

**MANUAL ABOUT APPLICATIONS OF LABOR MARKET INFORMATION (LMI)  
FOR ECONOMIC AND WORKFORCE DEVELOPMENT**

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# MANUAL ABOUT APPLICATIONS OF LABOR MARKET INFORMATION (LMI) FOR ECONOMIC AND WORKFORCE DEVELOPMENT

## Introduction

In many respects, economic development and workforce development are two sides of the same coin of business and employment growth. As a result, efforts to sustain and increase regional employment opportunities focus upon the nexus of economic and workforce development. These efforts require rigorous analysis of local labor market information to effectuate economic growth through workforce development and skill training. The major information tools of the Ohio Bureau of Labor Market Information (BLMI) available to regional planners for economic and workforce development include the following resources:

- The *Ohio Economic Analysis, 2007, Understanding the Environment and Charting a Course for the Future* (at <http://ohiolmi.com/research/Research.htm>). This report provides a current overview of the Ohio economy and labor force (i.e., the state gross domestic product, population and migration trends, labor force participation rates, trends over-time in employment and unemployment). It includes an analysis of industry employment and productivity trends, and measures of economic health such as per capita income, poverty rates, and educational attainment. The 2007 Ohio economic analysis report projects the labor force and industry and occupational employment to 2014, and offers unique forecasts of skill needs in the future economy. With its concluding chapter about strategies for economic and employment growth – that is, the planning models associated with high employment prospects by occupation, export industries, industry and occupational clusters, entrepreneurship, economically resilient industries (“proven survivors”), wealth generation models, and special populations and geographies – the 2007 statewide economic analysis of the Ohio BLMI offers a good starting point for the review of labor market information. The 2008 *Ohio Economic Analysis: Changing Course* (also available at <http://ohiolmi.com/research/Research.htm>) up-dates the economic and labor market analysis for the state, and adds an important new development discussion regarding “Ohio’s Strategies for the Future.”
- To complement this statewide, economic profile, the Ohio BLMI also prepared local workforce development reports entitled *Workforce Analysis by Workforce Investment Area Report* (at <http://lmi.state.oh.us/wa/waWIA.htm>). Local development planners will need to give special attention to the table of employment by industry sector, 2005 (figure 12 in the local workforce analysis reports), to the employment prospects by industry sector (figure 13), and to the sectors ranked by 2005 average weekly earnings (figure 14 in the same WIA workforce area reports).
- For skills which are grouped into sets of labor inputs (called jobs or occupations) for industry or firm production functions, planners will want to analyze both supply and demand forces in local, state, and national occupational labor markets to

determine occupational skill shortages. The report by the Ohio BLMI entitled, *Identifying Regional Skill Shortages Dayton Metropolitan Statistical Area and Research Documentation* (at <http://lmi.state.oh.us/research/Research.htm>), give useful state and national labor market information about specific, “high employment prospect” occupations, some of which qualify for the more restrictive designation of occupational skill shortages. Further, the report details the methodology required for analysis of occupational skill shortages, so that other Ohio regions can add their local data to the state and national information contained in the Dayton report about skill shortages by occupation. As a model planning tool, the skill shortage report defines occupational skill shortages in the following manner – “Throughout this report, the definition of occupational skill shortages refers to an inadequate supply of skilled labor for a specific occupational labor market within the Dayton MSA at prevailing labor market wages with which to meet the hiring demand from employers. These occupational skill shortages lead to upward pressures on occupational wage rates, and the possibility of production bottlenecks developing due to the lack of required, skilled labor at prevailing wages. The skill shortages also represent training investment opportunities and tend to provide the greatest economic returns to human capital investments in terms of job placement rates post training, employment stability, and wage levels.”

- To conclude the introduction of major LMI resources available to economic and workforce developers, four Ohio BLMI-supported web sites present encyclopedic information about the labor market, including industry and occupational employment, trends, and projections, industry and occupational wage rates, as well as the educational infrastructure in place to support regional workforce development. These BLMI-related web sites are the Labor Market Information Classic site at <http://ohiolmi.com>, the Ohio Workforce Informer at <http://ohioworkforceinformer.org>, the Occupational Supply/Demand System (OSDS) at <http://occsupplydemand.org>, and the Ohio Career Information System (OCIS) at <http://www.ocis.org>.<sup>1</sup> Each of these major web sites for labor market and career information display local, state, and national data and analysis. The LMI Classic web site links to the Statewide Profile, the Ohio Appalachian Region Profile, and Ohio County Profiles of the Ohio Department of Development at <http://www.odod.state.oh.us/research/files/s0.htm>. Also, the LMI Classic portal connects to the O\*Net OnLine at <http://online.onetcenter.org> for occupational information related to skills, tools and technology, and occupational taxonomies. The subsequent sections about the industry and occupational analysis of employment trends, wages, and special populations refine the overview to specific applications, concluding with a discussion of impact evaluations.

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<sup>1</sup> Although OCIS is an intranet system with “per building” annual subscription fees, the Ohio BLMI funds the annual OCIS subscription charges for “free” access by consumers at all One-Stop Centers. Also, many Ohio public libraries provide free access to OCIS as well.

## **Industry Analysis of Employment Trends and Wages**

Many approaches to economic and workforce development start with the classification of industries into export and local industries, using location quotients (LQs) as the statistic to distinguish between these two, basic types of industries.<sup>2</sup> The LQ statistic can be computed for any year for which good, comparable local (or state) and national industry employment data are available; but the comparisons of local (or state) and national industry employment concentrations must refer to the same time period. An excellent tool for the quick and easy computation of location quotients, using employment data from the Quarterly Census of Employment and Wages (QCEW), is the Location Quotient Calculator of the U.S. Bureau of Labor Statistics (BLS) at

[http://data.bls.gov/LOCATION\\_QUOTIENT/servlet/lqc.ControllerServlet](http://data.bls.gov/LOCATION_QUOTIENT/servlet/lqc.ControllerServlet).

As a complement to the categorization of regional industries as either export or local industries, local workforce development analysts need to review industry trends in employment and wages. Local analysts must understand which regional industries have demonstrated high employment growth rates, and which industries can be expected to have many replacement job openings based on their large employment size. New jobs result from an industry's employment growth; but replacement job openings due to death, retirement, and net geographic and occupational transfers are tied to the size of the industry employment base. Approximately three-fourths of all job openings result from replacement needs.<sup>3</sup> Helpful tables about local industries with large employment (which correlates directly with the number of replacement job openings), high employment growth rates (for new jobs), and the combination of both of these attractive characteristics for workforce and economic development, are available for study as part of the Ohio BLMI reports titled, *Workforce Analysis by Workforce Investment Area*, at <http://lmi.state.oh.us/wa/waWIA.htm> (see figures 12 and 13),<sup>4</sup> and in the Ohio Skills Bank Data Tool (at <http://lmi.state.oh.us/asp/sb/SkillsBank.htm>).

Another major characteristic of local industries that must be considered in tandem with the employment growth and employment size is the average wage level of regional industries. Figure 14 in each of the above referenced reports, *Workforce Analysis by Workforce Investment Area*, ranked industrial sectors by their 2005 average weekly earnings.<sup>5</sup>

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<sup>2</sup> Ohio BLMI, "The Case of Health Care: Regional Strengths," p.54, in *Inroads: Strategies for Economic Growth*, 2004, at <http://ohiolmi.com/research/archive.htm>, "Location quotients (LQ's) provide indicators of 'export' industries in contradistinction to 'local' industries. Economic development organizations pay close attention to export industries because they bring new capital into a community from outside the local area, while local industries circulate capital already in the community. Hence, export industries are one of the keys for income growth in a local area. The LQ statistic results from the comparison of the concentration of employment in an industry locally to the employment concentration of the same industry nationally, . . . . Most labor market analysts consider an employment concentration of twenty percent or more higher than the nation (i.e.,  $LQ \geq 1.2$ ) to be a likely indicator of an export industry, with employment concentration above the national standard resulting from product or service export."

<sup>3</sup> Ohio BLMI, *Ohio Job Outlook 2014 Executive Summary*, p.13, at <http://lmi.state.oh.us/proj/OhioJobOutlook.htm>.

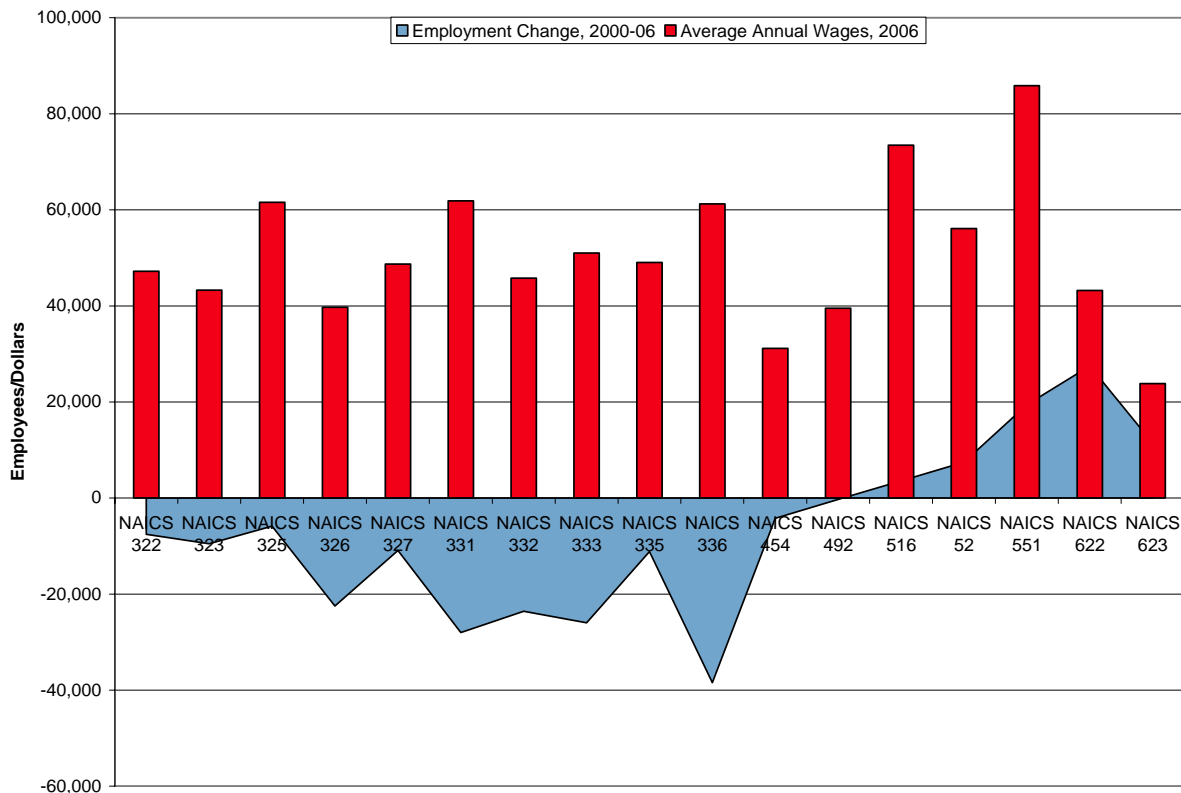
<sup>4</sup> Ohio BLMI, *Workforce Analysis by Workforce Investment Area*, at <http://ohiolmi.com/wa/waWIA.htm>.

<sup>5</sup> *Ibid.*

All of these major industry traits – that is, export industries, employment and job openings, and wages – need to be considered by labor market analysts and workforce developers, in order to focus and prioritize skill training projects. Graphical presentations can help when reviewing in concert these basic, three dimensions of local industries of export status, employment, and wages. For example, in the attached chart, the statewide job growth, 2000-2006, and the 2006 average annual wages for export sectors (3-digit NAICS codes<sup>6</sup> with LQs>1.2) are presented. This type of visual presentation and simultaneous consideration of export status, employment growth, and wages leads quickly to the suggestion for further study in greater, local detail of the NAICS sector 516 (internet publishing and broadcasting), NAICS 52 (finance and insurance\*), NAICS 551 (management of companies and enterprises), NAICS 622 (hospitals), and NAICS 623 (nursing and residential care facilities).

### Ohio Employment Change and Annual Wages for Export Sectors<sup>7</sup>

(Includes only sectors with a location quotient greater than 1.2.)



(\*Export sector NAICS 521, monetary authorities-central bank.)

Please note that this type of analysis is sensitive to the level of detail chosen for the review of sectors and industries at the 3, 4, or 5-digit level of NAICS codes.

<sup>6</sup> NAICS=North American Industrial Classification System.

<sup>7</sup> Ohio BLMI, Quarterly Census of Employment and Wages (QCEW), at <http://ohiolmi.com/asp/edeps/EdepsNAICS.htm>.

Additional economic criteria about industries for consideration by local skill training analysts are the employment resiliency or imperviousness of regional industries to economic recessions. The economic development profiles of the Ohio BLMI provide industry employment time series data for state and local areas from the Quarterly Census of Employment and Wages (QCEW), which frame the recent 2001 recession,<sup>8</sup> and make these resilient and impervious local industries readily apparent. As shown in the following economic development profile for the nursing and residential care facilities industry in Cuyahoga County, this industry was **impervious** to the effects of the 2001 economic contraction.

## Economic Development Profile of Quarterly Census of Employment and Wages Data<sup>9</sup>

Summary Profile For: Cuyahoga County NAICS Code: <b>623 - Nursing and residential care facilities</b>				
Item Type	Number of Establishments	All Employees	Total Wages (in thousands)	Average Annual Wage
2000	259	18,890	\$409,987	\$21,704
2001	283	19,757	\$446,511	\$22,600
2002	294	21,137	\$482,969	\$22,850
2003	295	21,147	\$502,958	\$23,783
2004	295	21,361	\$527,060	\$24,674
2005	299	21,410	\$529,422	\$24,728
2006	331	21,442	\$537,889	\$25,086
2007	348	21,906	\$560,149	\$25,571
Absolute Change 2000-2007	89	3,016	\$150,162	\$3,867
Percent Change 2000-2007	34.4%	16.0%	36.6%	17.8%

<sup>8</sup> The 2001 recession was officially designated by the National Bureau of Economic Research (U.S. Business Cycle Expansions and Contractions at <http://www.nber.org/cycles.html>), as occurring between March, 2001, and November, 2001, peak to trough.

<sup>9</sup> Ohio BLMI, Economic Development Profile of Quarterly Census of Employment and Wages, at <http://ohiolmi.com/asp/edeps/EdepsDisplay.asp>.

As another example (see below), in Franklin County, the **resilient** industry which manages companies and enterprises quickly recovered within two years of the end of the 2001 recession all establishments and employees lost to the 2001 economic contraction.

## Economic Development Profile of Quarterly Census of Employment and Wages Data<sup>10</sup>

Summary Profile For: Franklin County NAICS Code: <b>55111 - Management of companies and enterprises</b>				
Item Type	Number of Establishments	All Employees	Total Wages (in thousands)	Average Annual Wage
2000	177	12,898	\$907,945	\$70,392
2001	165	12,772	\$965,349	\$75,585
2002	161	13,597	\$1,148,348	\$84,459
2003	166	14,737	\$1,120,462	\$76,031
2004	183	15,425	\$1,237,302	\$80,215
2005	191	16,748	\$1,479,142	\$88,318
2006	199	17,258	\$1,598,324	\$92,612
2007	228	18,350	\$1,814,925	\$98,906
Absolute Change 2000-2007	51	5,452	\$906,980	\$28,514
Percent Change 2000-2007	28.8%	42.3%	99.9%	40.5%

In addition to industries resilient and impervious to economic recessions, skill training planners may choose to focus upon high technology industries; because of the significantly higher wages paid by the Ohio high tech industries relative to the average for all industries.<sup>11</sup> For an initial review of **high technology** industries as possible candidates for skill training, the Ohio BLMi offers the special research report, *High Technology and The Third Frontier* at <http://ohiolmi.com/research/archive.htm>.<sup>12</sup> Further, the economic development profiles, provided by the Ohio BLMi at <http://ohiolmi.com/asp/edepts/high.asp> enable developers to quickly sort and select high demand, high wage, and high technology industries.

<sup>10</sup> *Ibid.*

<sup>11</sup> Ohio BLMi, Ohio BLMi, *High Technology and the Third Frontier*, 2003, p. 3, at <http://ohiolmi.com/research/archive.htm>.

<sup>12</sup> *Ibid.*

After reviewing historical time series of industry employment, some analysts have applied various shift-share models to predict future industry employment levels, which can be problematic. The shift-share models commonly applied are the constant share, the constant regional rate model, the constant share of aggregate industry employment, the implicit shift share model, the modified implicit shift share, the classical shift share, and the fixed employment-to-population ratio. The shift share models require limited data about sub-state regional or state industry employment, local or state total employment, local or state population, national population, national industry employment, and total national employment. The specifications, strengths, and weaknesses of each of the shift-share models are discussed in detail, with examples of applications, in the basic primer about employment forecasts, called *Projecting State and Area Industry Employment*.<sup>13</sup> Its author, Professor Harvey Goldstein of the University of North Carolina at Chapel Hill, concluded that shift-share models should be used cautiously – “In summary, the accuracy of this class of models is not predictable. Their performance is unstable because of their simple assumptions about the forces driving state industry employment and their reliance upon very limited historical data. Very good analyst judgment is required to decide if any of these models’ assumptions will fit the particular case.”<sup>14</sup>

In contrast to shift/share models, input/output analyses are another class of economic models which have proven helpful to regional analysts in specifying the relationships between those industries producing final goods for consumers, and the industrial producers of intermediate goods as inputs into the production processes for other businesses. The Regional Input-Output Modeling System (RIMS II) of the U.S. Bureau of Economic Analysis is a noteworthy example of a regional input/output model (see <http://www.bea.gov/beat/regional/rims/>).<sup>15</sup> The case studies included in the user handbook regarding applications of the RIMS II for the construction and operation of a sports facility, the closing and converting of a military base, the operation of a new factory, the departure of the motor vehicle industry from a local area, and the economic impacts of the arrival of a new glass-containers manufacturing industry into a region all demonstrate the importance of the regional multiplier effects between final product and intermediate product industries in local economies.<sup>16</sup>

As an example of the importance of awareness about the input/output (or producer/supplier) relationships for regional industries, skill training planners may refer to the motor vehicles industry and its auto parts suppliers in southwest Ohio. In the Fall, 2006, Ohio State Profile, the Federal Deposit Insurance Corporation (FDIC) emphasized special economic opportunities for auto parts suppliers in southwestern Ohio: “In June, 2006, Honda Motor Company announced plans to build a \$550 million auto assembly plant in Decatur County, Indiana, which should bolster employment in the southwest Ohio manufacturing sector. This area of Ohio, hurt by layoffs in auto supplier companies,

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<sup>13</sup> Goldstein, Harvey, *Projecting State and Area Industry Employment*, 2005, at <http://ohiolmi.com/research/archive.htm>.

<sup>14</sup> *Ibid.*, p.45.

<sup>15</sup> Regional Input-Output Modeling System (RIMS II), U.S. Bureau of Economic Analysis (BEA), at <http://www.bea.gov/beat/regional/rims/>.

<sup>16</sup> *Regional Multipliers A User Handbook for the Regional Input-Output Modeling Systems (RIMS II)*, March, 1997, U.S. BEA, at <http://www.bea.gov/beat/regional/rims/>.

notably Delphi Corporation, has benefited from the construction of Honda and Toyota Motor Corporation assembly facilities in Ohio and northern Kentucky.”<sup>17</sup> Recently, Honda reported on plans to hire workers for its Decatur assembly plant only from the home county of the factory and its contiguous counties. Consequently, workforce development planners throughout southwest Ohio must focus upon the auto parts supply industry in order to take advantage of the massive Honda investments in nearby Indiana.

These planners can easily identify the specific employers in their local areas in the auto parts supply industry – or any other industry – through the Employer Locator at <http://www.acinet.org/acinet/employerlocator/employerlocator.asp>. This web-based, employer directory allows searches of the database by industry, occupation, location, or keyword. The same employer database may also be accessed through the disks of the ARC (Analyst Resource Center) Employer Database, with superior search criteria of company name, type of business by Standard Industrial Classification (SIC) code, city, zip code, county, state, or township, employment size of firm, geographic radius, or credit rating. The company profiles on disk include the North American Industry Classification System (NAICS) codes, as well. The ARC Employer Database on disks is available for workforce developers in the public and private, non-profit sectors without charge, when ordered through the Labor Market Information (LMI) Pro Suite products at <http://ohiolmi.com/jobs/ProSuiteProducts.htm>.

### **Occupational Analysis**

Another important type of analysis for skill training program investments is based upon the economic paradigm of production functions for industries and firms, and extends the prior analysis of industry input/output relationships to focus upon the inputs of labor and capital to produce the quantity of goods or services of businesses and industries, (i.e.,  $Q=f\{L,K\}$ , with the German  $K$  for capital inputs and an unspecified technology variable).

The labor inputs are refined into staffing patterns, which provide detailed industry/occupational employment profiles and critical insights into the production processes of individual firms and their respective industries. For instance, with a staffing pattern - available through the Ohio Workforce Informer at <http://ohioworkforceinformer.org>,<sup>18</sup> and the U.S. Bureau of Labor Statistics (BLS) at <http://data.bls.gov/oep/nioem/empiohm.jsp><sup>19</sup> - the total industry employment is allocated among all of the occupations represented in the industry in terms of number and percent, according to a standard occupational taxonomy with skill-based, functional job descriptions. As a result, labor market analysts can identify the critical labor inputs into the production process, both in terms of the skill requirements tied to the functional job descriptions and the order of magnitude of the number and percent of the occupational employment within the total industry employment.

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<sup>17</sup> Ohio State Profile, Federal Deposit Insurance Corporation (FDIC), Fall, 2006, FDIC State Profiles, at <http://www.fdic.gov/quicklinks/analysts.html>.

<sup>18</sup> Ohio BLMI, Ohio Workforce Informer, Occupation by Industry and Staffing Patterns, at <http://ohioworkforceinformer.org>.

<sup>19</sup> U.S. BLS, Industry Search, at <http://data.bls.gov/oep/nioem/empiohm.jsp>.

With skill training investments for economic development, such insights can be crucial. For instance, take the case of the hospital industry (NAICS 622) in Ohio, where registered nurses (RNs) compose more than 25% of the total industry employment and are projected by the Ohio BLMI and the U.S. BLS to increase their percentage of the hospital industry employment to 30% by 2014 in the state and the nation.<sup>20</sup> No other single, detailed occupational labor input into the production function for hospital medical services comes close to the magnitude of the RN labor input. As indicated by the staffing pattern, the hospital industry cannot produce its medical services without a sufficient supply of the critical RN labor input. The present technique of producing hospital medical services with capital and labor inputs requires the critical labor input of RNs. Skill training investments to produce more licensed registered nurses is one means of supporting the hospital industry, based on an understanding this industry's production function, staffing pattern, and current technology. The national BLS publication, *Career Guide to Industries*, provides excellent summaries for most industries and sectors about their respective economic outlook, technology, production inputs, and staffing patterns.<sup>21</sup>

These staffing patterns, when assembled for all industries, become an industry/occupational matrix of the entire economy, with industries as the column headings and occupations as the row headings. By transposing the industry/occupational (I/O) employment profiles (i.e., staffing patterns) into occupational/industry (O/I) employment distributions, labor market analysts can easily determine the industries of employment concentration for each occupation. In training program applications, these O/I profiles determine the range of industries that will be assisted by training for a specific occupation. As shown in the following table from the Occupational Supply Demand System (OSDS at <http://occsupplydemand.org>), based on the national O/I matrix, skill training for the occupation of licensed practical nurses (LPNs) will assist the nursing care facilities industry, hospitals, the offices of physicians, home health care services, and the employment services industry.<sup>22</sup>

Occupational Employment by Ind. (Top 5 Industries)				National				
SOC Code	Occupation	NAICS Code	Industry	Occupation Employment			Pct. of Total	
				2006	2016	Change	2006	2016
29-2061	Licensed Practical and Licensed Vocational Nurses	623100	Nursing care facilities	193,241	233,033	20.6%	25.8%	27.3%
29-2061		622100	General medical and surgical hospitals, public and private	175,018	159,223	-9.0%	23.4%	18.7%
29-2061		621100	Offices of physicians	92,067	104,391	13.4%	12.3%	12.2%
29-2061		621600	Home health care services	56,610	78,964	39.5%	7.6%	9.3%
29-2061		561300	Employment services	53,801	68,092	26.6%	7.2%	8.0%

<sup>20</sup> Ohio BLMI, *Research Documentation Identifying Regional Skill Shortages Dayton Metropolitan Statistical Area*, Ohio BLMI, 2007, p. 8, at <http://ohiolmi.com/research/research.htm>.

<sup>21</sup> U.S. BLS, *Career Guide to Industries* (CGI), 2006-07 edition, at <http://www.bls.gov/oco/cg/home.htm>.

<sup>22</sup> Occupational Supply/Demand System, at <http://occsupplydemand.org>, 2007, Georgia Career Information Center, Georgia State University.

Further, the Occupational Supply/Demand System includes a sorting option, in order to facilitate the quick identification of Ohio high demand/high wage/high skill (DWS) occupations for which skill training might be offered.<sup>23</sup> The complementary resource of the Ohio Skills Bank Data Tool (at <http://lmi.state.oh.us/asp/sb/SkillsBank.htm>) provides useful supply/demand information about occupational employment projections and training and licensing data by sub-state economic development regions and statewide.

### **Targeting Special Populations**

Among the different types of unemployment prevalent in Ohio, many persons without jobs who wish to work suffer from structural unemployment - that is, the skills they bring to the labor market are not the skills in demand by employers. Skill training for high demand occupations is the recommended remedy for this type of economic malady. The Ohio BLMI prepared statewide and sub-state (metropolitan statistical areas and economic development regions) industry and occupational employment projections to assist with the identification of the type and magnitude of job openings in high demand occupations.<sup>24</sup> In particular, the sections of these statewide, metropolitan area and economic development regional reports about “high employment prospects” at <http://ohiolmi.com/proj/OhioJobOutlook.htm> list state and local occupations with substantial numbers of total annual openings (due to both growth and replacement needs) that paid at least \$12 per hour in 2004.<sup>25</sup> These reports about long-term, projected job openings, 2004-2014, utilize the Standard Occupational Classification (SOC) coding system, which includes functional job descriptions and references to related tools and technologies and specific skill requirements in the O\*Net OnLine web site (at <http://online.onetcenter.org>). Furthermore, the Ohio BLMI adjusted for business cyclical effects in the *Ohio Short-Term Employment Forecast 3<sup>rd</sup> Quarter 2007 to 3<sup>rd</sup> Quarter 2009* for industry employment levels and occupational job openings.<sup>26</sup>

In addition to training for high demand, “high employment prospects,” many areas of the state may wish to target occupational skill shortages with workforce training. For instance, with dislocated workers who seek re-training, one of the primary concerns is to minimize the wage loss associated with a change of career or occupational focus. In order to reduce the wage loss as much as possible, skill training for dislocated workers needs to be targeted at occupational skill shortages in order to secure the highest economic returns for these training investments. The analysis of occupational skill shortages in local labor market areas requires a close review of both supply and demand-side forces in the labor market, as demonstrated in the 2007 Ohio BLMI report, *Identifying Regional Skill Shortages Dayton Metropolitan Statistical Area*, and *Research Documentation*, at <http://ohiolmi.com/research/research.htm>.<sup>27</sup>

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<sup>23</sup> *Ibid.*

<sup>24</sup> Ohio BLMI, *2014 Ohio Job Outlook*, at <http://ohiolmi.com/proj/OhioJobOutlook.htm>.

<sup>25</sup> *Ibid.*

<sup>26</sup> Ohio BLMI, *Ohio Short-Term Employment Forecast 3<sup>rd</sup> Quarter 2007 to 3<sup>rd</sup> Quarter 2009*, at <http://ohiolmi.com/proj/projections/ShortTermForecast.pdf>.

<sup>27</sup> Ohio BLMI, *Research Documentation Identifying Regional Skill Shortages Dayton Metropolitan Statistical Area*, 2007, at <http://ohiolmi.com/research/research.htm>.

This occupational skill shortage report analyzed sub-baccalaureate, high employment prospect occupations in the Dayton labor market area that paid above average wages for their respective educational and training stratum. In addition to the local high employment prospects model, the regional skill shortage report utilized 6 different planning tools that assessed job opportunities, i.e., the FY 2006 human resource accounting model of occupational employment projections and training and licensing data at the state and local levels; the occupational wage data over time, 2002-2006, statewide and locally, compared to the Cincinnati-Hamilton area Consumer Price Index (CPI) for the same time period, with wage data from the Occupational Employment Statistics (OES) surveys for Ohio and from the National Compensation Surveys (NCS) for the Dayton area; 2006 hard-to-fill job order statistics from the Ohio Job Matching System; keyword analysis of job orders and resumes from the 2004 America's Job Bank (AJB) transactions data; the 2006 Dayton area job vacancy survey; and the national analysis of the U.S. Bureau of Labor Statistics (BLS) about job opportunities and competition in the 2006-07 edition of the *Occupational Outlook Handbook (OOH)* and its statistical supplement entitled, *Occupational Projections and Training Data*.<sup>28</sup> The regional skill shortage report noted above employed the analytic technique of seeking multiple indicators from conceptually different economic models of the labor market that reached the same or similar conclusions about skill shortage or competitive occupational labor markets.

In addition to the attention to high employment prospect occupations and occupational skill shortages, long-term projections about the future size and make-up of the labor force and the forthcoming, sizeable increases in retirements may lead some regions to support projects that help critical industries develop skill training supplier programs and relationships with educational and training institutions for critical labor inputs, as a means to ensure a long-term supply of these necessary human resources. The rapidly increasing numbers of retirements of Ohio skilled workers were documented in the Ohio BLMI report titled, *Ohio's Graying Labor Force: Aging through 2016*, where analysts estimated that in excess of 1 million "baby boomers" (that is, 55-64 years old in 2016) will leave the labor force during the decade 2006-2016.<sup>29</sup>

From the perspective of production functions with capital and labor inputs, it is interesting to contrast the personnel policies of many businesses with the standard practice among corporate purchasing agents to develop long-term, contractual working relationships with suppliers of capital inputs to the production process. In light of the forthcoming, across-the-board increases in the rates of retirements, some local areas may wish to use training resources to help human resource departments of important businesses and industries develop close supplier relationships with local educational and training institutions for critical labor inputs and skills – in a manner analogous to the close supplier relationships for capital inputs established by purchasing departments.

Other, special challenges in the labor market needing attention may be related to geography. As an example, the Ohio Appalachian Region covers 29 Ohio counties,

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<sup>28</sup> *Ibid.*

<sup>29</sup> Ohio BLMI, *Ohio's Graying Labor Force: Aging through 2016*, p. 13, at <http://ohiolmi.com/research/research.htm>.

primarily in Southeastern Ohio and along the Ohio River. Relative to the major metropolitan areas of the state, the Ohio Appalachian Region is sparsely populated with smaller labor forces. This situation can create data and information gaps which make it difficult for local areas to rigorously analyze labor market conditions. As a response to the information needs of this region, the Ohio Department of Development and the Ohio BLM I created a profile of the entire sub-state, Ohio Appalachia area, with complete demographic and labor market information (see Ohio County Profiles, Appalachia County Profile, at <http://www.odod.state.oh.us/research/files/s0.htm>).<sup>30</sup> In addition, the Ohio BLM I added the Ohio Appalachian Region as a sub-state data area within the Occupational Supply/Demand System (OSDS) at <http://occsupplydemand.org>.<sup>31</sup>

### **Impact Evaluations**

Workforce development analysts may develop both *ex ante* and *ex post* impact evaluations with tools at their disposal for little cost. The *ex ante* impact evaluations rely upon the input/output models such as RIMS II to anticipate the regional impacts of economic development projects that may involve skill training.<sup>32</sup> The *ex post* impact evaluations involve the use of wage records from employers and comparison groups to gain an accurate understanding of the magnitude of the net increases in wages of participants resulting from the skill training. Many wage record impact evaluations utilize training program “completers” as the treatment group, with training program “leavers” as the comparison group. For an example of this type of *ex post* evaluation model, please see the *Monthly Labor Review* article of the Ohio BLM I entitled, “Using wage records in workforce investments in Ohio.”<sup>33</sup>

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<sup>30</sup> Ohio Department of Development (ODOD) and Ohio BLM I, ODOD Office of Strategic Research, Ohio County Profiles, Appalachia County Profile, at <http://www.odod.state.oh.us/research/files/s0.htm>.

<sup>31</sup> Occupational Supply/Demand System, at <http://occsupplydemand.org>, 2007, Georgia Career Information Center, Georgia State University.

<sup>32</sup> U.S. Bureau of Economic Analysis, *Regional Multipliers A User Handbook for the Regional Input-Output Modeling System (RIMS II)*, Third Edition, March, 1997, at <http://www.bea.gov/region/rims>.

<sup>33</sup> Schaff, Gordon, and Shaw, “Using wage records in workforce investments in Ohio,” in May, 2004, *Monthly Labor Review*, pp. 40-44, U.S. BLS, at <http://ohiolmi.com/research/archive.htm>.