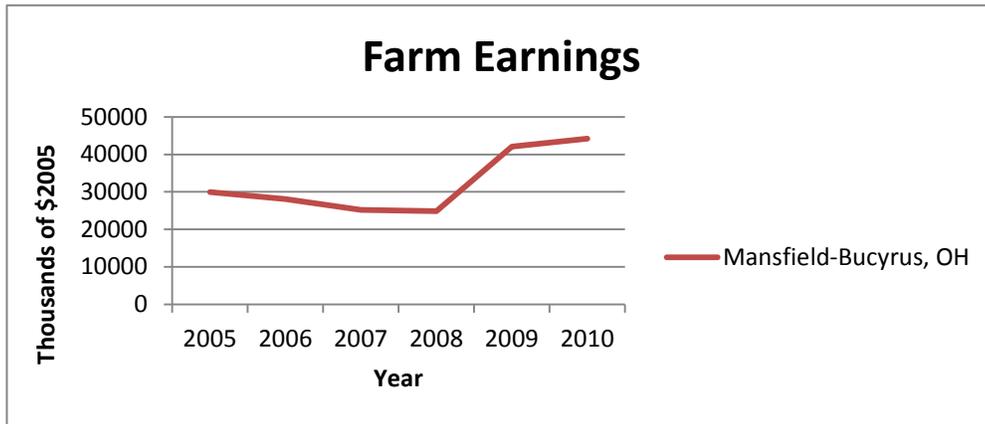
Mansfield – Bucyrus CSA contains Richland and Crawford counties. The population in 2010 is listed as 168,018 persons with a per capita income of \$29,297. The average earnings per job in 2010 was \$38,019 with a total of 82,183 full and part time jobs. Per capita unemployment insurance benefits totaled \$457 in 2010, \$80 less than in 2009, but still nearly 400% higher than the CSA’s 2007 low of \$115. The Mansfield – Bucyrus CSA is a strong commuter area, sending many workers to both the Cleveland and Columbus metro areas.

Figure 2-30: Personal Income Mansfield-Bucyrus CSA



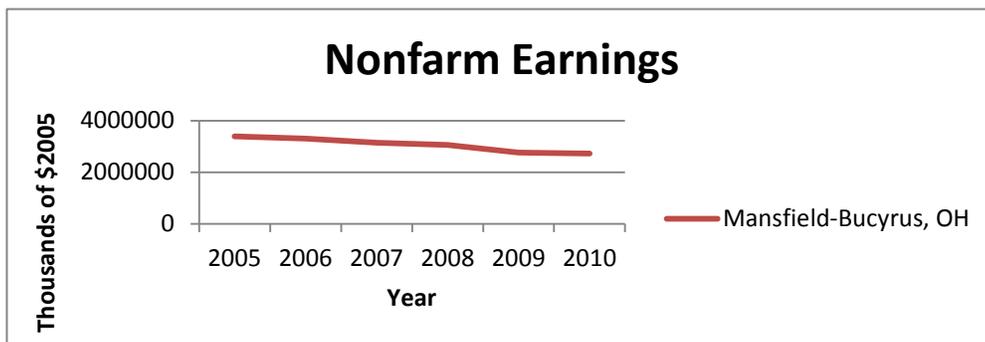
Source: BEA

**Figure 2-31: Farm Earnings Mansfield-Bucyrus CSA**



Source: BEA

**Figure 2-32: Nonfarm Earnings Mansfield-Bucyrus CSA**



Source: BEA

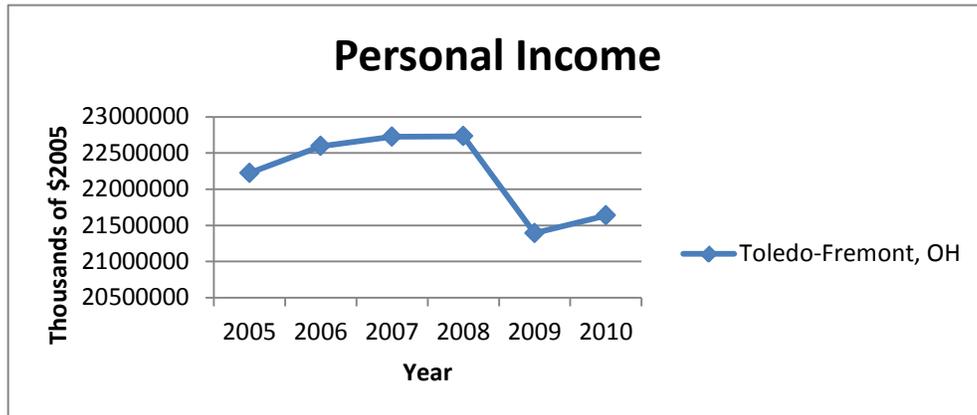
**TOLEDO-FREMONT CSA**

The Toledo-Fremont CSA contains the four counties of Lucas, Wood, Fulton and Ottawa – all in Ohio.



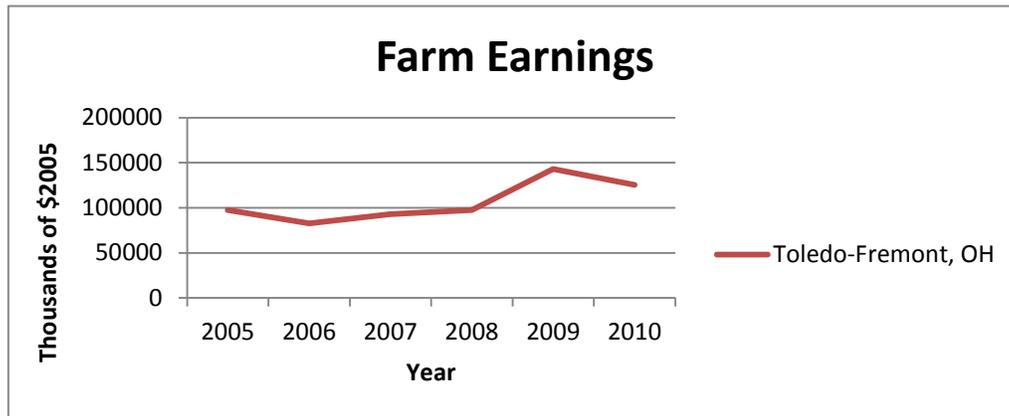
The CSA is centered on the city of Toledo, which according to the 2010 Census has a population of 287,208 people. The greater CSA/metro area has a population of 712,061, down from its 2005 estimated peak of 720,313 persons. There were 403,187 full and part time jobs in the CSA in 2010, down 30,000 from the 2005 peak of 431,838. The average earnings per job in 2010 was \$45,504. Per capita income rose slightly from 2009 to \$34,238 in 2010, a level still below its 2008 peak. The CSA’s per capita unemployment insurance benefits fell in 2010 to \$445.

Figure 2-33: Personal Income Toledo-Fremont CSA



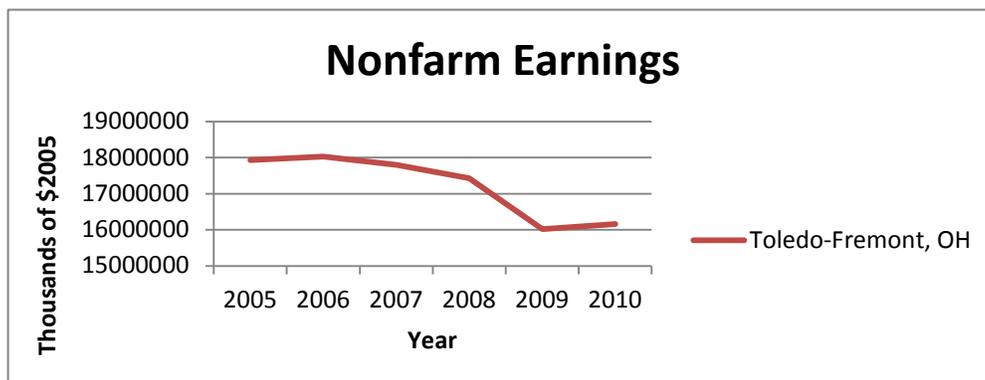
Source: BEA

Figure 2-34: Farm Earnings Toledo-Fremont CSA



Source: BEA

Figure 2-35: Nonfarm Earnings Toledo-Fremont CSA



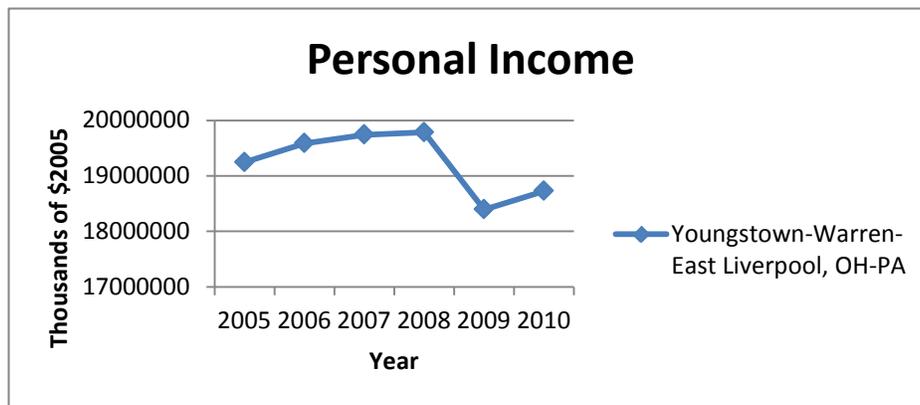
Source: BEA

**YOUNGSTOWN-WARREN-EAST LIVERPOOL CSA**



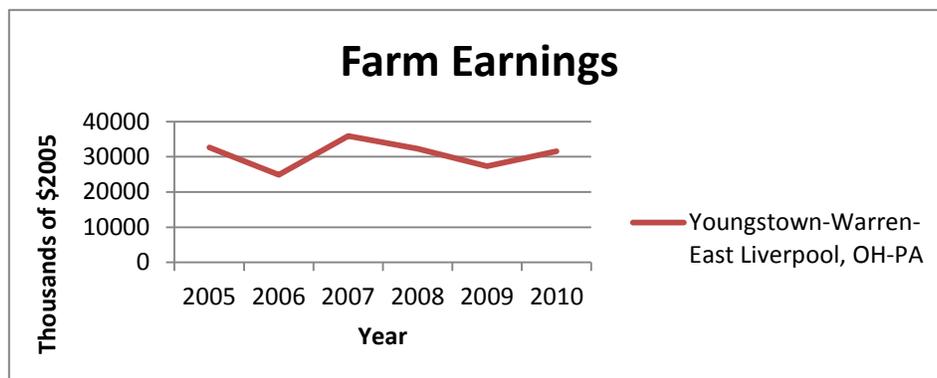
The Youngstown-Warren-East Liverpool CSA contains the Ohio counties of Trumbull and Mahoning as well as Mercer County in Pennsylvania. The 2010 Census reported the population to be 672,824. 2010 per capita income was \$31,363 with per capita unemployment benefits falling from \$557 in 2009 to \$493 in 2010. Total full and part time jobs rose slightly from 322,426 in 2009 to 323,080 in 2010. The average earnings per job is \$38,710 and, in real terms, is at its highest level since 2006.

**Figure 2-36: Personal Income Youngstown-Warren-East Liverpool CSA**



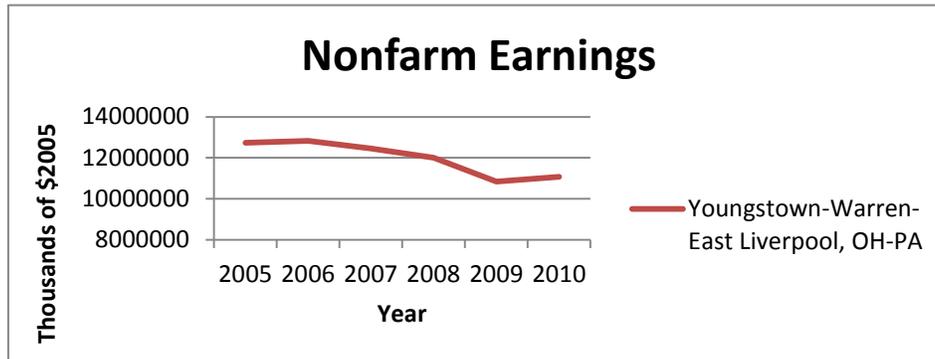
Source: BEA

**Figure 2-37: Farm Earnings Youngstown-Warren-East Liverpool CSA**



Source: BEA

Figure 2-38: Nonfarm Earnings Youngstown-Warren-East Liverpool CSA



Source: BEA

### 2.2.3 Select Trends for Target Manufacturing Industries

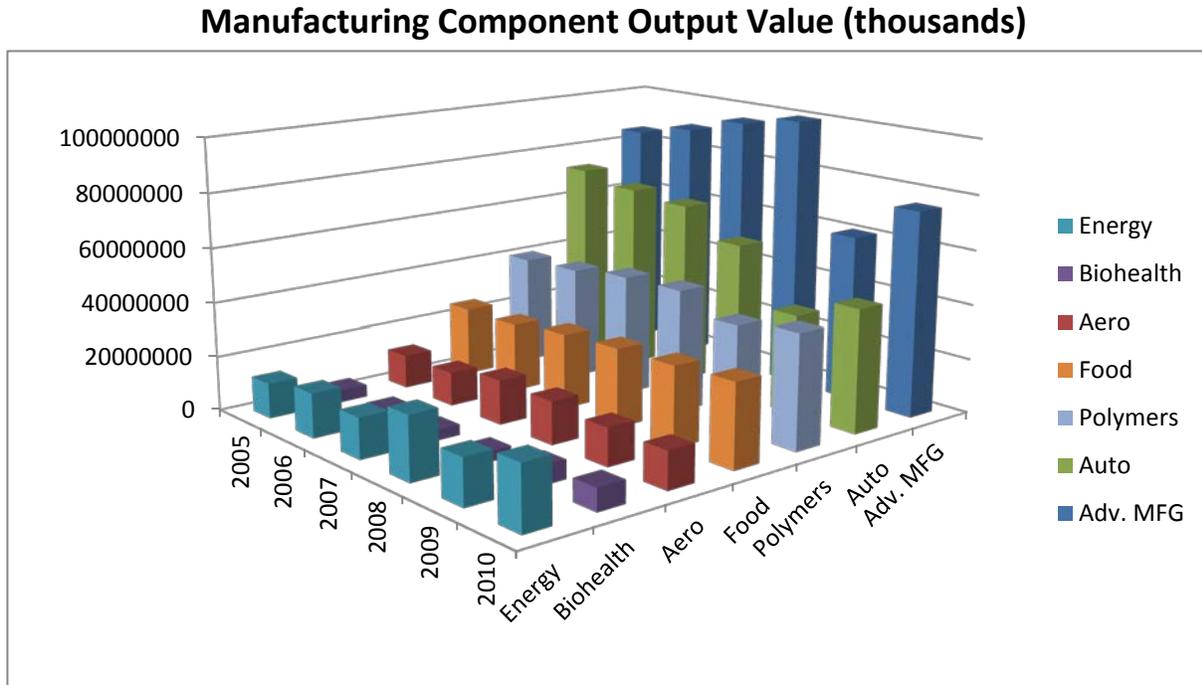
More than half of the Ohio target industries are in the manufacturing sector. This subsection provides an overview of this group, using data from the U.S. Census Bureau Survey of Manufacturers. The data is derived from surveys of manufacturing companies coded in the North American Industry Classification System (NAICS) at the two digit level between 31-33. Employment, material cost and output values in those Ohio target industries with sub-classifications in the 31-33 NAICS range are analyzed. Data provided here are annual aggregate values in the above mentioned range only; sub-classifications in target industries outside this range are not represented here. (A detailed list of target industries with sub-classification components and NAICS codes is available in the appendix.) Subsequent subsections consider each of the target industries in greater detail, both in manufacturing and in the other Jobs Ohio sectors.

Figure 2-39 below displays employment trends for manufacturing elements in the energy, biohealth, aerospace, food processing, polymers & chemicals, automotive and advanced manufacturing industries. In all industries employment declined in 2009 after the recession. Similarly, declines are noted during the same period for material costs (Figure 2-40) and output value (Figure 2-41). It is important to note that some of the target industries analyzed here have low employment levels compared to the costs and output. In these industries, particularly in automotive and polymers & chemicals, the technology employed and efficiency of process capabilities are key drivers. Furthermore, in these sectors values of output decreased after the recession at a faster rate than employment decline, suggesting the use of lean manufacturing practices in these industries. These industries depend on reliable transportation to maintain efficiency in their supply chain and to manage inventory costs through greater efficiency.



Source: U.S. Census Bureau Survey of Manufacturers – Industries with NAICS between 31-33

Figure 2-41: Target Industry Manufacturing Component Output Value 2005 – 2010



Source: U.S. Census Bureau Survey of Manufacturers – Industries with NAICS between 31-33

Manufacturing requires infrastructure capable of handling freight, Figure 2-41 (above) is included to visualize quantifiably a portion of the freight value moving on the Ohio system. In aggregate, in these industries alone, close to \$150 billion of materials are moving on Ohio's transportation system for Ohio businesses annually. This is only a portion of the freight moving through the system. This analysis does not capture the value of materials a) outside these target industries for other Ohio businesses; b) received by Ohio businesses and consumers from sources beyond the state; and c) moving through the state where origins and destinations are outside the state boundaries.

Figure 2-42: Ohio Interstate and Class A Rail System



Figure 2-42 (above) shows major interstate highways and Class 1 railroads that move freight in and through the state. As the following industrial maps will illustrate, business concentrations occur in many parts of the state and rely on US, state, and local roads in addition to these facilities, to connect them and the Ohio economy to markets.

The remaining subsections of this report examine individual industry sectors. While these analyses for the most part utilize a consistent set of data to present geographic patterns and economic trends, in some cases less information is available because the industry definition used by Jobs Ohio is not matched in the data sources. Approximations are adopted in a few cases, which can be seen in chart titles.

### 2.2.4 Aerospace and Aviation

From the birthplace of aviation with Orville and Wilbur Wright (1903) to being the nation's leader in advanced propulsion and power technology today, Ohio's aerospace and aviation industry is cutting edge (4). Ohio is the number one supplier to EADS/Airbus and number two to Boeing (5). The state is home to over 1,000 businesses that employ over 100,000 workers in the industry, two federal aviation laboratories and 20 universities offering related programs that provide a skilled aerospace workforce (2, 4, 6). Ohio's central location supported by a comprehensive logistics infrastructure, easy access to markets and supply chains, a highly skilled workforce, and public-private sector leadership all provide further benefits to the industry in the state (4, 6).

After its peak in 2008, the aerospace and aviation industry worldwide fell 42 percent (7). Analysts predict some improvements to production in the industry in 2012 and greater improvements beyond. A study from Forecast International predicts production of 10,907 business jets before 2020 (8). Some analysts predict up to 12% revenue growth for the corporate jet sector in 2012 alone (7), which is good news for this industry and an area for additional growth opportunities in Ohio. Figure 2-43 maps Ohio's aerospace and aviation employment centers. A majority of these businesses cluster around the interstate highway system for easy access to suppliers and markets. The sector employs 33,200 Ohioans across more 528 establishments. Nearly 30% of employment in the industry occurs at only 13 locations in the state. Significant clustering is present in Cuyahoga, Hamilton, Franklin and Summit Counties. The top 5 companies, by employment, are:

1. Barnes Group Inc. (1 location in Butler County with 4,000 employees)
2. Honeywell Inc. (5 establishments – Champaign, Cuyahoga, Franklin and Hamilton Counties – 2,000 employees)
3. Ranco North America, L.P. (Madison County location provides 1,600 jobs)
4. Good Rich Corp. (Cuyahoga, Miami, Stark and Summit Counties – 1,415 jobs)
5. The Boeing Company (2 establishments in Licking County; 1,300 jobs)



of finished vehicles, other than heavy duty trucks. Water is important for imports and exports, mainly via seaports but heavy units like axles may move through the Lakes.

The industry provides approximately 94,000 jobs across more than 560 locations in over 80% of the states counties. The state’s top 5 automotive manufacturers (by employment) are responsible for more than 30% of the state’s jobs at only 3% of the state’s industry establishments. By employment, these companies are:

1. Ford Motor Company (14,260+ employees, 7 locations)
2. General Motors LLC (5,150+ employees at 4 locations)
3. The Chrysler Group LLC (4,600 employees, Lucas & Wood County)
4. Shiloh Industries Inc (2,800+ employees across 4 locations)
5. Paccar Inc (2,000 employees at the Ross County Kenworth plant in Chillicothe)

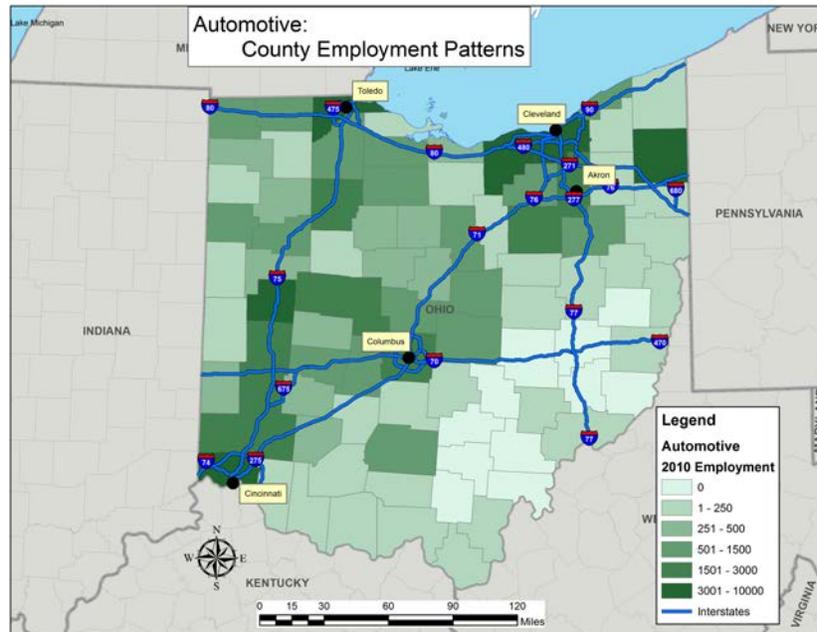
Figure 2-44: Ohio Automotive Employment Centers



Source: Dun and Bradstreet data from Hoovers

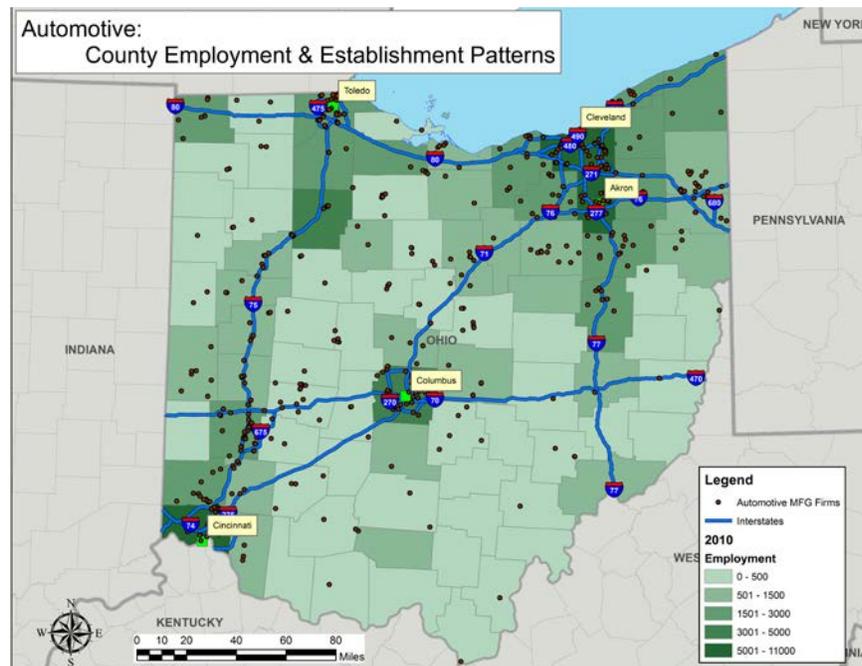
2010 data from County Business Patterns is used to show employment concentrations for the automotive industry across the state in Figures 2-45 and 2-46 below. Figure 2-46 also includes an overlay of establishment locations from Dun and Bradstreet.

Figure 2-45: Ohio Automotive Employment Patterns by County



Source: County Business Patterns

Figure 2-46: Ohio Automotive Employment Patterns by County with Establishment Counts

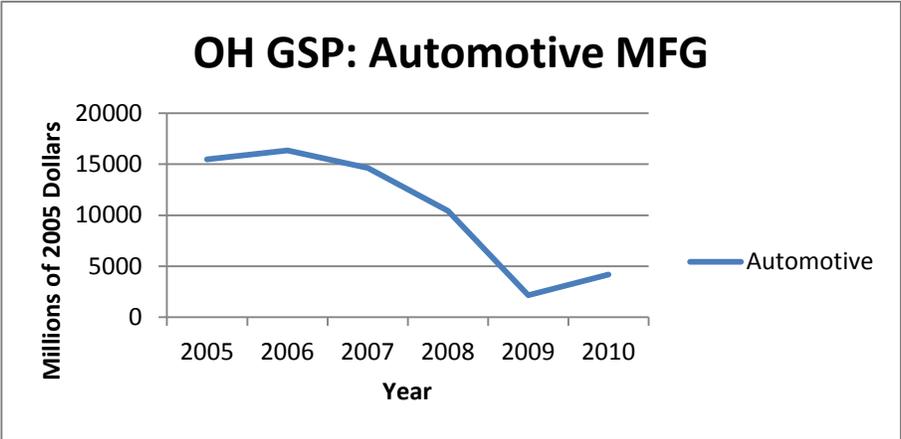


Source: Dun and Bradstreet data from Hoovers

Due in large part to the 2008 financial crisis, the output of the industry was hit especially hard. In 2008 the U.S. “Big Three” were sent into a crisis of their own requiring \$80 billion in loans from the U.S. government to help stabilize the industry. 2006 marked the GSP peak for the automotive industry, though the industry fell drastically after the 2008 crisis with some recovery beginning in

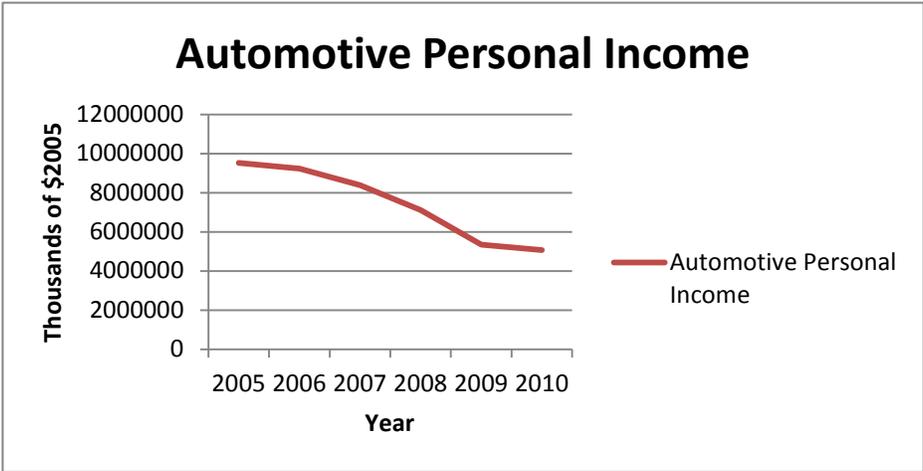
2009-2010 (Figure 2-47). The recovery of personal income in the automotive industry did not return as quickly over the same time period, though the rate of decline in personal income has begun to slow during the time period (Figure 2-48).

Figure 2-47: Ohio Automotive Manufacturing GSP



Source: BEA

Figure 2-48: Ohio Automotive Personal Income



Source: BEA

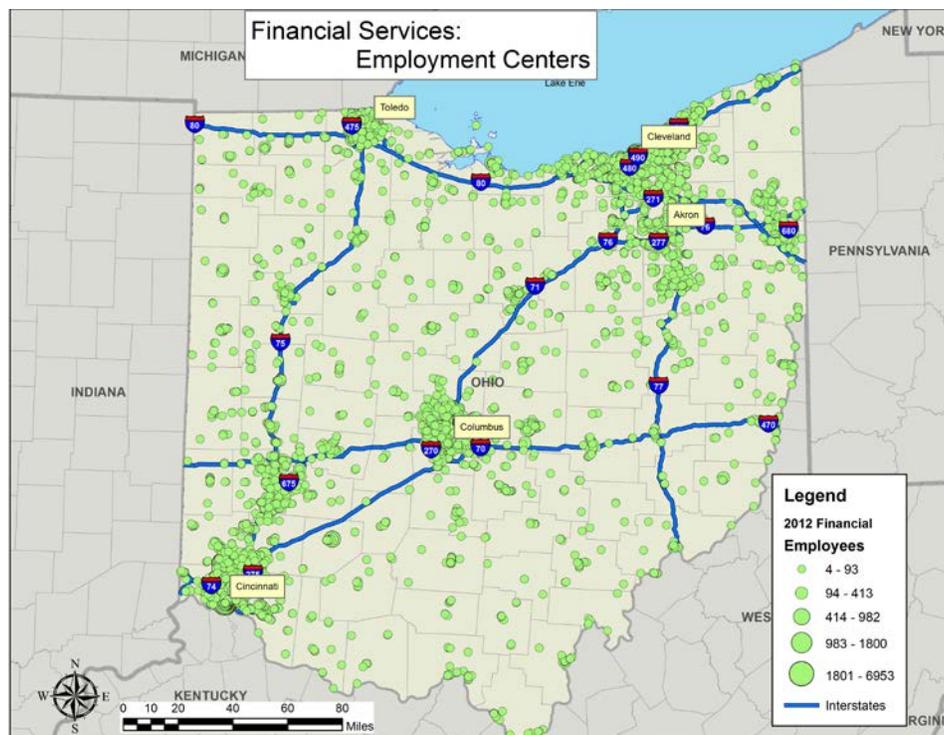
Despite the significant downturn of recent years, the industry has rebounded and future growth is expected. Some industry analysts predict vehicle sales to be over 14 million units for the U.S. in 2012 with numbers increasing to 16 million units by 2014 (9). In turn Original Equipment Manufacturers (OEMs) and suppliers alike have announced investments around Ohio. Chrysler Group, LLC, Ford Motor Co., General Motors Co., and Honda of America have all announced investments in facilities and operations of over \$50 million in Lucas, Cuyahoga, Lorain, Union, and Wood counties (10). Johnson Controls Inc. and Vehtek Systems Inc., both automotive suppliers, have also announced investments of over \$50 million in Lucas and Wood counties along with smaller investments from many other suppliers that support this industry around the state (10). In addition, the emergence of

natural gas as a low cost and cleaner fuel could create demand for vehicles that use them, notably for heavy duty trucks to reduce supply chain transportation costs and emissions, but also for automobiles. Ohio's vehicle makers offer natural gas powered units now and are able to increase production. Investments and new sources of demand are good news for growth expectations within the automotive sector in Ohio.

## 2.2.6 Banking and Insurance – Financial Services

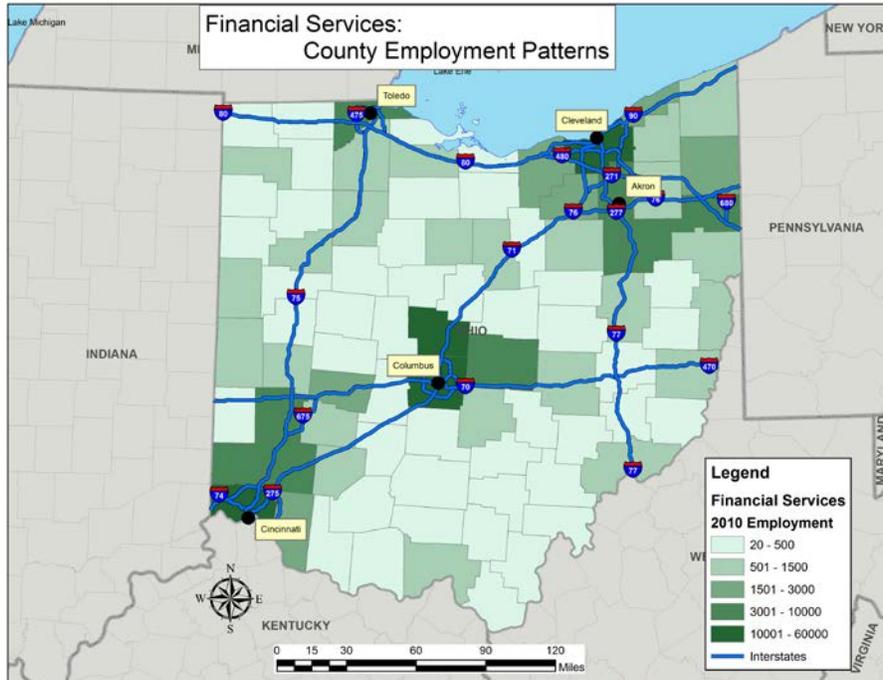
Though the banking and insurance/financial services industry does not have a major direct impact on the state's transportation system, it does provide key support services and access to capital for the many businesses that are reliant on the state's freight-bearing infrastructure. Locations within Ohio give financial services companies access to over 60% of the U.S. and Canadian populations (2). Moreover, reliable roads are important for this industry in order for consumers to frequent establishments.

Figure 2-49: Financial Services Employment



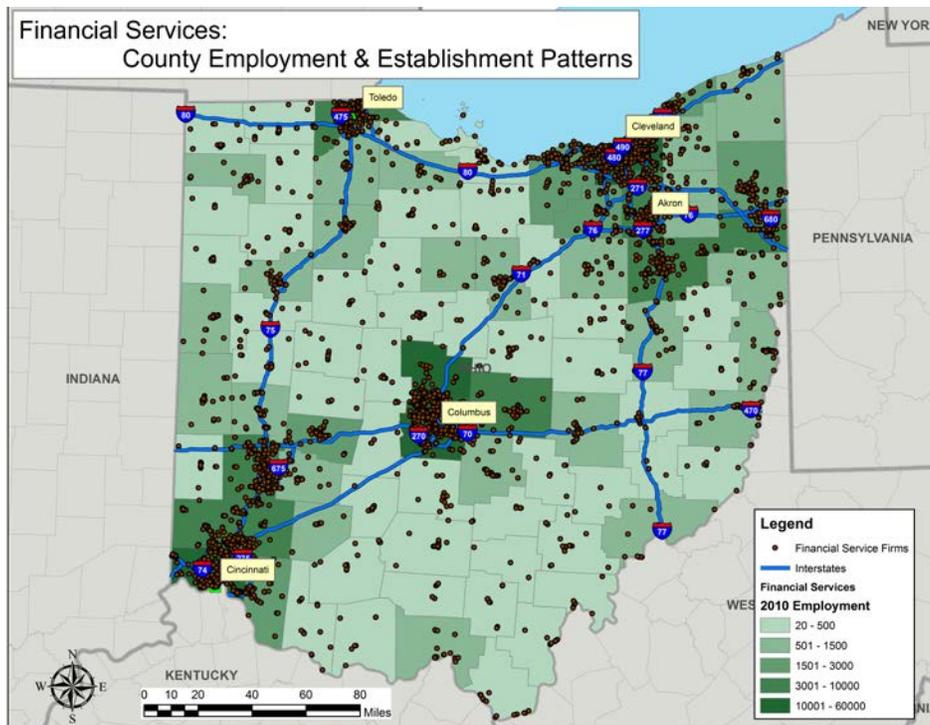
Source: Dun and Bradstreet data from Hoovers

Figure 2-50: Financial Services County Employment Patterns



Source: County Business Patterns

Figure 2-51: Financial Services County Employment and Establishment Count Patterns



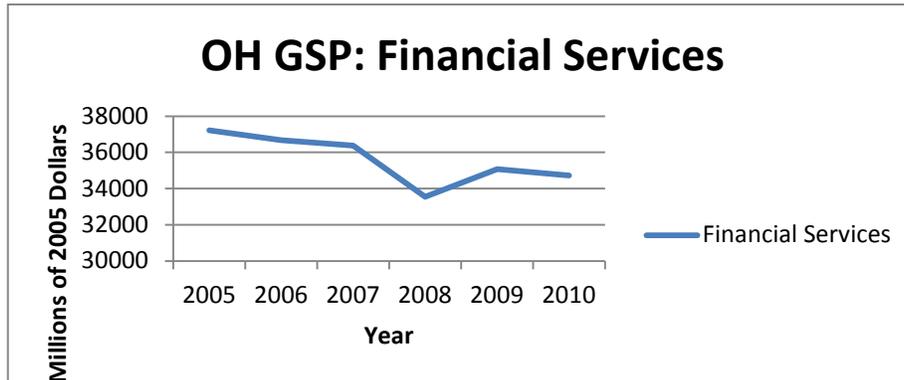
Source: Dun and Bradstreet data from Hoovers

Above, Figures 2-49, 2-50, and 2-51 show employment and establishment patterns for the financial services industry across the state. The state's top 5 employers provide around 18% of Ohio's jobs in this sector and are as follows:

1. Nationwide Mutual Insurance Company (7,500+ employees at 7 locations)
2. JP Morgan Chase Bank (6,550+ employees at 236 establishments)
3. U.S. Bank (5,600+ employees at 272 locations)
4. PNC Bank (4,300+ employees and 388 locations)
5. Fifth Third Bank (4,180+ employees, 276 locations)

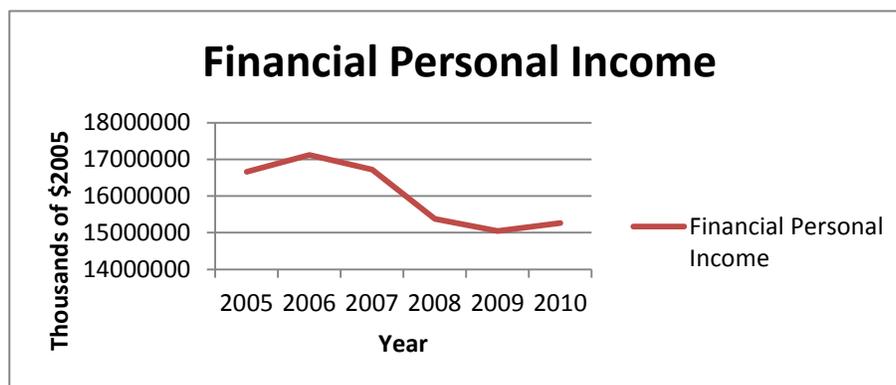
As evidenced by the maps, the industry has a notably strong presence in Cuyahoga, Franklin, Hamilton, Summit, Montgomery as well as Lucas and Stark Counties. Together, these 7 counties represent more than 50% of this sector's establishment locations. As of March, 2012 there were 6,366 establishments in the state providing a total of 153,723 jobs.

**Figure 2-52: Financial Services GSP**



Source: BEA

**Figure 2-53: Financial Services Personal Income**

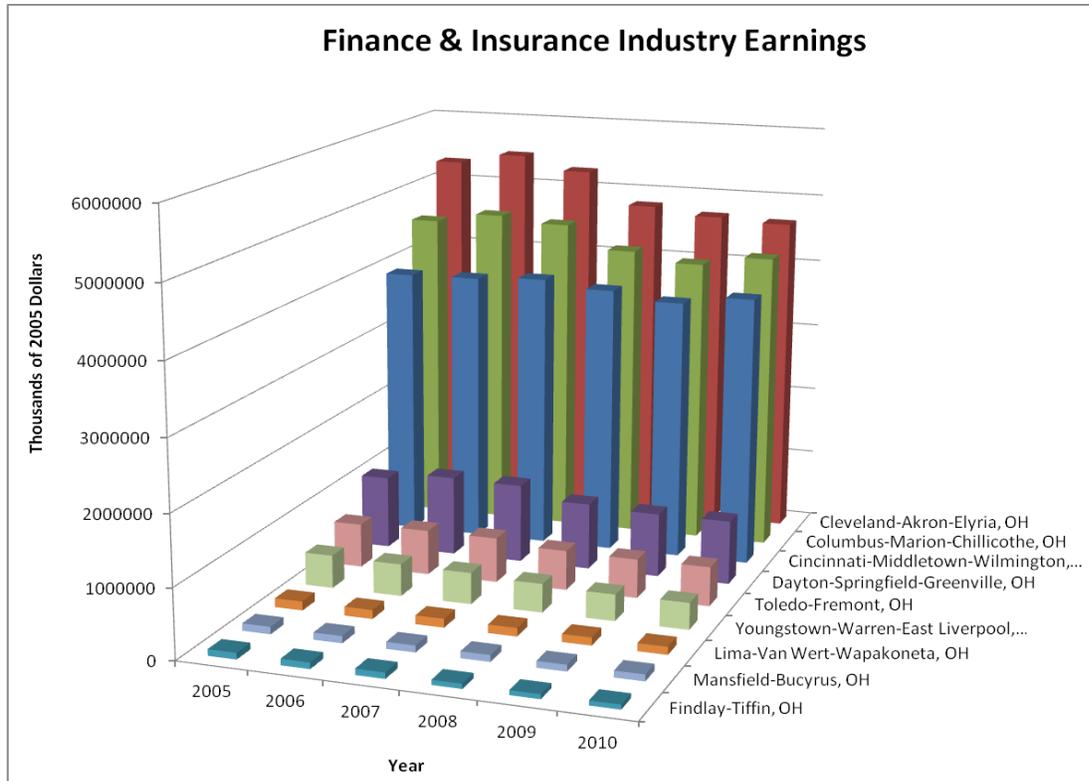


Source: BEA

Figures 2-52 and 2-53 (above) show GSP and personal income trends from 2005-2010 for the financial services industry. Sharp declines are noted in 2007-2008 for both GSP and personal income. It is interesting to note that from 2009-2010, while GSP fell, personal income increased – this is not a

pattern observed in many industries. Figure 2-54 below shows significant activities in the Cleveland, Columbus and Cincinnati metropolitan areas.

**Figure 2-54: Financial Services Industry Earnings – CSA Breakdown**



Source: BEA

### 2.2.7 BioHealth

Ohio has repeatedly been ranked in the top 10 for its biotechnology, hospitals and medical centers. Even though the bio-health sector is relatively small compared to other sectors in Ohio (accounting for approximately 2.5 percent of all manufacturing output from Ohio in 2010), it has experienced a rapid growth over the last five years. By 2009 there were 1,345 bio-health organizations at 1,800 facilities in Ohio (2, 11, 12). Bio-health includes pharmaceuticals and therapeutics, medical device and equipment manufacturers, R&D facilities, medical laboratories, diagnostic imaging centers, agricultural feedstock and chemicals, and their respective infrastructures. Approximately 55 percent of all bio-health establishments are in two subsectors – medical laboratories & diagnostic imaging centers, and medical equipment & supplies (11). Among the biggest bio-health companies in Ohio are Cleveland Clinic, Abbott Nutrition, Battelle Memorial Institute and Ethicon Endo-Surgery. In 2009 Cleveland Clinic employed 38,000 people, making it the state's third largest single employer. In addition there are seven medical colleges (including Cleveland Clinic) in Ohio, each with their own research focus (2). The top 5 employers in the state according to Hoover's Dun and Bradstreet database are:

1. Abbott Laboratories (3 branches in Franklin County providing support for 3,700 jobs)
2. Ethicon Endo-Surgery Inc. (Hamilton County Location with 1,440 employees)
3. Ben Venue Laboratories Inc. (Cuyahoga County Location: 1,280 employees)
4. STERIS Corporation (4 Lake County Branches: 1,193 employees)
5. Invacare Corporation (4 Lorain County Locations: 756 employees)

Significant clustering is found in Cuyahoga, Franklin, Hamilton, Summit and Lucas Counties – all have over 25 distinct establishments. The aforementioned top 5 companies provide nearly 43% of the state’s jobs at 13 (of 400) branch locations in the sector. As of March, 2012 there were a total of 19,658 jobs in the state.

Two subsectors in manufacturing– pharmaceuticals/medicine and medical equipment & supplies – contributed 2.2 and 2.7 percent of the total national output within their sectors, respectively. On the service side, Ohio accounted for 4.4 percent of bio-health service jobs in America. The largest service subsector, ambulatory health care, provided services valued at almost \$19 billion, representing 4.1 percent of Ohio’s GDP (2). According to a study performed by the Center for Economic Development at Cleveland State University in 2010, the industry as a whole produces annual taxes of approximately \$3 billion. Data from year 2010 shows that the industry provides direct employment of around 62,500 jobs to Ohioans. The average wage is estimated to be \$68,384 (2, 12). Economic forecasts project that the total (not only direct) employment on the manufacturing side will increase by 9 percent by year 2018. In the service sector, the predictions show an increase of 7.9 percent for the same time period (2). As shown by the map in Figure 2-55 of Ohio’s bio-health employment centers, the main part of the industry is focused around Cleveland, Columbus, Cincinnati, Dayton and Toledo.



Source: Dun and Bradstreet data from Hoovers

## 2.2.8 Consumer Goods Headquarters

Ohio ranks fifth in the nation for the number of headquarters on Fortune's top 500 list. Fifty-nine Fortune 1,000 companies and 27 Fortune 500 companies are headquartered in the state. The state also has a significant number of divisional and regional offices. Ohio is home for well known consumer retail and product brands such as The Limited, Macy's, Abercrombie & Fitch, Duracell, Tide and Pampers. The Jobs Ohio target group specifically is company headquarters in the consumer sector, which means that company factory and store locations are not part of the group unless they share headquarter functions.

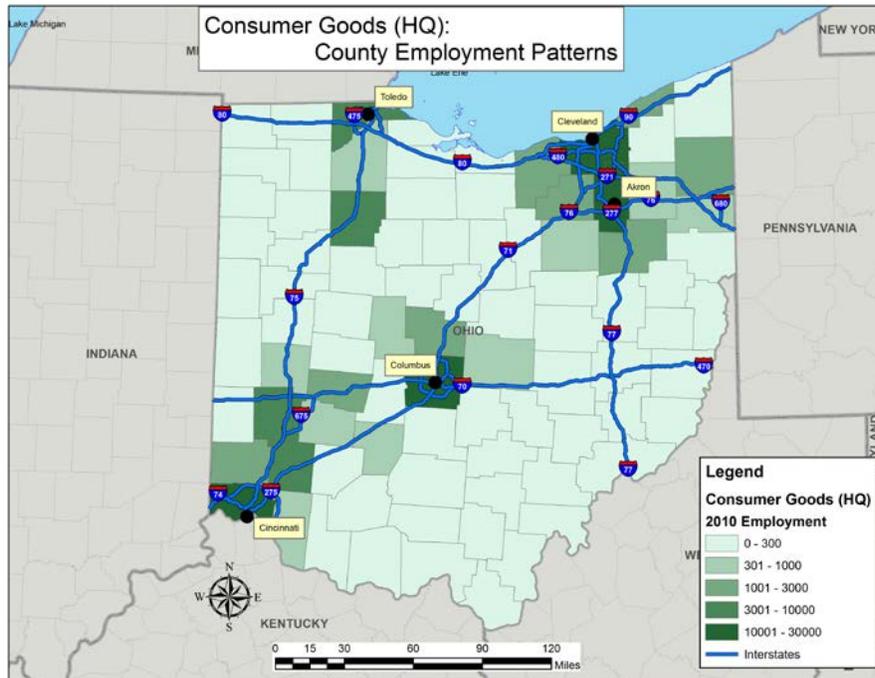
Similar to other industries, most establishments in this sector are located around Cleveland, Cincinnati, and Columbus, (specifically Cuyahoga, Hamilton and Franklin Counties) but there are also some larger employment centers close to Youngstown and Toledo as shown in Figures 2-56 to 2-58. Contributions to the GSP fell by \$1.1 billion between 2006 and 2010 (see Figure 2-59). Except for a drop in 2009, the personal income generated from this industry fluctuates around \$10.8 billion annually. Employment is fairly concentrated in the industry with the top 5 employers in the state accounting for more than 65% of the state's jobs at only 6 establishments. Investments of over \$50 million have been announced by Diebold Inc., American Greetings, LLC and Procter & Gamble Co. in Summit, Cuyahoga, and Allen counties respectively (10). In terms of utilization of the transportation system, this sector depends on the reliability of the transportation system to not only move goods to market, but also to ensure consumers can frequent establishments that carry these goods for purchase.

Figure 2-56: Consumer Goods Employment



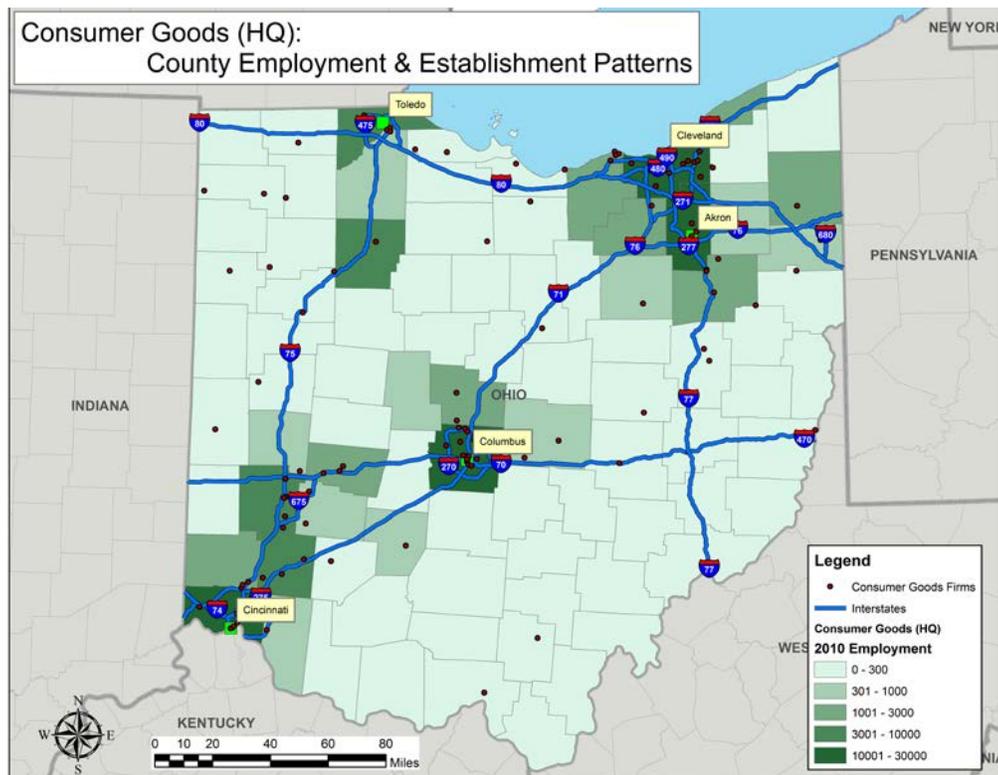
Source: Dun and Bradstreet data from Hoovers

Figure 2-57: Consumer Goods County Employment



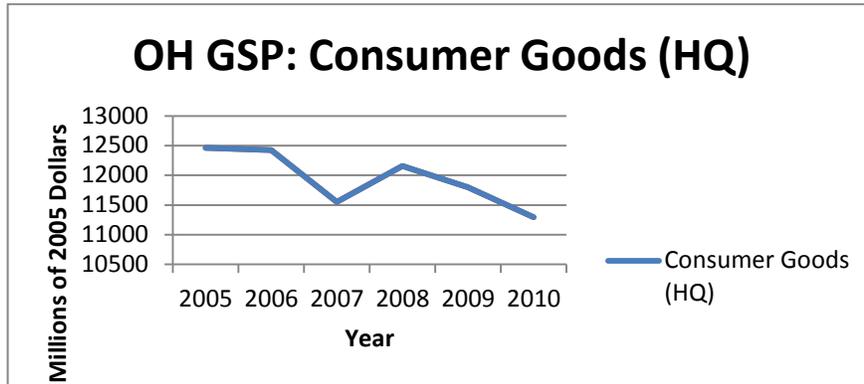
Source: County Business Patterns

Figure 2-58: Consumer Goods County Employment and Establishment Count Patterns



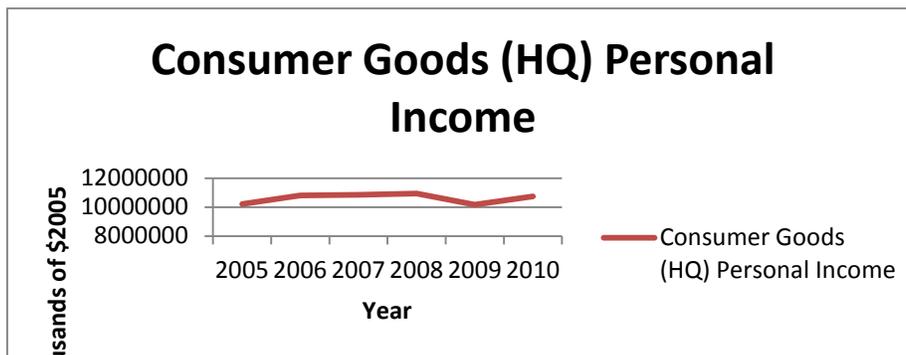
Source: Dun and Bradstreet data from Hoovers

Figure 2-59: Consumer Goods GDP



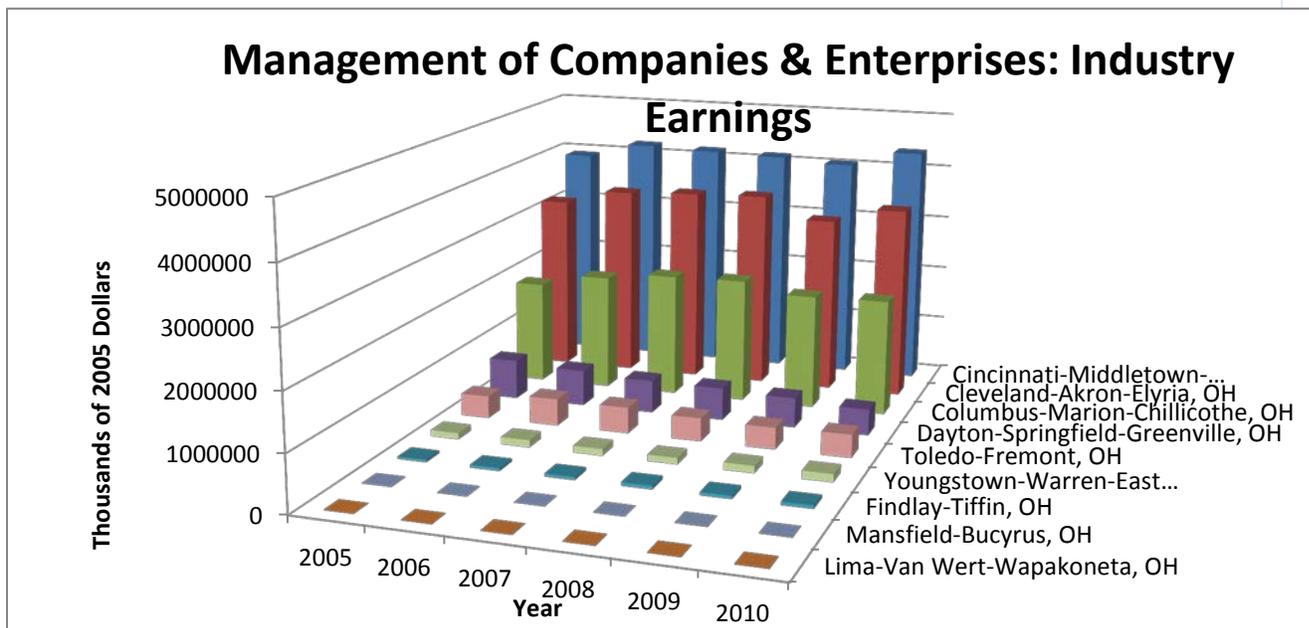
Source: BEA

Figure 2-60: Consumer Goods Personal Income



Source: BEA

Figure 2-61: Consumer Goods – CSA Breakdown



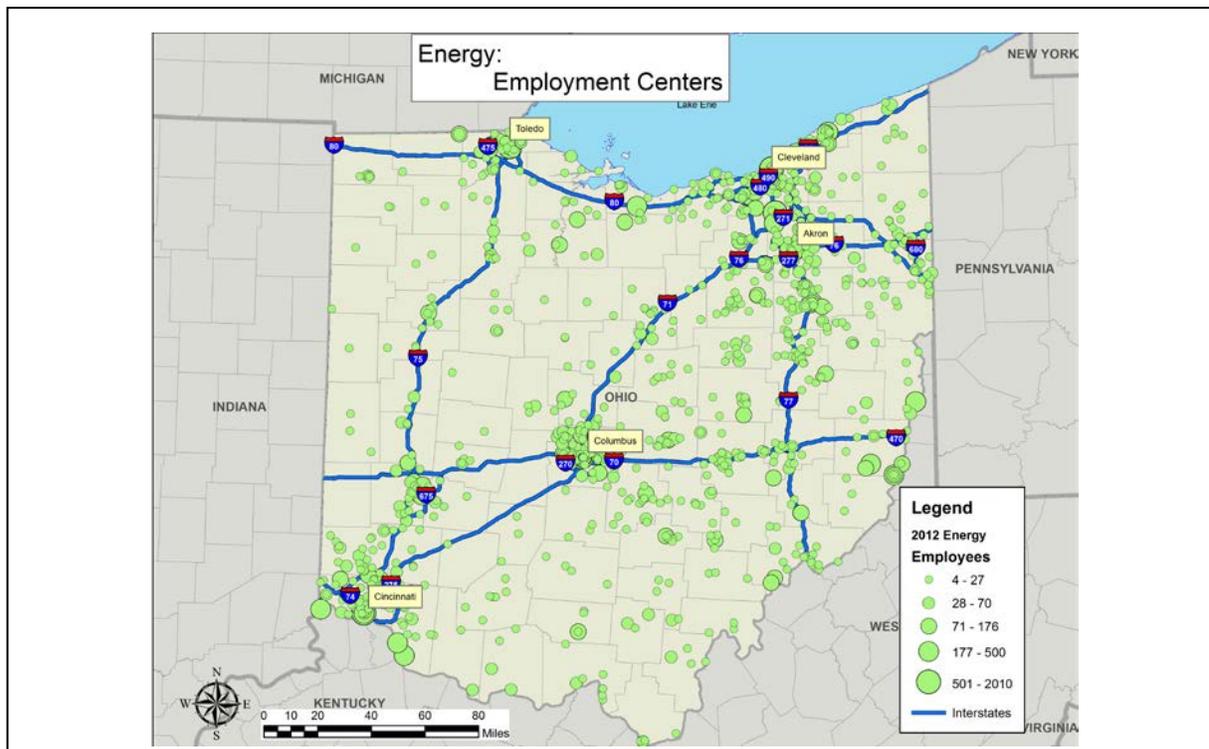
Source: BEA

## 2.2.9 Energy

A recent report put out by the Pew Charitable Trust ranked Ohio first in the Midwest and in the top five for the nation for job growth in clean energy (13). Ohio companies make a variety of advanced clean energy parts and components from wind turbines to fuel cells. Approximately 60,000 manufacturing workers in Ohio specialize in advanced energy (2). Furthermore, the Ohio Shale Gas Coalition recently released a report stating that by 2014 the Utica Shale is expected to produce an additional 65,000 jobs and over \$5 billion in growth for Ohio's economy (14). Earlier reports estimate over \$7 billion in growth for Ohio's economy but only an additional 17,000 jobs (15). As of March 2012, Dun and Bradstreet database reports 34,219 jobs spread across 1,016 establishments. Approximately 25% of the state's employment in the sector occurs in the top 5 companies. The top 5 companies employ 8,741 Ohioans at 34 establishments and are as follows:

1. Indiana Michigan Power Company (2,010 employees at the Franklin County Headquarters)
2. The East Ohio Gas Company (10 establishments in 7 counties; 1806 employees)
3. Cinergy Corp (Hamilton County; 1700 employees)
4. Jersey Central Power & Light Co. (1,678 jobs, 13 locations – 67% in Cuyahoga County)
5. Ohio Edison Company ( 9 branch locations with 1,547 employees)

Figure 2-62: Ohio Energy Employment Centers

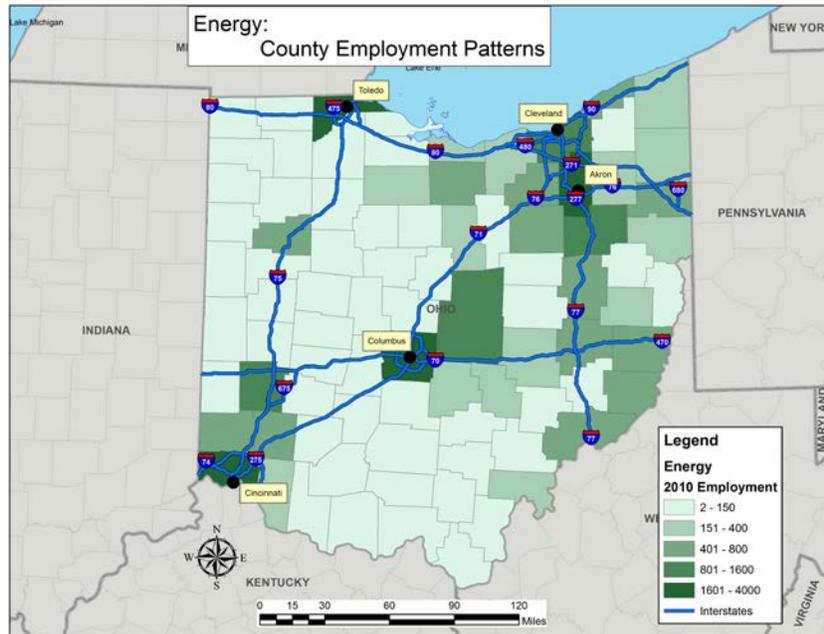


Source: Dun and Bradstreet data from Hoovers

Investments of over \$50 million have been announced by IBERDROLA Renewables and EDP Renewables in wind energy, Xenex Biofuels, LLC, and Columbia Gas of Ohio in Van Wert, Paulding, Green and Franklin counties respectively. In addition, Houston based Exterran is building a 65,000 square foot plant in Youngstown – convenient for processing extracted shale – that is expected to

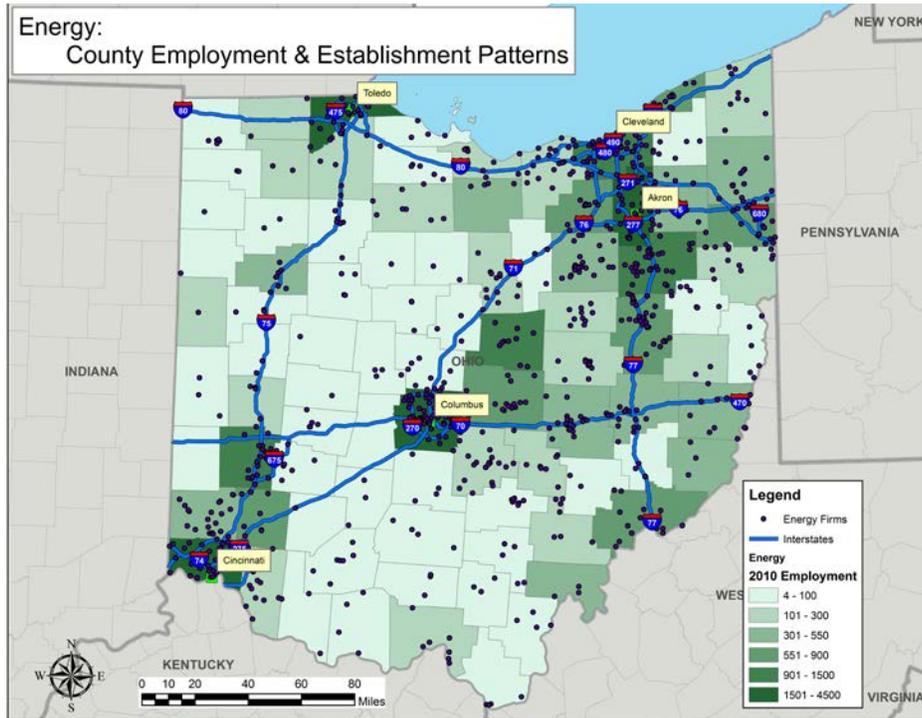
open late in 2012 and employ 100 workers (14). The industry employment patterns in Figures 2-62, 2-63, and 2-64 show clustering around major metropolitan areas particularly in Cleveland, Akron, Cincinnati, Columbus and to a lesser extent Toledo. Concentrations already tend toward the eastern part of the state where shale country lies. GSP and Personal Income trends are similar to other industries for the time period (Figures 2-65 and 2-66), but are not recent enough to capture the full emergence of shale oil and gas production, implying that stronger growth lies ahead.

**Figure 2-63: Ohio Energy County Employment Patterns**



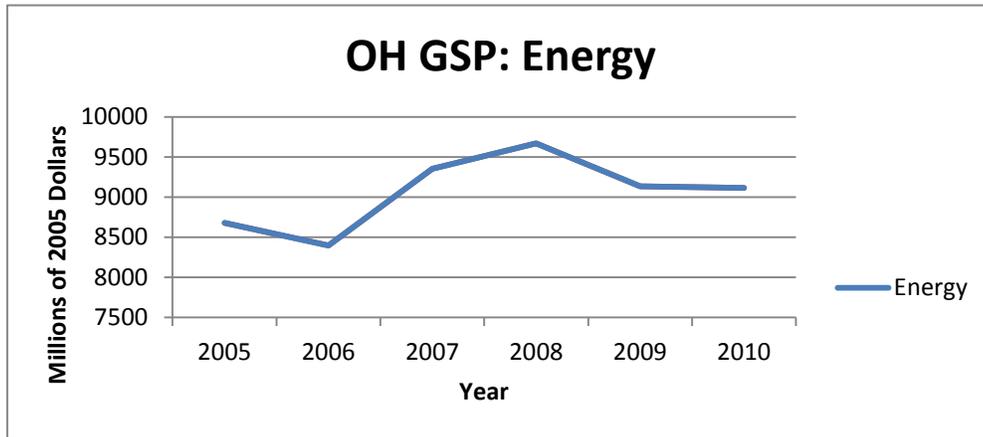
Source: County Business Patterns

Figure 2-64: Ohio Energy County Employment and Establishment Count Patterns



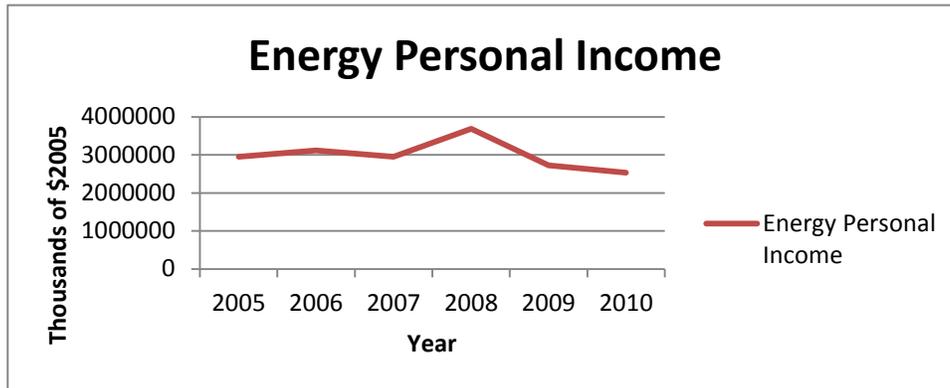
Source: Dun and Bradstreet data from Hoovers

Figure 2-65: Ohio Energy Industry GSP Trend



Source: BEA

Figure 2-66: Ohio Energy Industry Personal Income Trend



Source: BEA

### 2.2.10 Food Processing

Ohio's central location between the grain belt and the highly populated Eastern markets make it an ideal location for food processing centers (2). Similar to trends with other industries, the employment centers are well dispersed yet clusters are evident in major metropolitan areas and particularly at highway junctions (Figures 2-67, 2-68 and 2-69). Contrary to other industries in the state, the GSP dipped in 2008 but rose back to 2007 levels by 2009 (Figure 2-70). In addition, personal income continued to rise through 2008 and had only a slight decline from 2009-2010 (Figure 2-71). Dannon Company Inc. and Nestle R&D have announced investments of over \$50 million in Auglaize and Cuyahoga counties in this industry sector (10).

The industry is quite evenly distributed across the counties of Ohio – establishment counts coincide with population. There are food processing establishments present in almost all counties. The sector provides jobs to 61,110 Ohioans at more than 2,100 establishments. The top 5 employers in the state are:

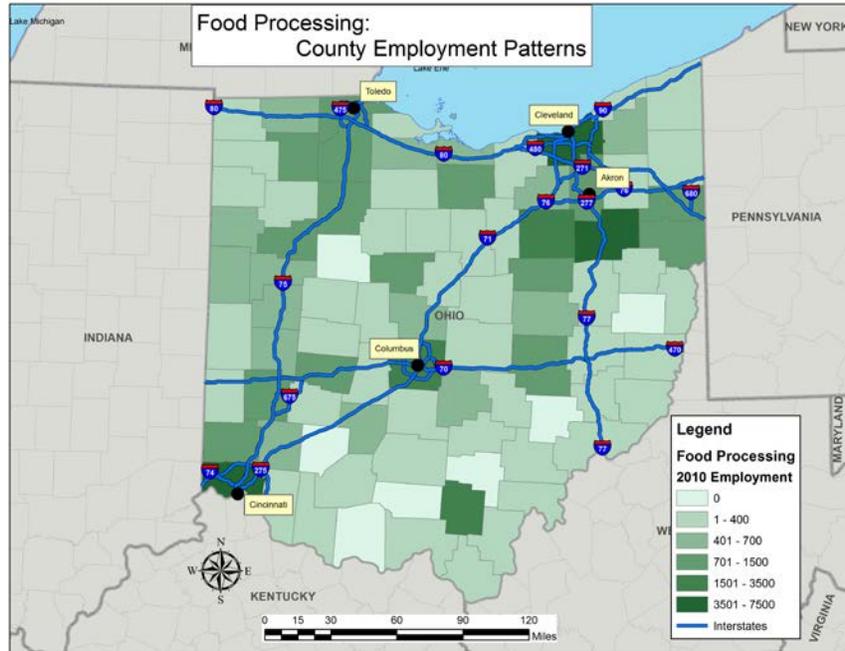
1. Hearthside Food Solutions (3 branches: Erie, Hancock and Lucas Counties – 2,555 jobs)
2. H.J. Heinz Company (5 branches: Hamilton, Sandusky, Stark (2) and Wood Counties – 2,090 jobs)
3. PepsiCo, Inc. (11 branches – 2,057 jobs)
4. Snack Alliance Inc. (Stark County Headquarters – 1,600 jobs)
5. The Wornick Co. (2 Hamilton County locations – 1,250 jobs)

Figure 2-67: Ohio Food Processing Employment Centers



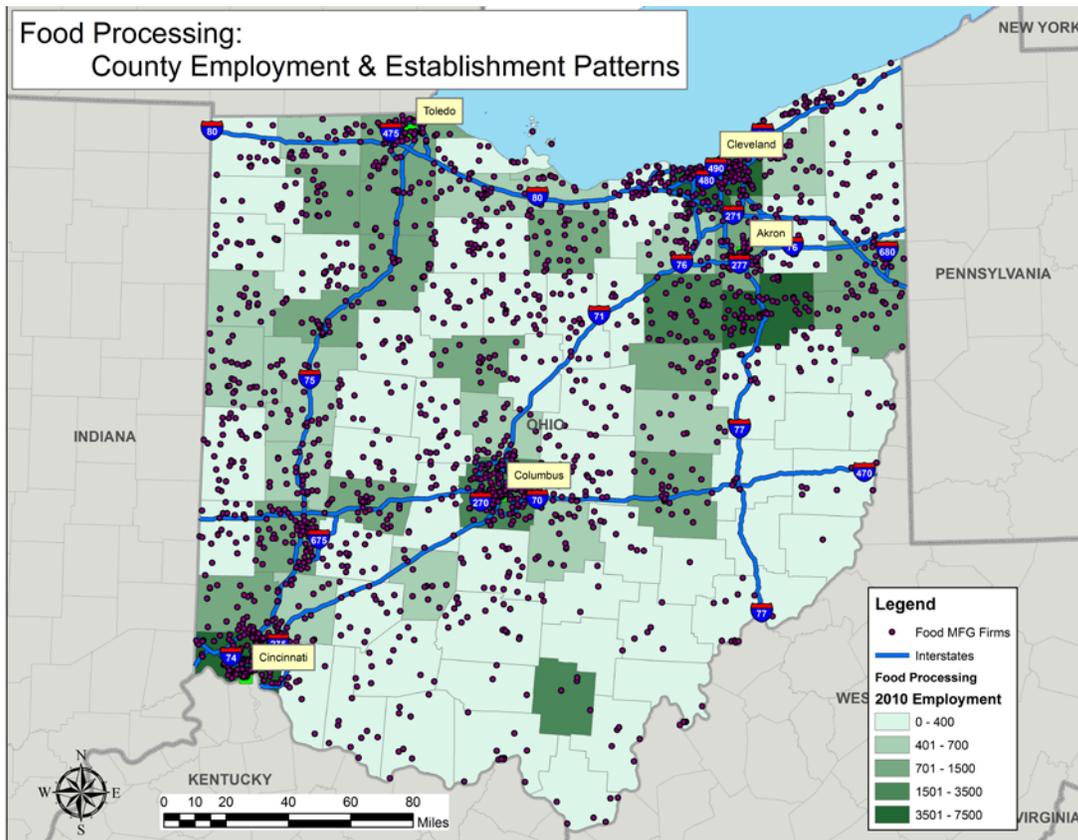
Source: Dun and Bradstreet data from Hoovers

Figure 2-68: Ohio Food Processing County Employment Patterns



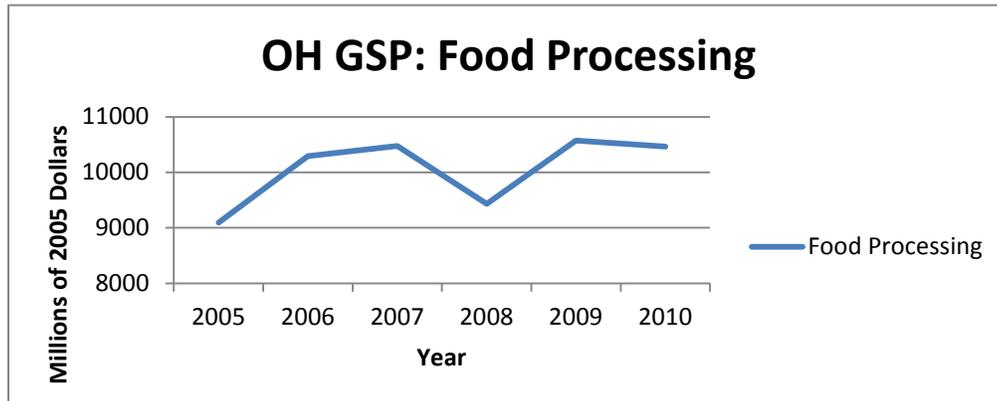
Source: County Business Patterns

Figure 2-69: Ohio Food Processing County Employment and Establishment Count Patterns



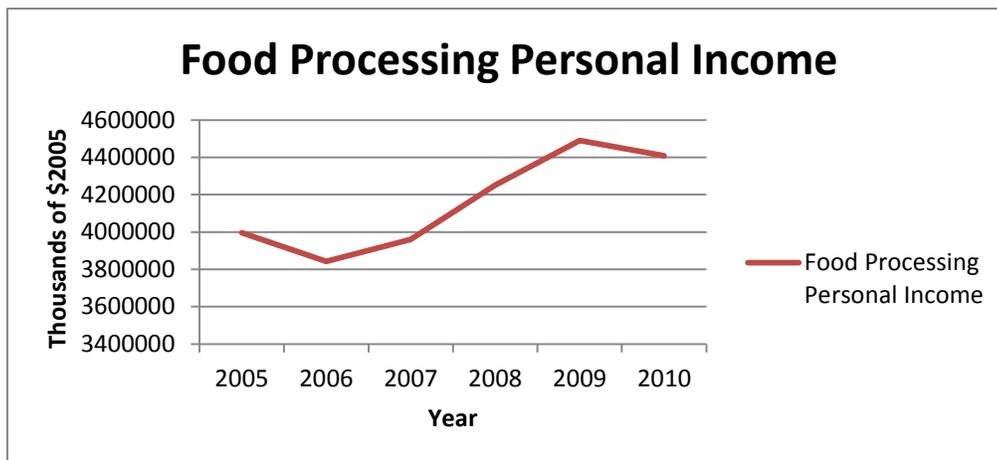
Source: Dun and Bradstreet data from Hoovers

Figure 2-70: Ohio Food Processing County GSP Trends



Source: BEA

Figure 2-71: Ohio Food Processing Industry Personal Income Trend

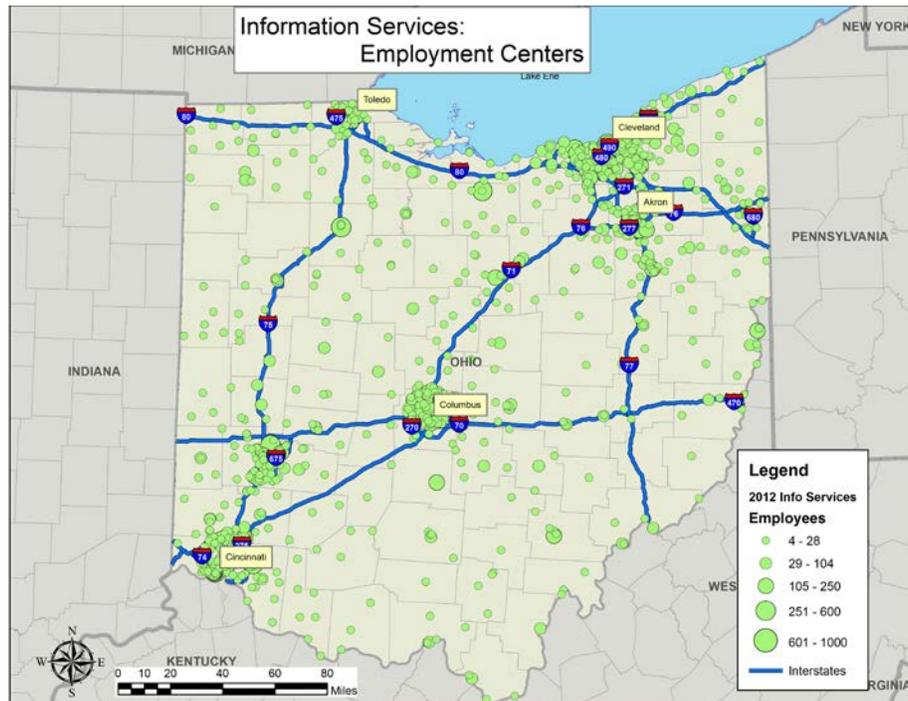


Source: BEA

### 2.2.11 Information Services & Software

In 2009 Ohio exported over \$3 billion in high tech goods and services (2). More than 170,000 workers are employed across the state (2). A fair amount of establishment dispersion is observed across the state, again with clustering in the major metropolitan areas (Figures 2-72, 2-73 and 2-74). GSP trends for the industry are a bit different than the other industries detailed in this report (Figure 2-75); 2008 appears to be the peak for the time period with a small dip in 2009 then back to 2008 levels in 2010. In contrast, personal income declined steadily over the time period with a sharper drop in 2008 (Figure 2-76). AT&T has announced more than \$50 million in investments for Phase II of their Data Center in Summit County (10).

Figure 2-72: Ohio Information Services Employment Centers



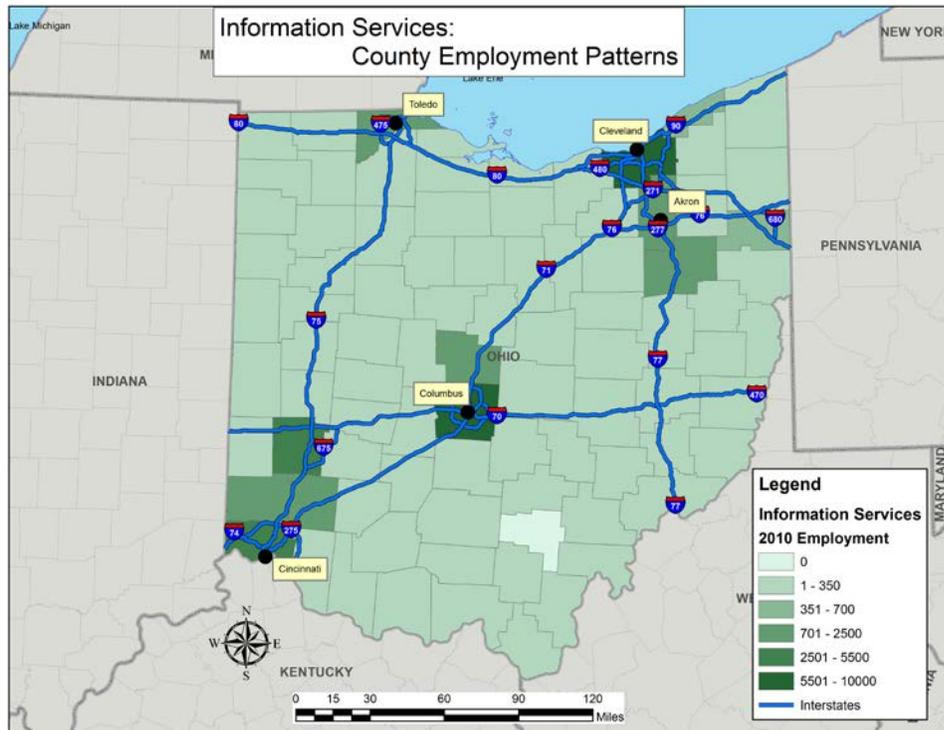
Source: Dun and Bradstreet data from Hoovers

Information Services, like Food Processing is well distributed throughout the state. However, the majority of the establishments lying outside of the significant metro area clusters contribute little to the broader impact of the sector. According to the Dun and Bradstreet data from Hoovers, there are 985 establishments which provide 29,245 jobs in nearly all counties. The top 5 employers are:

1. HP Enterprise Services, LLC (9 establishments – 1,136 employees)
2. The Reynolds and Reynolds Co (Headquarters in Montgomery County – 1,000 employees)
3. Online Computer Library Center, Inc. (Franklin County – 890 employees)
4. Cuyahoga County Library (21 Establishments in Cuyahoga County – 832 employees)
5. Limited Technology Services, Inc. (Franklin County – 800 employees)

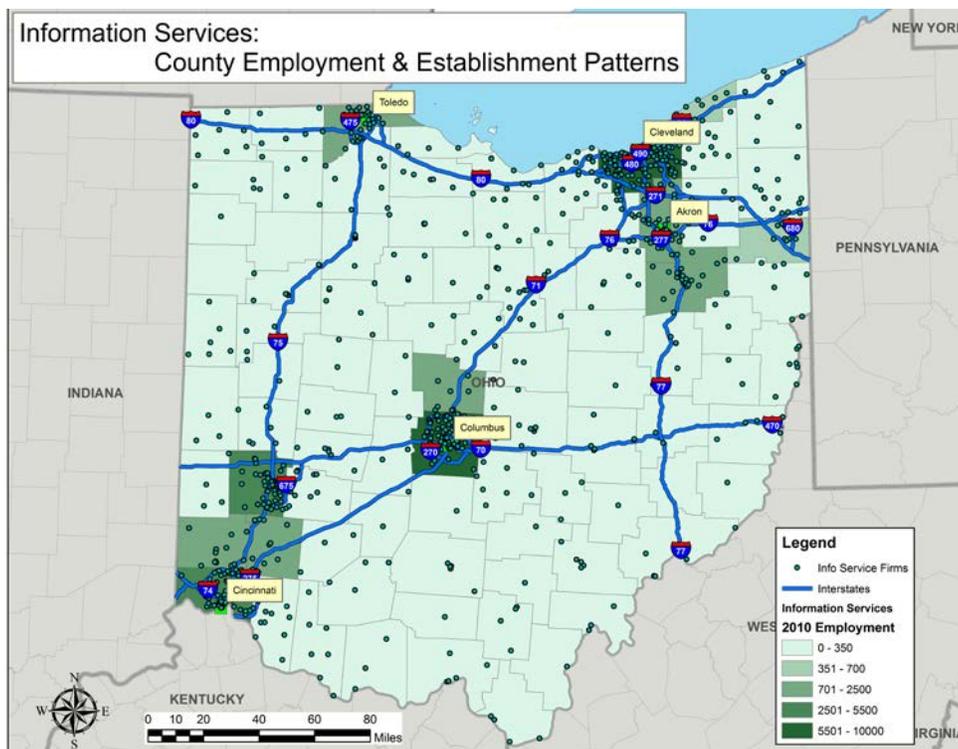
These 5 firms contribute approximately 15% of the sector's jobs in the state.

Figure 2-73: Ohio Information Services County Employment Patterns



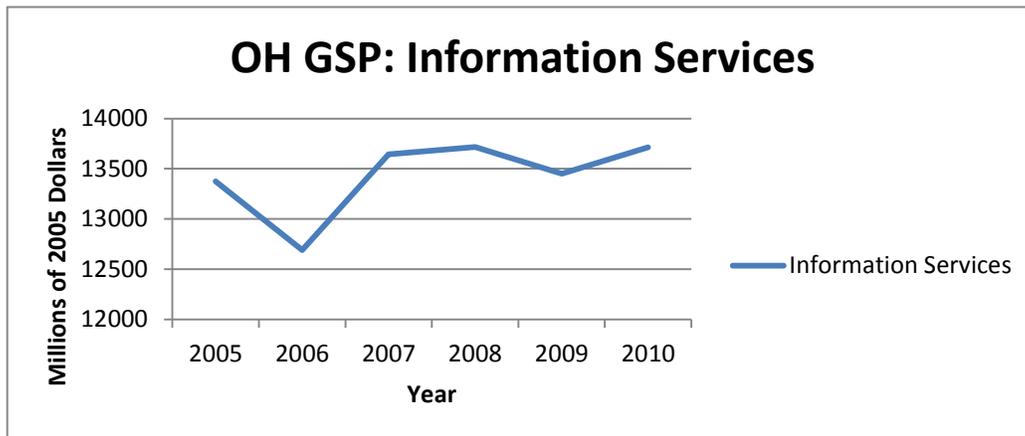
Source: County Business Patterns

Figure 2-74: Ohio Information Services County Employment and Establishment Count Patterns



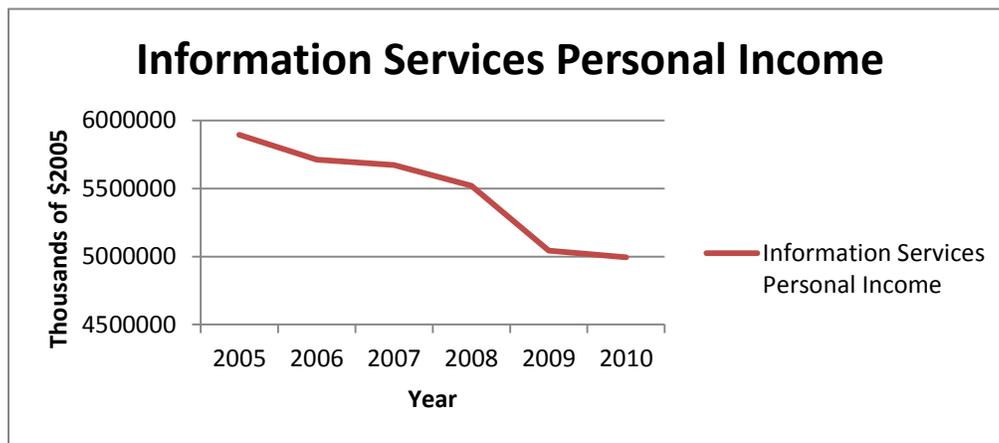
Source: Dun and Bradstreet data from Hoovers

Figure 2-75: Ohio Information Services GSP Trends



Source: BEA

Figure 2-76: Ohio Information Services Personal Income Trends



Source: BEA

### 2.2.12 Polymers & Chemicals

With an extensive, centralized supply chain, Ohio is a global leader in the polymer and chemicals industry. In 2008, with more than 81,100 employees (accounting for 7 percent of U.S. total employment in this industry), \$5 billion in plastic and rubber products were produced in the state - the largest contribution to the nation's GDP from this industry. Most exports from this industry go to Canada and Mexico. Between 2006 and 2009, Ohio gained approximately 200 new polymer plants and expansions. Still, employment has fluctuated around 60,000 people since 2010 which is less than it was between 2001 and 2008. Forecasts have indicated a continued fall in employment to around 50,200 in 2018 (2). However, the growing availability of lower cost feedstock from the nearby shale fields should provide a meaningful boost to this industry.

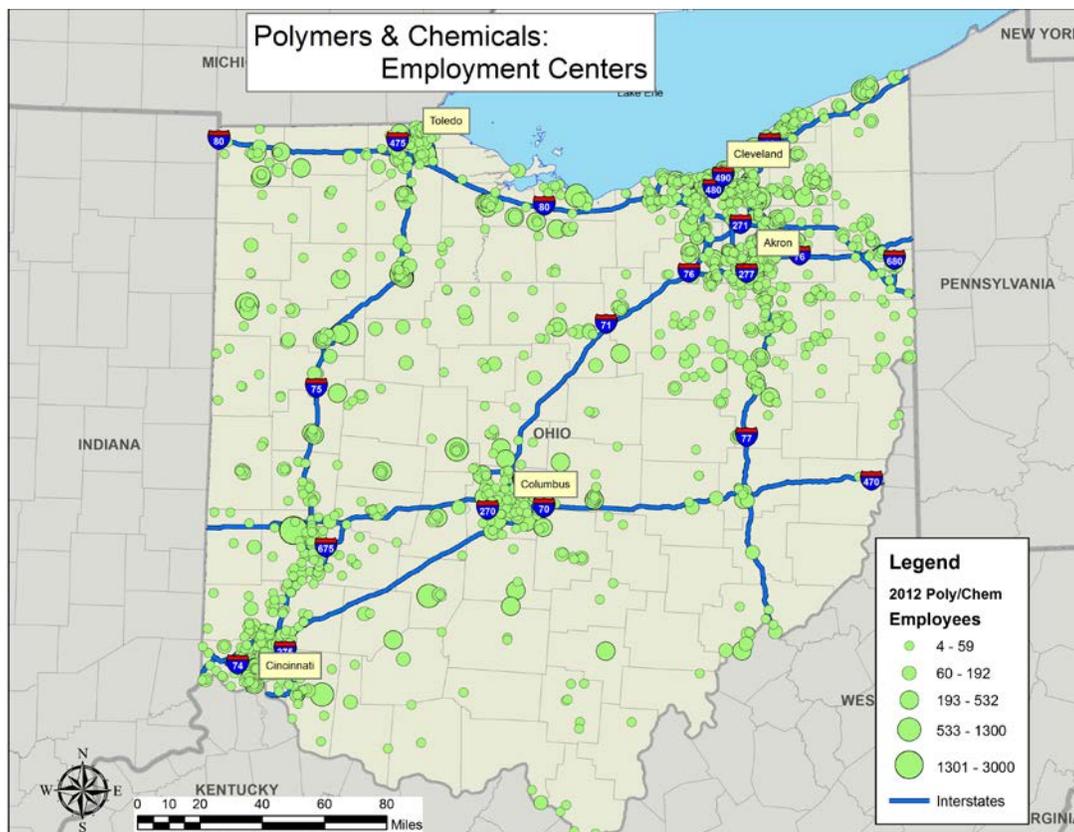
Of the 1,758 rubber and plastic establishments located in Ohio, 29 are Fortune 1,000 companies. Seven of these companies have both polymer operations and their world headquarters located in the state. These are Goodyear Tire and Rubber, Cooper Tire and Rubber, PolyOne, Eaton, A.

Schulman, Parker Hannifin, and Owens Corning (2). The top 5 employers of the state provide a little over 11% of the state's employment in the industry at 20 distinct establishments. They are:

1. The Sherwin-Williams Co. (10 facilities employing more than 4,900 workers)
2. The Procter & Gamble CO. (14 facilities – providing jobs for 3,902 Ohioans)
3. The Goodyear Tire and Rubber Co. (4 facilities – 3,050 jobs)
4. Eaton Corp. (5 facilities – 1,810 employees)
5. The Lubrizol Corporation (3 facilities: Cuyahoga (1) and Lake (2) Counties – 1,354 jobs)

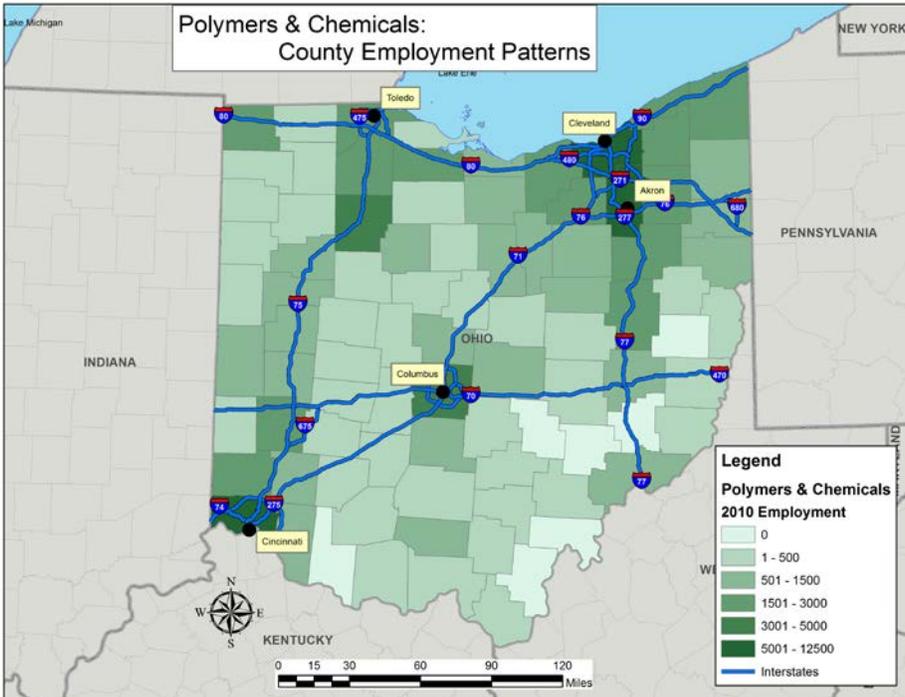
As shown by the maps in Figures 2-77, 2-78 and 2-79 Ohio's polymer and chemicals employment centers are focused around Cleveland, Akron, Columbus, and Cincinnati, but also Dayton, and some in Toledo. As for research and development, the Center for Multifunctional Polymer Nanomaterial and Devices at The Ohio State University performs research on a new generation of polymeric foams. The Center also collaborates with several companies and universities to promote new product innovations (2).

**Figure 2-77: Ohio Polymer Industry Employment Centers**



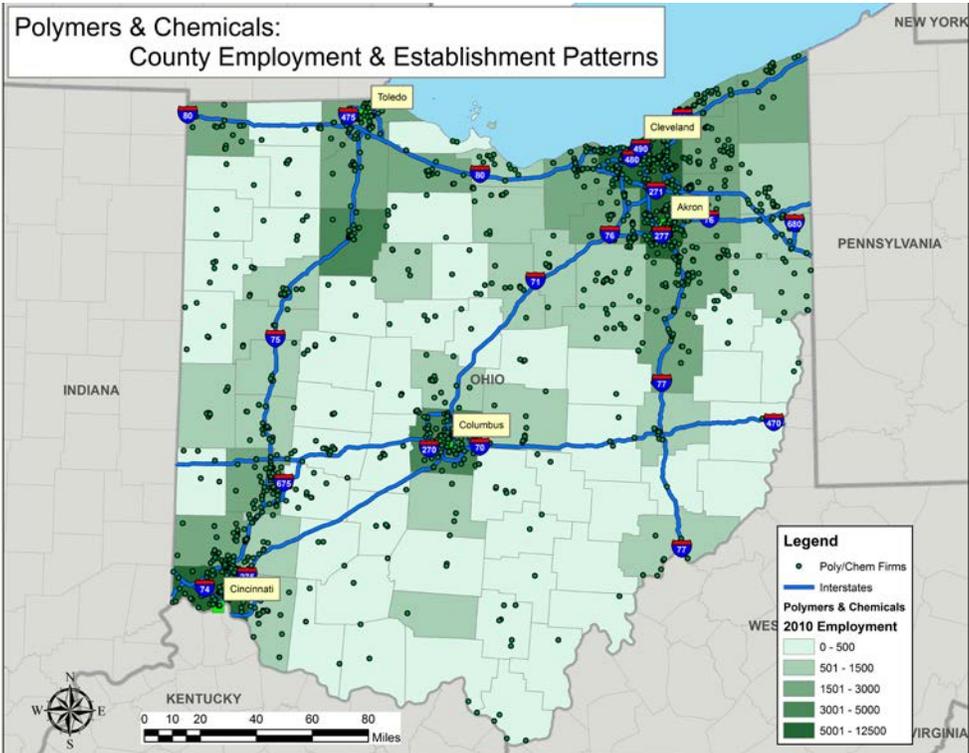
Source: Dun and Bradstreet data from Hoovers

Figure 2-78: Ohio Polymer Industry County Employment Patterns



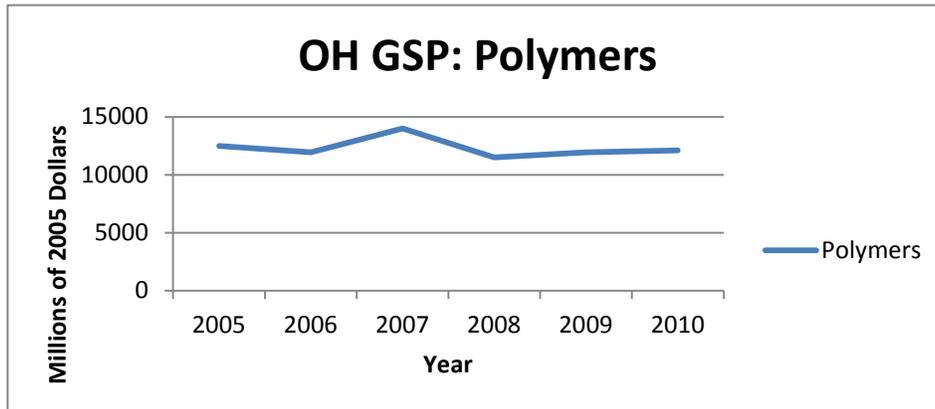
Source: County Business Patterns

Figure 2-79: Ohio Polymer Industry County Employment and Establishment Count Patterns



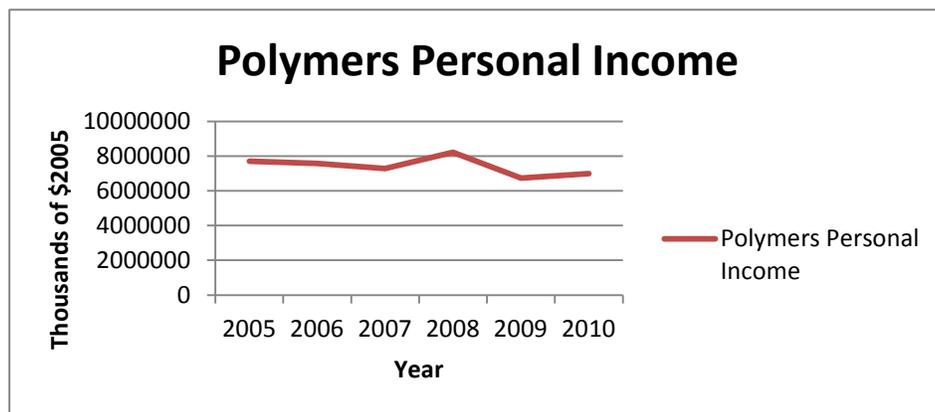
Source: Dun and Bradstreet data from Hoovers

Figure 2-80: Ohio Polymer Industry GSP Trends



Source: BEA

Figure 2-81: Ohio Polymer Industry Personal Income Trends



Source: BEA

### 2.2.13 Advanced Manufacturing

This is one of the largest producing industries in the state. Establishments are dispersed throughout the state with heavy reliance on the highway and interstate systems for transporting goods. Figures 2-82, 2-83 and 2-84 show employment patterns from two data sets for the state while Figures 2-85 and 2-86 show trends in GSP and personal income for the industry. Similar to other sectors of the economy this industry fell after the 2008 financial crisis with signs of recovery in the 2010 data. Some wide scale investments have been announced, for example Republic Engineered Products Inc. and AISher Titania, LLC have announced investments of over \$50 million in Lorain and Cuyahoga counties (10). There are 6,976 establishments providing support for nearly 300,000 jobs. The top 5 advanced manufacturers in the state by employment are:

1. Lincoln Electric Holdings, Inc. (4 establishments in Cuyahoga (3) and Lake Counties; 12,755 jobs)
2. General Electric Co. (16 establishments in 12 counties; 4,092 jobs)
3. General Motors, LLC (1 establishment in Defiance County – 4,000 jobs)
4. Anchor Hocking, LLC (5 establishments in Fairfield County – 2,911 jobs)

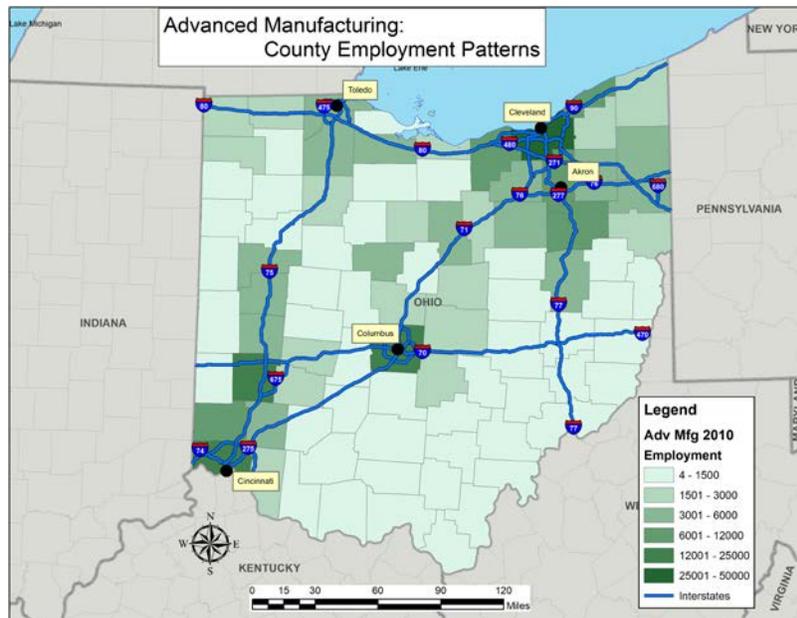
5. Crown Equipment Corp. (6 establishments; Auglaize, Mercer and Montgomery Counties – 2,904 jobs)

Figure 2-82: Ohio Advanced Manufacturing Employment Centers



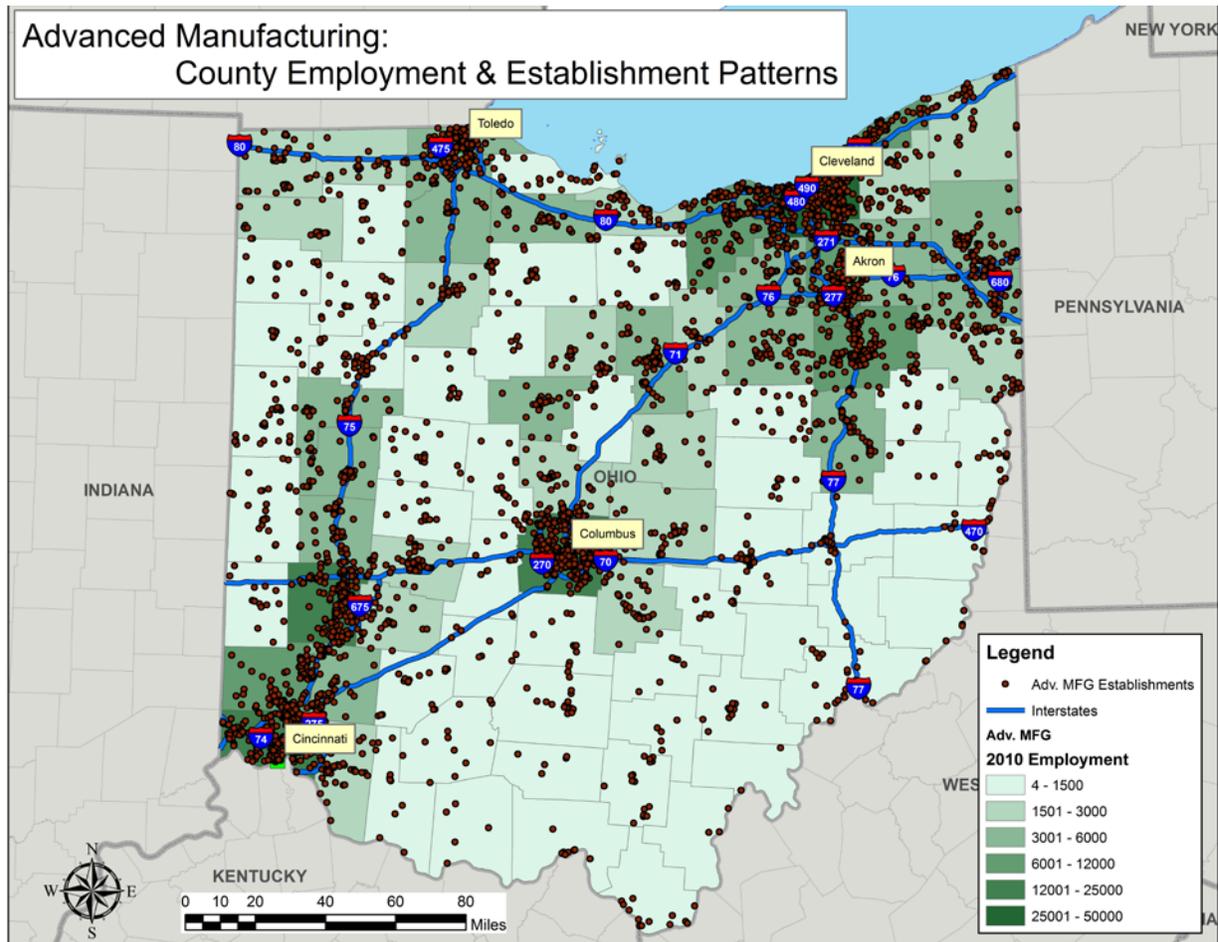
Source: Dun and Bradstreet data from Hoovers

Figure 2-83: Ohio Advanced Manufacturing County Employment Patterns



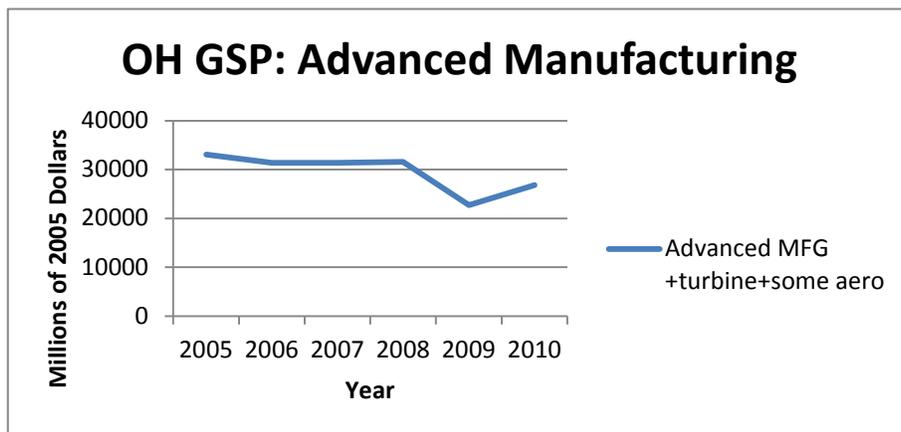
Source: County Business Patterns

Figure 2-84: Ohio Advanced Manufacturing County Employment and Establishment Count Patterns



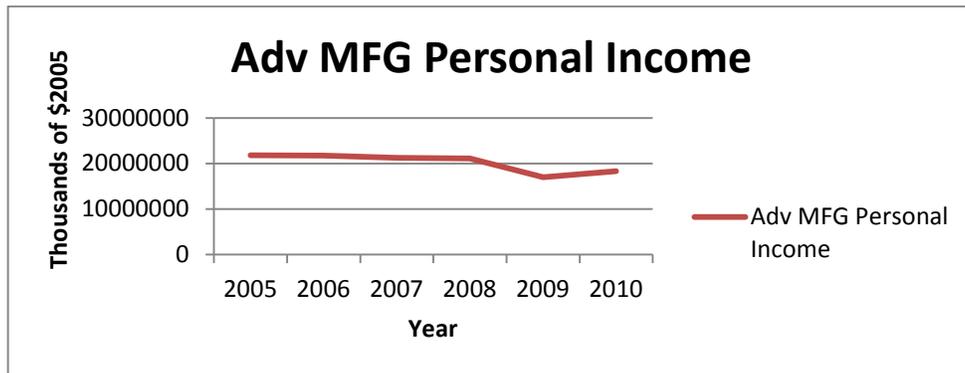
Source: Dun and Bradstreet data from Hoovers

Figure 2-85: Ohio Advanced Manufacturing GSP Trends



Source: BEA

Figure 2-86: Ohio Advanced Manufacturing Personal Income Trends



Source: BEA

### 2.2.14 Information Technology

Information technology also exhibits significant clustering around the Cleveland, Cincinnati, and Columbus metropolitan areas and to a lesser extent Toledo and Youngstown (Figure 2-82). Figure 2-82, 2-83 and 2-84 emphasize how the establishments and thus employment trends coincide with the highway infrastructure. As of March, 2012 the sector recorded a total of 70,409 jobs at more than 2,300 establishments within the state.

The top 5 employers provide 15,700 jobs at 16 establishments. Because information technology is a facilitator of business functions, significant activity occurs in companies that are principally engaged in different industries. In order of employment, the top 5 are as follows:

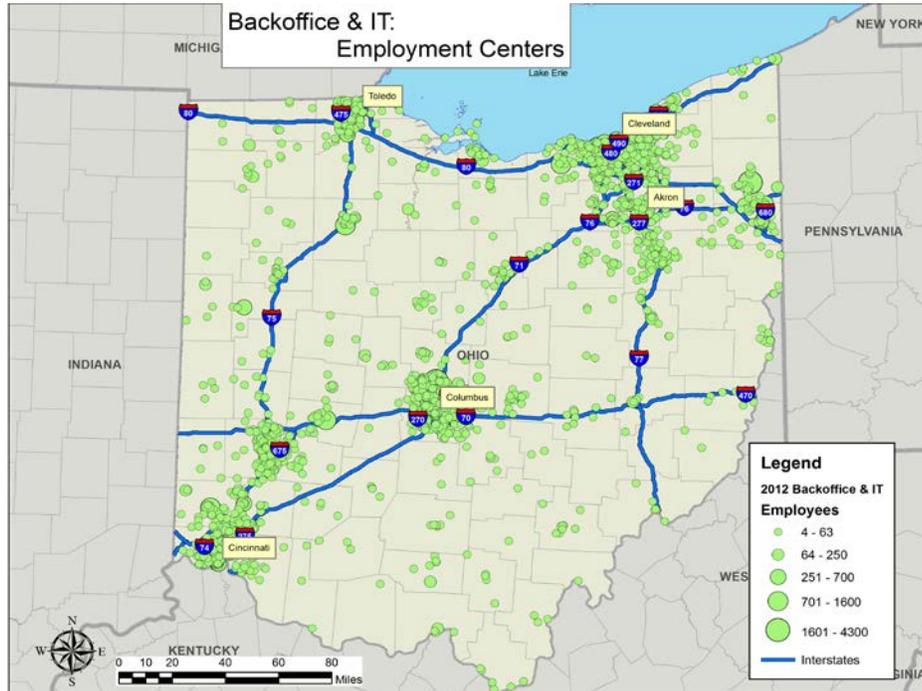
1. Forum Health (1 Trumbull County Establishment; 4,300 employees)
2. Cleveland Clinic (5 Cuyahoga County Establishments; 2,931 employees)
3. Banc One Services Corp. (1 Delaware County Establishment; 2,855 employees)
4. General Electric (2 establishments: Hamilton and Montgomery Counties; 1,750 employees)
5. InfoCision Management Corp. (5 establishments; 1,416 employees)

Figure 2-87: Ohio Information Technology County Employment Patterns



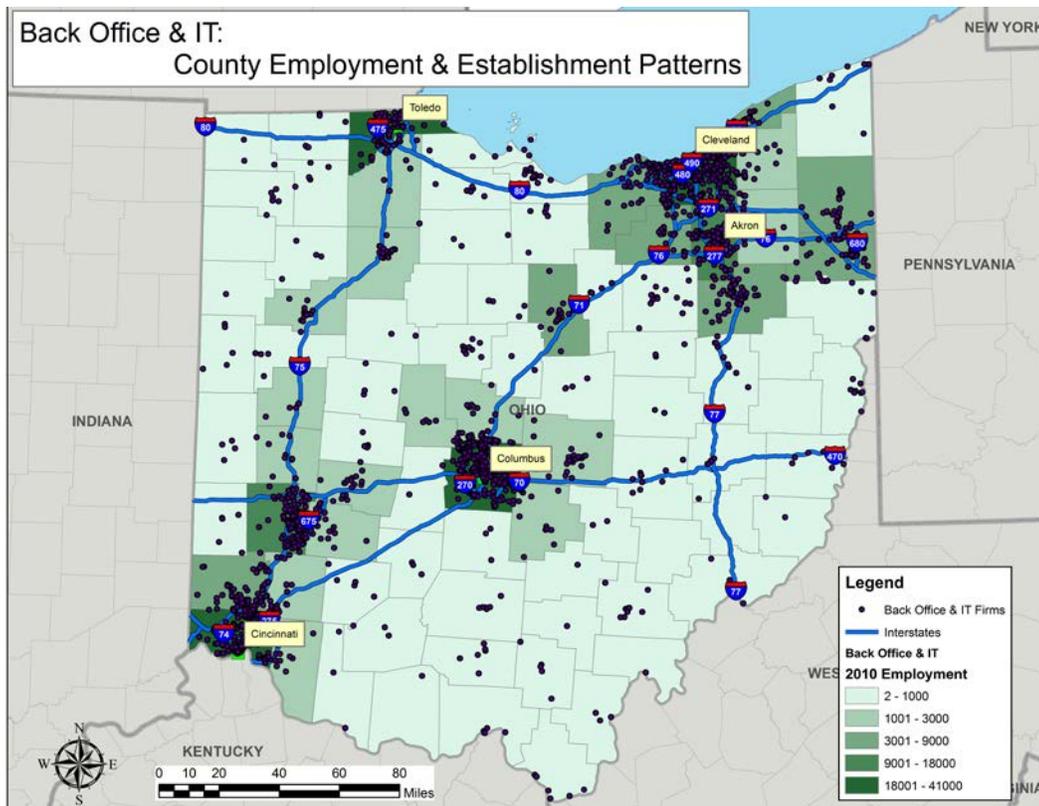
Source: County Business Patterns

Figure 2-88: Ohio Information Technology Employment Centers



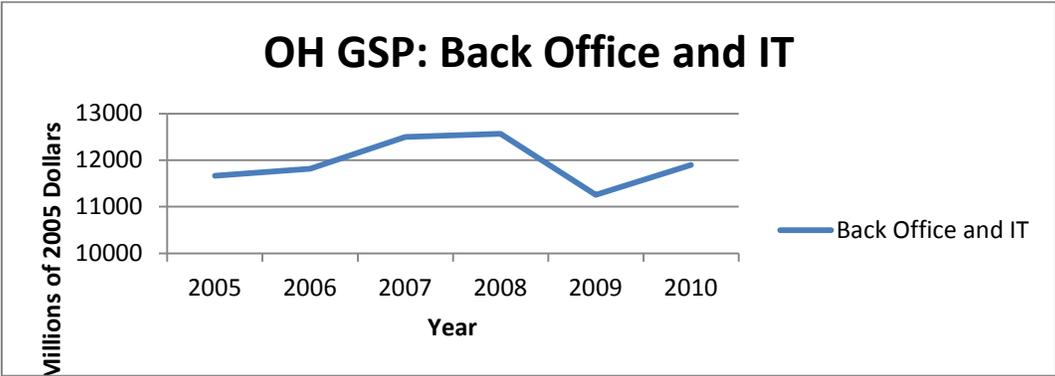
Source: Dun and Bradstreet data from Hoovers

Figure 2-89: Ohio Information Technology County Employment and Establishment Count Patterns



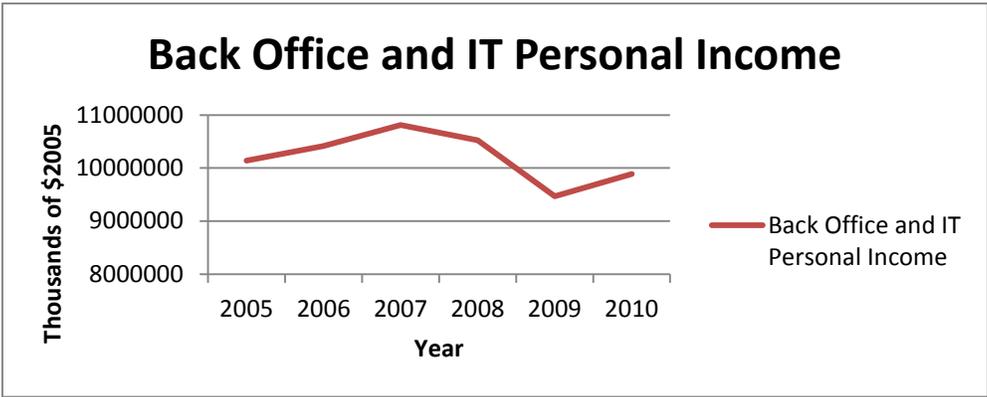
Source: Dun and Bradstreet data from Hoovers

Figure 2-90: Ohio Information Technology GSP Trends



Source: BEA

Figure 2-91: Ohio Information Technology Personal Income Trends



Source: BEA

### 2.2.15 Logistics

According to the Commodity Flow Survey of 2007, Ohio ranked 4<sup>th</sup> in the US in terms of value of shipped goods originating in the state. The 2007 value of originating goods topped \$563 billion dollars for a total of 475 million tons by all modes (16). The average mileage of shipments originating in the state was 580 in 2007. In terms of destination states, Ohio ranked 6<sup>th</sup>, receiving \$193 billion worth of goods weighing 314 million tons from out of state. Such heavy transportation utilization necessitates a complex and proficient logistics industry. According to 2010 County Business Pattern data, there are 6,475 establishments engaged in logistics-type activities employing (at minimum) 117,000\* people. The industry is acutely sensitive and responsive to economic conditions, and this represents a loss of over 640 establishments from the year 2007 and a loss of *at least* 6,000 employees.\*\* However, as the economy recovers, logistics jobs should follow.

As expected, the majority of all logistic industrial activity is clustered in and around the major metropolitan areas of the state. Establishments not lying within the metropolitan clusters typically follow the major infrastructure routes (the interstates and rail systems) as their main function is to

coordinate with shippers, trans-loaders and warehousing industries. As examples of some investment activity planned for this sector, CSX Transportation and FedEx Freight have announced over \$50 million in investments to operations in Franklin and Wood counties (10).

The top 5 logistics companies in the state of Ohio as of March, 2012 are:

1. United Parcel Service (19 logistics related establishments – 6,421 jobs)
2. Wal-Mart Stores, Inc. (4 logistic centers – 3,004 jobs)
3. Federal Aviation Administration (14 establishments – 2,404 jobs)
4. Exel Inc. (21 establishments providing support for 1,935 jobs)
5. R+L Carriers, Inc. ( 2 Clinton County establishments – 1,900 jobs)

The industry has establishments all over the state.

\*Estimate only, based upon available data – This figure represents the minimum employment estimate; its upper bound is 152,000 employees).

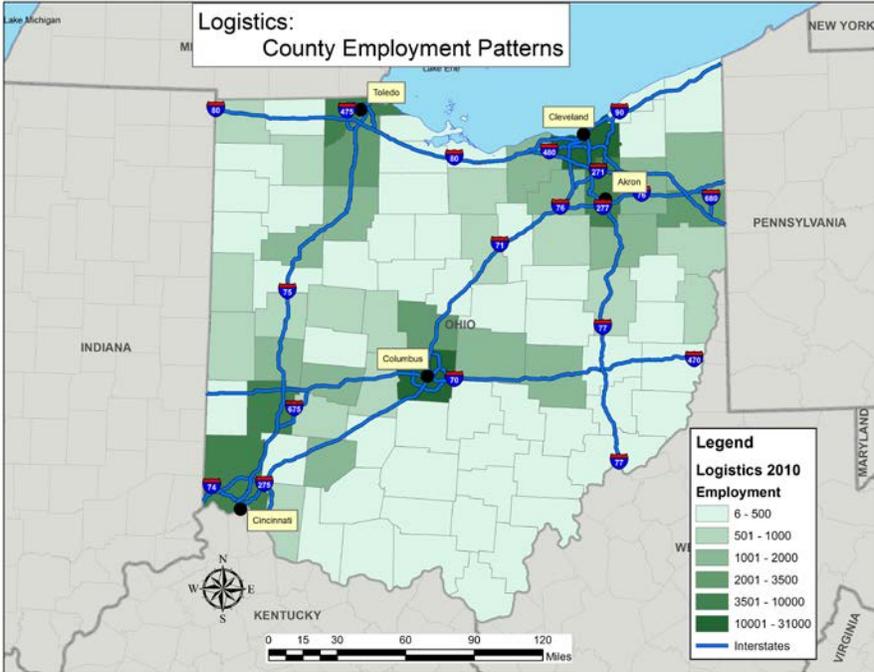
\*\*Again, this is an estimate and represents the minimum loss.

**Figure 2-92: Ohio Logistics Employment Centers**



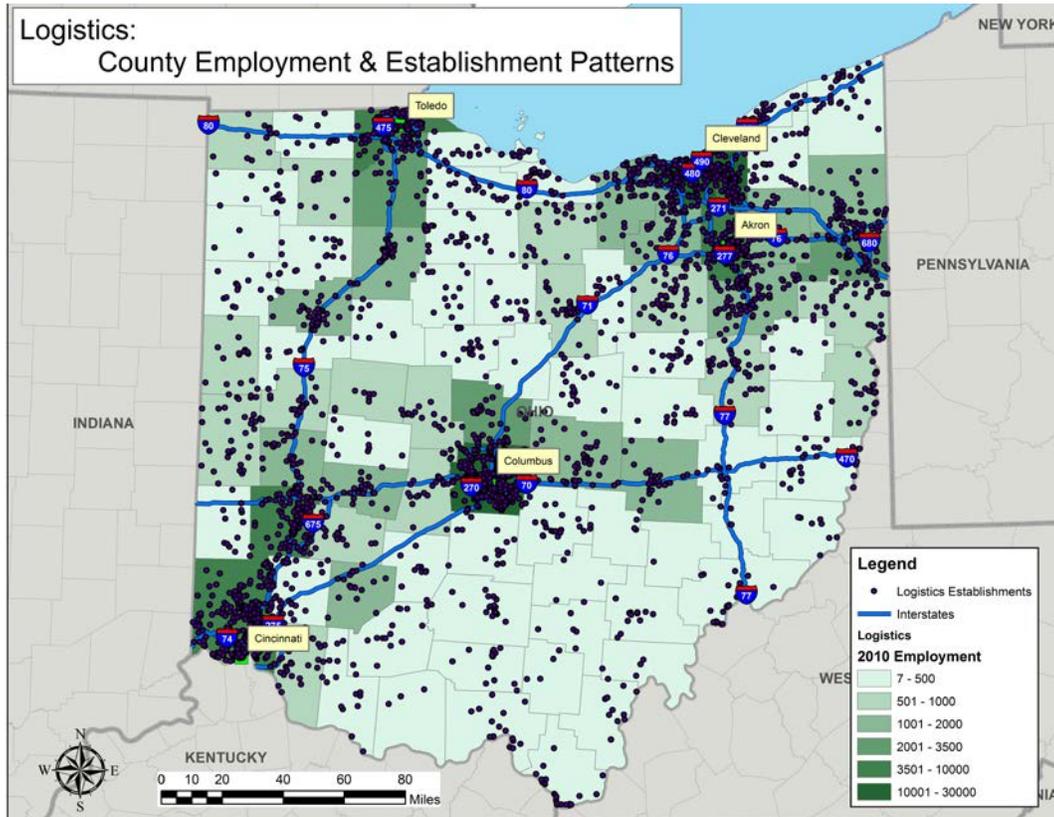
Source: Dun and Bradstreet data from Hoovers

Figure 2-93: Ohio Logistics County Employment Patterns



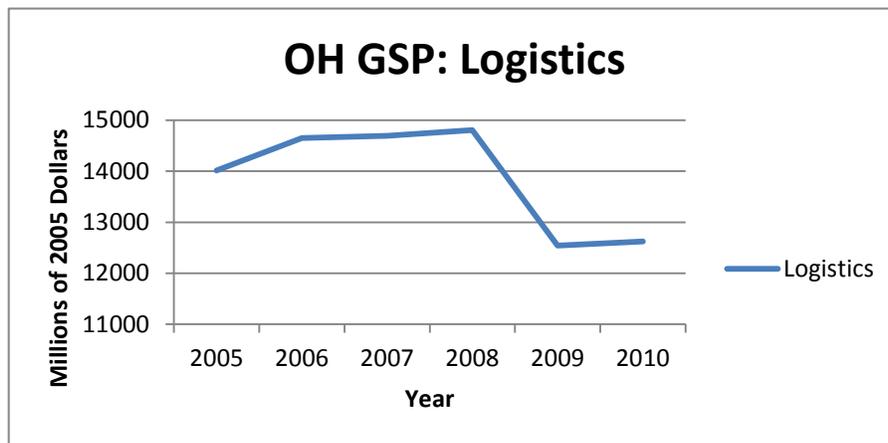
Source: County Business Patterns

Figure 2-94: Ohio Logistics County Employment Patterns



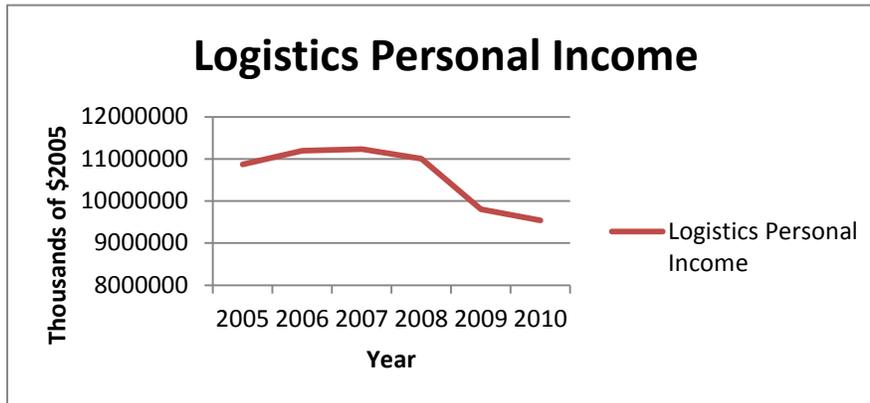
Source: Dun and Bradstreet data from Hoovers

Figure 2-95: Ohio Logistics GSP Trends



Source: BEA

Figure 2-96: Ohio Logistics Personal Income Trends



Source: BEA

### 2.2.16 Research and Development

This industry shows similar spatial and temporal patterns as several of the other industries examined. The main centers are clustered around the major metropolitan areas (Figures 2-97, 2-98 and 2-99). The industry declined in 2008 with the recession while recovery is evident in 2009 (Figures 2-100, 2-101). The sector provides 100,000+ jobs to Ohioans at more than 4,633 establishments across the state. The top 5 employers account for nearly 17% of the industries jobs at 12 establishments in the state. The top 5 firms are:

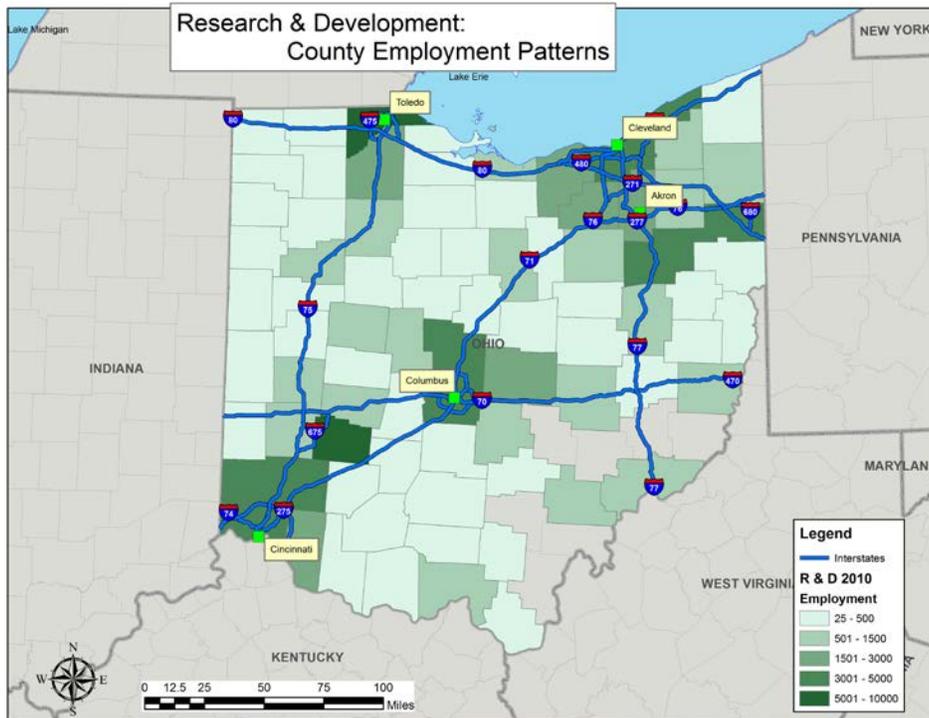
1. Battelle Memorial Institute (9 establishments: 5,110 jobs)
2. Safelite Solutions, LLC (1 Franklin County establishment: 3,500 jobs)
3. Nationwide Children's Hospital (1 Franklin County location: 3,000 jobs)
4. AT&T Corp. (1 Cuyahoga County Branch: 3,000 jobs)
5. United States Enrichment Corp. (2 Pike County Establishments: 2,360 jobs)

Figure 2-97: Ohio R&D Employment Centers



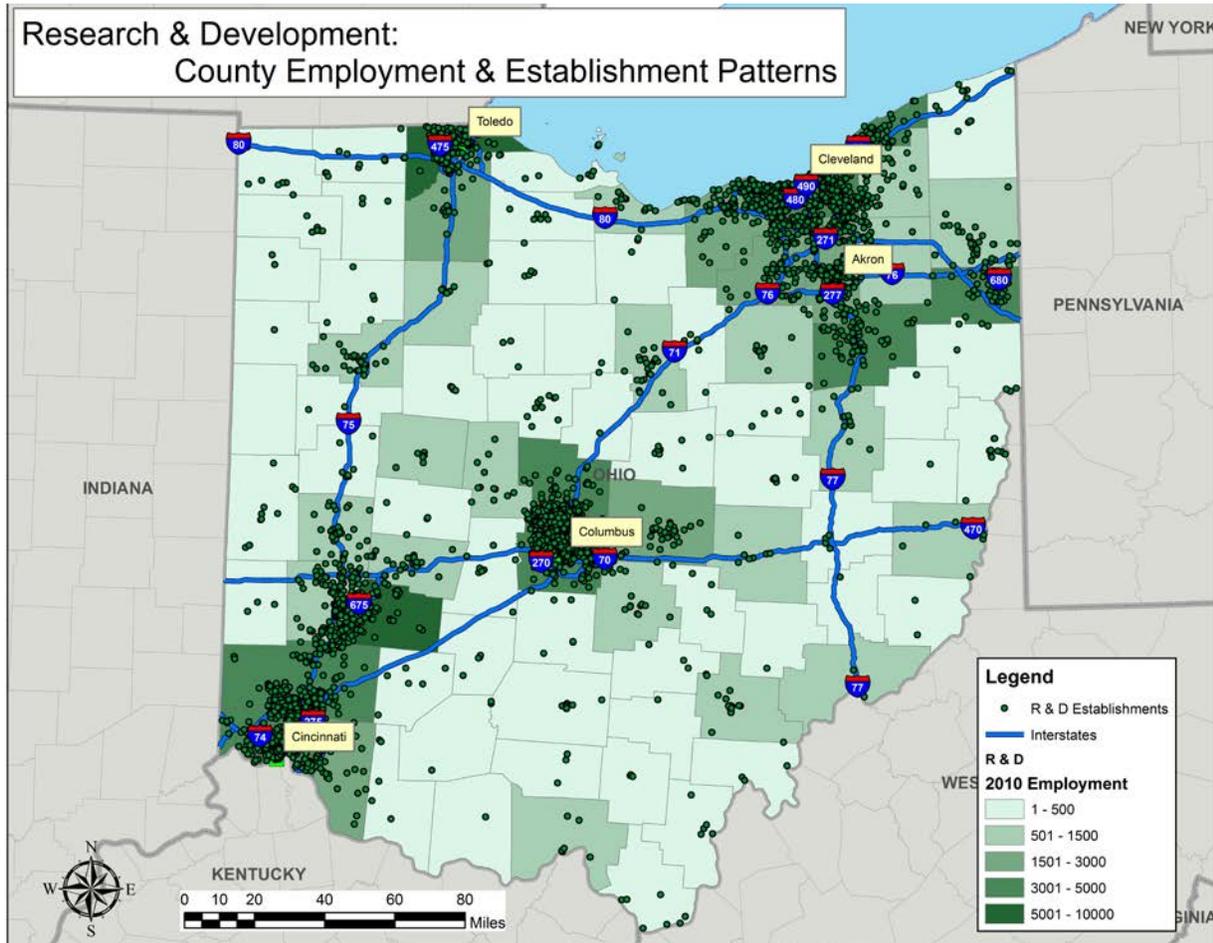
Source: Dun and Bradstreet data from Hoovers

Figure 2-98: Ohio R&D County Employment Patterns



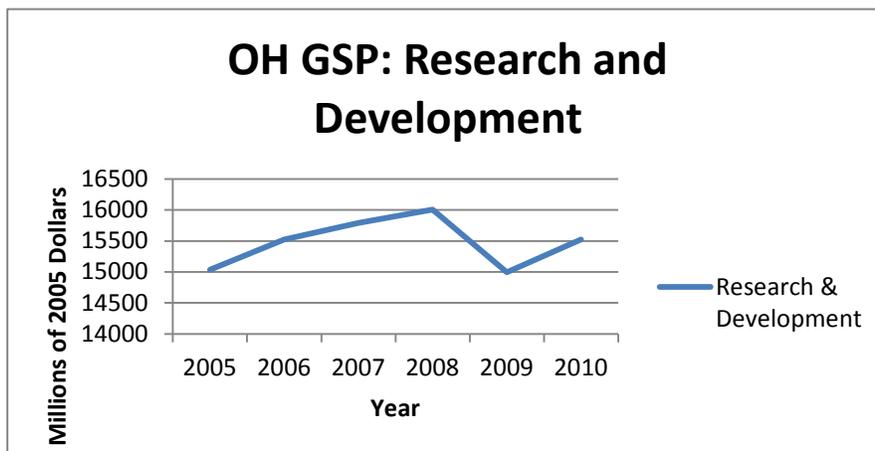
Source: County Business Patterns

Figure 2-99: Ohio R&D County Employment and Establishment Count Patterns



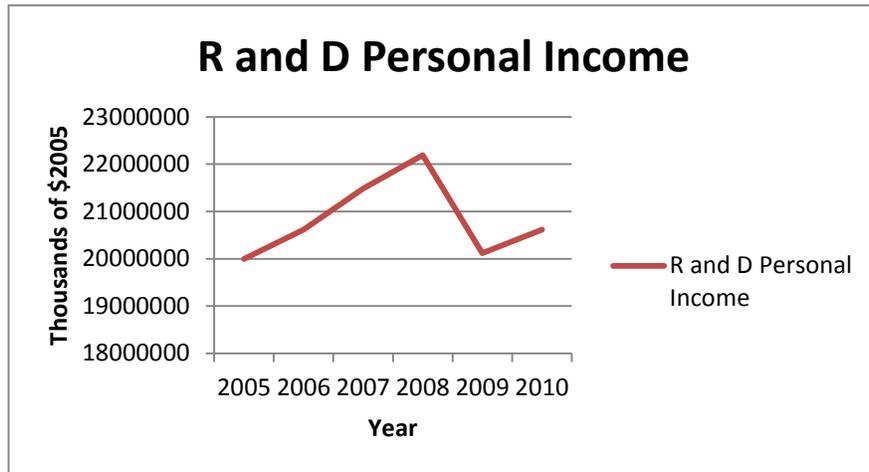
Source: Dun and Bradstreet data from Hoovers

Figure 2-100: Ohio R&D GSP Trends



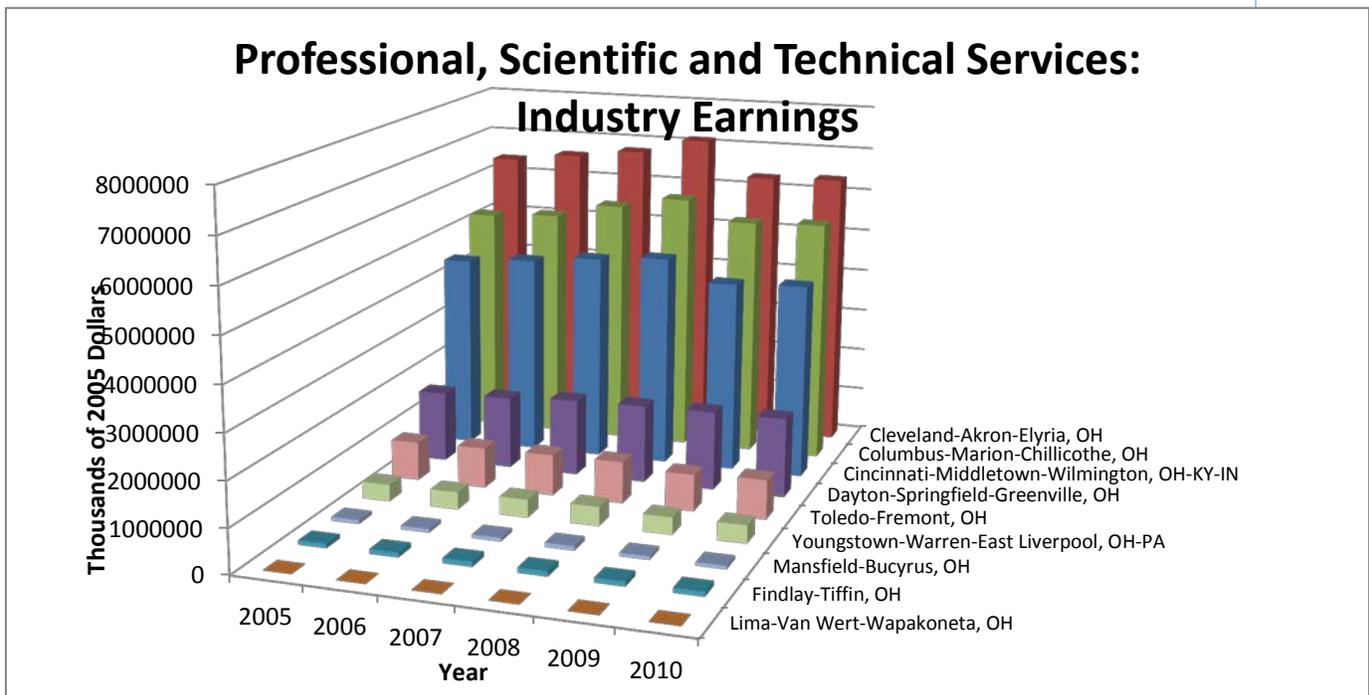
Source: BEA

Figure 2-101: Ohio R&D Personal Income Trends



Source: BEA

Figure 2-102: Ohio R&D – CSA Breakdown



Source: BEA

### 2.2.17 Conclusions

Ohio industries depend on the reliability of the state transportation infrastructure to not only ship and receive their raw materials and goods nationally and internationally, but also for consumers to frequent their establishments for the purchase of final goods. This report examined Ohio's current economic profile in the context of key economic drivers of growth and their relevance to infrastructure utilization and the movement of goods in and through the state. As such, the analysis examined current data trends and provided maps of Ohio's economic geography based on major industry cluster analyses. The first section looked at general indicators for the state of Ohio as a whole then discussed a breakdown of each CSA region. The remaining sections explored the contributions of individual target industries to Ohio's economy. All industries use the transportation system in one way or another; however findings show that some industries rely heavily on the transportation system to move raw materials and goods to market while others provide support functions. Furthermore, some industries have a significant economic presence and depend on infrastructure for commerce as arterials to their locations.

As expected, industries that rely heavily on the transportation system are typically in manufacturing and distribution or logistics. These industries depend on the transportation system to move raw materials for processing and final products to market. The automotive industry is particularly dependent on the reliability of transportation infrastructure, not only to bring materials for just-in-time production, but also for consumers to be able to use their end products. Approximately 95,000 workers are directly employed in the automotive sector in Ohio. Growth is certainly expected in this sector, analysts predict a significant increase in car sales by 2014 and OEMs and suppliers alike are making sizable investments in their operations around the state. Low cost natural gas could create demand for vehicles that use them, as well as reduce logistics costs in the state as fuel distribution networks emerge. The aerospace and aviation sector is also predicted as an area of growth based on current data trends. According to Dun and Bradstreet data, the sector currently employs approximately 30,000 workers in the state. The polymer & chemical industry currently has a significant level of employment in the state, yet employment declines are expected by 2018. It is not clear whether the industry as a whole will decline or if process improvements are a factor for the expected labor reduction. The rising availability of lower cost feedstock from shale oil and gas production certainly should be a stimulus.

The consumer goods industry depends on the freight system for distribution of goods to market and for consumers to purchase their products from fixed location establishments. Not surprisingly, GSP from the industry fell \$1.1 billion over the study period when consumer confidence was at a low point. As the economy improves and based on announced investments in this sector, some additional growth is expected. Similarly, the logistics industry employs over 117,000 workers in the state, even though job losses were noted during the study period, growth is expected based on the significant level of investments across the industry in the state. Finally, advanced manufacturing and food processing are also expected to be areas of growth based on announcements of significant investments and data showing recovery of GSP in the sectors after the 2008 decline.

Moreover, some industries support those industries that are freight driven. One such industry is the financial services sector, which is crucial for providing working capital for freight intensive industries. Another is the information services software and the information technology industries. The information services software industry both supports freight intensive industries and is an economic powerhouse on its own. This industry employs over 170,000 workers in the state; GSP recovered after a fall in 2008 and some growth can be expected based on significant investments in the industry. Likewise, the back office information technology sector has shown recovery since the 2008 fall in GSP. These industries support the information transfer for material controls in manufacturing production control systems between manufacturers and suppliers. Research and development efforts are contributors to product innovations that help firms maintain their competitive advantages. As such, this is a significant producer of GSP for the state; recovery of this sector is evident in the data after the decline in 2008.

The final set of industry sectors have a significant economic presence and depend on infrastructure for commerce as arterials to their locations. Biohealth is an area to watch; it is growing rapidly and employs a number of highly skilled workers. Employment in this sector is expected to rise by 9% on the manufacturing side and 7.8% on the services side by 2018. Energy is another significant industry in Ohio. This industry is ranked in the top five in the nation for job growth in clean energy. This is not surprising considering the fact that over \$1 billion in investments that have been announced across the state in natural gas, wind, bio-fuels and shale gas.

This report examined Ohio's current economic profile of key economic drivers of growth and their relevance to infrastructure utilization. Economically Ohio was hit hard during the 2008 financial crisis. Its fall was similar to the rest of the country, though current data trends show a pattern of recovery in most sectors. Overall, most sectors have expectations of growth through both economic improvements and significant investments in the area.

### **2.2.18 Limitations of the Data**

This report is an in-depth analysis of the state of Ohio's economic health and activities at the county (sub-state) level, yet some comments on limitations of the data sets used for this study are important for context. Due to Federal Data Disclosure/With-holding requirements publicly available data follows a rule of 80/3, where the 80 means that data is withheld if more than 80% of any economic activity is attributable to one firm in the area of analysis. Similarly, if there are not more than 3 firms engaged in the market, data is withheld. This becomes especially problematic at the sub 2 digit North American Industrial Classification System (NAICS) levels where more than half of the counties for certain industries are not disclosed. As such the data represented in this report reflects a tradeoff between specifically matching the target industries 4 Digit NAICS codes and providing usable data. In-depth county level data on firms is only available every 5 years when the Census Bureau releases its Economic Census data reports. Due to the fact that 2007 is the most recent available data year at this level of detail, the Intermediate estimated County Business Patterns data set has been heavily relied upon. Unfortunately this dataset suffers heavily from the previously mentioned data withholding requirements. Additionally, Hoover's Dun and Bradstreet data is used. Any discrepancies in cited numbers are due to different datasets do not always maintaining a one-to-one correspondence.

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## Appendix

### Reallocated target industry NAICS structure used in County Business Patterns data

#### **Aerospace & Aviation\*** –

481: Air Transportation

927: Space Research Technology

5174: Satellite Communications

\*Scheduled & nonscheduled air transportation fall under logistics

\* Navigation, Measuring, Electromedial MFG falls under Adv MFG

\*Aerospace Product & Parts MFG falls under Automotive (NAICS 336)

#### **Automotive\*** –

336: Transportation Equipment MFG

\*Engine, turbine and power transmission fall under adv mfg

\*Aerospace Products & Parts falls in this category

#### **Financial Services \***

52: Finance & Insurance

\*This adds in Central Bank/Monetary Authorities as well as Insurance Agencies & Brokerages --- it overstates ODOTS request

#### **Biohealth\***

the miscellaneous falls under advanced manufacturing while

pharmaceutical mfg falls under polymers & chemicals

#### **Consumer Goods Headquarters –**

551: Management of Companies and Enterprises (Contains exactly what ODOT asked for)

**Energy\* –**

21: Mining, Quarrying, and Oil and Gas Extraction

324: Petroleum and Coal Products MFG

237: Heavy and Civil Engineering Construction

(237 includes land subdivision, hwy street & bridge construction & other civil engineering)

\*Energy is thus, overstated.

**Food Processing\* –**

111: Crop Production (exact)

311: Food MFG

\* Missing Beverage

\*Understated

**Information Services & Software\* –**

511: Publishing Industries (except internet)\*

\*This includes newspaper, periodical book and directory publishers

\* Overstates the industry

518: Data Processing, Hosting and Related Services

519: Other Information Services

**Polymers & Chemicals\* –**

325: Chemical MFG\*

\*Includes pharmaceuticals; overstates polymers & chemicals, but only by the amount missing from Biohealth

326: Plastics and Rubber Products MFG (exact)

**Advanced Manufacturing\*** –

327: Nonmetallic Mineral Product MFG\*

\*This includes cement and concrete and thus overstates adv mfg

331: Primary Metal Manufacturing (exact)

332: Fabricated Metal Product Manufacturing\*

\*Includes Cutlery & Handtool MFG, AND Hardware MFG (overstates)

333: Machinery Manufacturing

Includes Engine, Turbine and Power Transmission Equipment MFG (which was left out of automotive)

334: Computer & Electronic Product MFG

Includes Navigation, Measuring, Electromedical and Control Instrument MFG which was omitted from Aerospace

335: Electrical Equipment, Appliance and Component MFG (exact)

339: Miscellaneous MFG

Includes the omitted medical equipment & supplies mfg which was omitted from Biohealth

**Backoffice & Information Technology – \***

561: Administrative & Support Services\*

\*Includes Travel Arrangement & Reservation Services, Investigation & security Services, Services to Buildings and Dwellings & Other Support Services ---- overrepresents actual numbers of target industry.

**Logistics –**

484: Truck Transportation (exact)

488: Support Activities for Transportation (exact)

492: Couriers & Messengers (exact)

493: Warehousing & Storage (exact)

**R & D – \***

## 541: Professional, Scientific and Technical Services\*

Includes the following additional:

Legal Services

Accounting , Tax Prep, bookkeeping & payroll

Architectural, Engineering and Related Services

Specialized Design Services

Advertising, Public Relations and Related Services

Other Professional, Scientific, and Technical Services

\*Potential to be highly misrepresented.

