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# Strategic Employment Growth in Wisconsin

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# Executive Summary

This report, prepared for Competitive Wisconsin's BE BOLD 3 initiative, identifies 10 sectors that should have strong Wisconsin employment growth into 2020. These sectors, based on the North American Industry Classification System, represent 36% of Wisconsin's jobs. We judge these 10 economic sectors to be the greatest contributors to past and future employment growth for Wisconsin. The 10 sectors are:

- Insurance Carriers and Related Activities
- Professional, Scientific, and Technical Services
- Management of Companies and Enterprises
- Administrative and Support Services
- Ambulatory and Health Care Services
- Hospitals
- Nursing and Residential Care Facilities
- Social Assistance
- Amusement, Gambling, and Recreation Industries
- Food Services and Drinking Places

The sectors identified fall into three clusters: (1) management and professional services to business; (2) health care and social services; and (3) leisure and recreation services. The sectors we identify highlight one strong theme: All are service sectors. The list does not include manufacturing, dairy, or other food-related industries, which have been traditionally strong employment sectors in Wisconsin.

We are well aware these results may be somewhat controversial, but all 10 sectors had strong employment growth from 1997 to 2012, and the data show we can expect continued growth in these areas into 2020. The data and wide range of statistical methods on which we relied clearly and consistently pointed in this direction.

We recommend that Wisconsin policymakers acknowledge the shift of employment in our state economy toward service sectors.

To identify the industries and sectors that are doing well, we created six indices to identify what turned out to be a remarkably consistent set of 10 sectors based on the North American Industry Classification System. Our first index is an equally weighted average of annual job growth for 1997-2012 and projected average annual growth 2010-2020. The second method normalizes these variables, and it adds normalized 2012 average annual wages and the 2012 location quotient variable. We also computed other indices that served as robustness tests and used varying measures and weighting mechanisms.

The results of all of these measures and indices were remarkably similar, with the 10 sectors we identify rising to the top, or very near the top. The sectors and identified subsectors cover a wide range of occupations, many of which involve higher wage jobs. The type of job creation the state of Wisconsin will ultimately target is a policy decision; however, because of the potential outmigration of young and highly educated Wisconsin workers, we note the higher paying jobs that are most likely to retain these workers.

# I. Introduction

This report, prepared for Competitive Wisconsin's BE BOLD 3 initiative, employs a range of methods to identify a set of economic sectors that we believe have provided and will continue to provide the greatest potential for employment growth for Wisconsin. Competitive Wisconsin identified the goals for this report in a series of power points and memoranda describing BE BOLD 3, the third in a series of Competitive Wisconsin initiatives to devise strategies that identify opportunities to strengthen Wisconsin's economy. Specifically, the University of Wisconsin tasks were: "Task: Identify industries/sectors that are doing well in Wisconsin. Task: Analyze data to identify 5 or 6 industries/sectors that are doing well and explain why they are doing well in Wisconsin." To do this, Competitive Wisconsin indicated the data to be used would include: "recent job growth; recent wealth creation; future growth potential; and related growth."[1]

This report identifies the sectors as requested. We use six indices to identify what turn out to be a remarkably consistent set of 10 sectors based on the North American Industry Classification System (NAICS), the standard federal statistical agencies use to classify business establishments. Of the four sets of data Competitive Wisconsin suggested, we rely on the first three: (1) actual job growth from 1997 to 2012;[2] (2) projected job growth from 2010 to 2020 as prepared by the Wisconsin Department of Workforce Development (DWD); and (3) average sector wages and growth in wages. The actual and projected job growth data are the most recent available. Finally, we employ the location quotient that measures Wisconsin's competitiveness relative to other states; the location quotient is defined as the percentage of employment in a sector relative to the nation as a whole. This measure enables comparison of the proportion of workers in a certain sector in Wisconsin verses the proportion of workers in that same sector across the country. Any industry with a location quotient over 1 can be thought of as having a tendency to locate in Wisconsin, hence offering a competitive advantage for Wisconsin.[3]

Because of the emphasis on jobs in the BE BOLD 3 tasking statements, the first index we create is an equally weighted average of past annual job growth (1997–2012) and projected average annual growth (2010–2020). The second method normalizes these variables, and adds normalized 2012 average annual wages and the 2012 location quotient variable. For that index, each component is given an equal (25%) weight. Other combinations and varying measurements, such as unit and percent changes or rankings, are used in the robustness tests contained in Appendix A.

The results of all of these measures and indices are remarkably similar, with the 10 sectors we identify rising to the top, or very near the top, using each of the six methods.[4] The sectors and identified subsectors cover a wide range of occupations, which we discuss with emphasis on higher wage jobs. Although the type of job creation the state will target is a policy decision,

[1] Competitive Wisconsin, *BE BOLD 3* slides 2 and 3.
[2] We first analyzed growth from 1997 to 2007 and then 2002 to 2012 to capture effects of the recession, but the results were almost identical, so we simplified the measurement to incorporate the entire 15-year period.
[3] Rob Sentz, "Understanding Location Quotient," EMSI, October 14, 2011, http://www.economicmodeling.com/2011/10/14/understanding-location-quotient-2/
[4] An additional sector, Support Activities to Transportation (NAICS No. 488) was also rated very high but was eliminated because it was very, very small in terms of current and future employment.

because of the potential outmigration of young and highly educated workers to other states, we note the higher paying jobs among these high employment growth sectors.[5] Lopez and Scholz study net migration patterns of educated individuals (bachelor's or higher). They find that: (a) 22- to 30-year-olds leave for Chicago and Minneapolis, (b) Milwaukee does not have the same pull factor from Illinois and Minnesota, and (c) Wisconsin actually brings in a net in-migration of educated 30- to 49-year-olds. They state (p. 2): "Wisconsin was a net exporter of its educated 22- to 30-year-old population to Illinois and Minnesota, with an apparent trend of more people going to Minnesota and roughly constant for emigration {sic} to Illinois."

The sectors identified fall into three clusters: (1) management and professional services to business; (2) health care and social services; and (3) leisure and recreation services. As is apparent, our recommended strategic sectors carry one strong theme—all are service sectors rather than Wisconsin's traditional sectors of manufacturing, dairy, and other food-related industries. We are well aware these results may be somewhat controversial, but the data we rely on clearly and consistently point in this direction.

We also acknowledge that other methods can produce other justifiable results. For example, a 2013 report by MPI Group Inc.—sponsored by the Wisconsin Economic Development Corporation and others—relies more heavily on sectoral changes in productivity, which will usually be inversely related to job growth. Productivity for a particular sector is defined as output per employed worker. If productivity is increasing in a sector, output per worker is rising. It follows that a sector that experiences rapid increases in labor productivity is able to increase output with minimal expansion in employment.

As MPI writes: "For each 4-digit industry, a diverse set of 12 variables is used to characterize the individual industry. Each of the variables is an indicator of the past or present economic performance of the industry and represented in two groups: measures of competiveness (including productivity) and measures of export orientation and regional centrality (including output location quotient)."[6] The results of that analysis are understandably very different than those reported here; our emphasis is on jobs, wages, and geographic employment competitiveness. "All but one driver industry identified by the *Wisconsin Economic Future Study* is within manufacturing," MPI notes.[7] We see these and other methods as complementary to our analysis as tasked by BE BOLD 3. In combination, they provide a range of findings that should inform policymakers throughout Wisconsin.

This report proceeds as follows. Section II is the main analysis of sectors, describing data, methods, and results by industrial sector and clusters. We primarily use three-digit NAICS codes for the analysis, but also include a description of subsectors (four-digit codes) for the 10 sectors we identify. The codes group similar economic sectors. For example, codes 600–999 represent a set of service industries ranging from Educational Services to Hospitals to Social Assistance

[5] See Yeri Lopez and John Karl Scholz, "Migration To and From Wisconsin" (La Follette School of Public Affairs Working Paper No. 2007-007, University of Wisconsin–Madison, 2007). http://www.lafollette.wisc.edu/images/publications/workingpapers/scholz2007-007.pdf.
[6] MPI Group Inc., *Wisconsin Economic Future Study: Statewide and Regional Analysis* (June 2013), 2. See http://inwisconsin.com/economicfuturestudy/.
[7] Ibid., 1.

Services. Section III discusses the main occupations associated with the sectors. Appendix A describes and presents results of different methods of identifying high-growth sectors for robustness purposes. Appendix B describes data and sources. Appendix C describes the methods that the DWD uses to make job projections. Appendix D provides detailed data and descriptions of the 10 sectors that should have strong employment growth into 2020. Appendix E describes DWD's long-term occupation projections methodology. Appendix F contains tables showing education breakdown of selected high-growth industries (Table F1), projected occupation employment change by cluster (Table F2), and projected employment change by occupation (Table F3).

## II. Identifying High Employment Growth Sectors in the Wisconsin Economy

In this section, we describe our strategy for identifying those sectors in the Wisconsin economy that stand out as high potential employment growth sectors. Our strategy combines evidence on actual sector employment growth in recent years and on sector growth projections by the DWD (and the U.S. Department of Labor). Use of data on past performance presumes the structure of demands leading to rapid employment growth in the recent past will be operative in future years. Use of the projections directly addresses expected patterns of future growth. We also make use of data on the average wage and the Wisconsin location quotient, indicating how competitive the sector is in Wisconsin relative to the rest of the nation.

We first identify the 15 highest sectors in terms of potential growth (using the past actual and projected growth patterns), and then group closely related sectors among these 15 into clusters that appear to have high expected levels and rates of employment growth. For example, we identify hospitals, nursing, and ambulatory care as three high-growth sectors that compose a health-care cluster. We test the robustness of our high-growth cluster choice by estimating other methods for identifying these clusters. In this analysis, we also make use of the wealth generation characteristics of sectors (measured by the average annual wage) and of the propensity of sectors to locate in Wisconsin (measured by the location quotient).

### A. Actual Sectoral Employment Growth Patterns (1997–2012)

As a first step, we assemble data from the U.S. Bureau of Labor Statistics on actual employment growth patterns for 1997–2012 for 98 sectors. Our procedures for compiling these data are described in Appendix B. For each sector, we calculate:

(1) the change in the absolute number of actual employed workers,[8]
(2) the percent change in total actual employment,[9] and
(3) the average annual percent rate of employment growth (decline).[10]

### B. Projected Sectoral Employment Growth Patterns (2010–2020)

In a second step, we calculate analogous absolute change, percent change, and annual growth rate values describing DWD projected growth patterns over the 2010–2020 period. These statistics are calculated for the 54 sectors (out of the 98 sectors) for which we have 2010–2020

[8] [(2012 actual employment – 1997 actual employment)$_i$]
[9] {[(2012 actual employment – 1997 actual employment)$_i$] / 1997$_i$ actual employment}
[10] {[(2012 actual employment/1997 actual employment)$_i$]^[1/(15 years)] – 1}

projections. Our procedures for creating these data are described in Appendix C.[11] In particular, for each sector, we calculate:

(1) the absolute change in projected employment growth,[12]
(2) the percent change in total projected employment,[13] and
(3) the average annual percent rate of employment growth (decline).[14]

## C. Average Annual Employment Growth Rate Index

For our first base case, we rely on the average annual employment growth rate measure for each sector (98 sectors in the 1997–2012 actual estimate; 54 sectors in the 2010–2020 projected estimate). We then use these annual employment growth rates—one set describing patterns of actual growth (1997–2012) and the other set describing patterns of projected growth (2010–2020)—to rank 54 sectors in terms of our Average Annual Employment Growth Index.

As a first step in identifying the 10 sectors with the highest employment annual growth rates, we first rank all of the 98 sectors by the value of their *actual* average annual employment growth rate for 1997–2012. We then rank the 54 sectors with available *projected* employment growth for 2010–2020 by the same growth indicator, the value of their *projected* average annual employment growth rate. We identify the top 10 sectors in each of the rankings—one for actual employment growth for 1997–2012 period and a second for projected employment growth for 2010–2020 period.

Table 1 identifies the actual employment growth and annual growth rates for actual and projected growth. The Average Annual Employment Growth Rate Index shown in the last column is a simple average of the actual and projected annual growth rates.[15] The sectors are ordered from the highest index rating to the lowest. After eliminating the sector Support Activities for Transportation because it employed fewer than 5,500 workers in 2012, we retain the 10 yellow shaded sectors as those with the highest past and future growth rates. These top sectors are concentrated in the 400, 500, 600, and 700 NAICS sectors.

Among the 54 sectors, 22 have a negative growth rate index. Nineteen sectors have a growth index of zero to 1%. Each of our top 10 sectors has a growth rate index of greater than 1% per year. In terms of our Average Annual Employment Growth Index, the highest growth rate index among our 10 sectors is for the Management of Companies and Enterprises sector. With an average annual growth rate of 2.4%, this sector is expected to produce the most jobs through 2020. Two sectors have the lowest growth rate of 1% per year.

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[11] As noted in Appendix C, the DWD procedure used to create these projections relies on a variety of statistical methods, including ordinary least squares regression and a shift-share model.
[12] [(2020 projected employment – 2010 actual employment)$_i$]
[13] {[(2020 projected employment – 2010 actual employment)$_i$] / 2010 actual employment}
[14] {[(2020 actual employment/2010 actual employment)$_i$]^[1/(10 years)] – 1}
[15] This single ranking is obtained by imposing the following criteria on the ranking of the sectors: (0.5 x annual actual growth rate from 1997–2012) + (0.5 x annual projected growth rate from 2010–2020).

## Table 1: Average Annual Employment Growth Rate Index

Average Annual Employment Growth Rate Index (AAEGRI) = (0.5)(1997-2012 Average Annual Employment Growth Rate) + (0.5)(2010-2020 Average Projected Annual Employment Growth Rate). The yellow indicate the 10 sectors with the highest past and future growth rates

| NAICS Code | Code Description | 1997 Employ-ment | 2012 Employment | 1997–2012 Average Annual Employment Growth Rate | 2010 Employment | 2020 Projected Employment | 2010–20 Ave. Projected Annual Employment Growth Rate | 2012 Average Wage | AAEGRI |
|---|---|---|---|---|---|---|---|---|---|
| 551 | Management of Companies and Enterprises | 29,424 | 52,752 | 4.0% | 46,990 | 53,180 | 0.8% | $86,642 | 2.4% |
| 488 | Support Activities for Transportation | 4,000 | 5,478 | 2.1% | 5,360 | 7,580 | 2.3% | $43,212 | 2.2% |
| 624 | Social Assistance | 38,208 | 64,395 | 3.5% | 62,300 | 66,030 | 0.4% | $28,061 | 2.0% |
| 622 | Hospitals | 90,294 | 123,749 | 2.1% | 118,870 | 144,140 | 1.3% | $52,217 | 1.7% |
| 621 | Ambulatory Health-Care Services | 86,127 | 116,557 | 2.0% | 108,870 | 133,640 | 1.4% | $51,910 | 1.7% |
| 561 | Administrative and Support Services | 110,528 | 134,291 | 1.3% | 123,740 | 156,550 | 1.6% | $29,025 | 1.4% |
| 623 | Nursing and Residential Care Facilities | 69,087 | 84,674 | 1.4% | 76,850 | 96,070 | 1.5% | $31,681 | 1.4% |
| 524 | Insurance Carriers and Related Activities | 49,028 | 63,538 | 1.7% | 69,600 | 81,470 | 1.1% | $80,187 | 1.4% |
| 541 | Professional, Scientific, and Technical Services | 84,847 | 98,652 | 1.0% | 93,070 | 116,750 | 1.5% | $61,359 | 1.3% |
| 722 | Food Services and Drinking Places | 163,321 | 190,177 | 1.0% | 186,280 | 229,510 | 1.4% | $15,156 | 1.2% |
| 713 | Amusement, Gambling, and Recreation Industries | 27,179 | 33,900 | 1.5% | 25,360 | 27,600 | 0.6% | $23,386 | 1.0% |
| 562 | Waste Management and Remediation Services | 5,079 | 5,663 | 0.7% | 5,290 | 6,180 | 1.0% | $39,669 | 0.9% |
| 813 | Religious, Grant-making, Civic, Professional, and Similar Organizations | 25,621 | 29,246 | 0.9% | 91,100 | 102,240 | 0.8% | $41,520 | 0.8% |
| 423 | Merchant Wholesalers, Durable Goods | 59,529 | 64,566 | 0.5% | 61,370 | 70,510 | 0.9% | $39,128 | 0.7% |
| 452 | General Merchandise Stores | 57,308 | 62,212 | 0.5% | 61,050 | 68,250 | 0.7% | $18,827 | 0.6% |
| 721 | Accommodation | 29,056 | 30,132 | 0.2% | 29,560 | 34,250 | 1.0% | $19,919 | 0.6% |
| 522 | Credit Intermediation and Related Activities | 47,139 | 50,470 | 0.5% | 52,240 | 58,330 | 0.7% | $57,311 | 0.6% |
| 712 | Museums, Historical Sites, and Similar Institutions | 2,011 | 2,072 | 0.2% | 1,750 | 2,020 | 1.0% | $36,792 | 0.6% |
| 485 | Transit and Ground Passenger Transportation | 15,020 | 15,435 | 0.2% | 14,070 | 15,500 | 0.6% | $26,770 | 0.4% |
| 448 | Clothing and Clothing Accessories Stores | 18,221 | 18,687 | 0.2% | 19,330 | 21,240 | 0.6% | $16,335 | 0.4% |
| 238 | Specialty Trade Contractors | 69,926 | 59,348 | -1.1% | 59,880 | 79,060 | 1.9% | $43,392 | 0.4% |
| 517 | Telecommunications | 11,714 | 12,002 | 0.2% | 13,010 | 14,130 | 0.6% | $57,104 | 0.4% |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | 11,702 | 11,521 | -0.1% | 11,730 | 13,250 | 0.8% | $16,915 | 0.4% |
| 812 | Personal and Laundry Services | 25,378 | 26,062 | 0.2% | 25,900 | 27,740 | 0.5% | $37,701 | 0.3% |
| 332 | Fabricated Metal Product Manufacturing | 76,075 | 72,232 | -0.3% | 63,730 | 72,800 | 0.9% | $48,378 | 0.3% |
| 446 | Health and Personal Care Stores | 15,109 | 15,896 | 0.3% | 15,890 | 16,350 | 0.2% | $32,794 | 0.3% |
| 443 | Electronics and Appliance Stores | 8,052 | 8,249 | 0.2% | 9,310 | 9,680 | 0.3% | $32,406 | 0.2% |
| 811 | Repair and Maintenance | 21,850 | 20,982 | -0.3% | 20,310 | 22,390 | 0.7% | $44,347 | 0.2% |
| 444 | Building Material and Garden Equipment and Supplies Dealers | 26,538 | 24,727 | -0.5% | 24,750 | 28,020 | 0.8% | $25,879 | 0.2% |
| 441 | Motor Vehicle and Parts Dealers | 36,515 | 35,403 | -0.2% | 32,920 | 35,370 | 0.5% | $36,928 | 0.1% |
| 311 | Food Manufacturing | 62,202 | 62,239 | 0.0% | 59,930 | 61,910 | 0.2% | $42,875 | 0.1% |
| 531 | Real Estate | 20,034 | 17,851 | -0.8% | 17,210 | 19,270 | 0.8% | $33,023 | 0.0% |
| 326 | Plastics and Rubber Products Manufacturing | 32,603 | 29,298 | -0.7% | 27,920 | 30,900 | 0.7% | $45,893 | 0.0% |
| 337 | Furniture and Related Product Manufacturing | 17,084 | 14,527 | -1.1% | 14,850 | 16,880 | 0.9% | $41,396 | -0.1% |
| 327 | Nonmetallic Mineral Product Manufacturing | 10,512 | 8,370 | -1.5% | 8,500 | 10,060 | 1.1% | $46,078 | -0.2% |
| 511 | Publishing Industries (except Internet) | 20,278 | 18,227 | -0.7% | 17,300 | 17,980 | 0.3% | $61,804 | -0.2% |
| 312 | Beverage and Tobacco Product Manufacturing | 3,345 | 2,824 | -1.1% | 2,910 | 3,080 | 0.4% | $39,937 | -0.4% |
| 532 | Rental and Leasing Services | 8,803 | 6,608 | -1.9% | 7,030 | 8,030 | 0.9% | $32,693 | -0.5% |
| 331 | Primary Metal Manufacturing | 24,766 | 17,625 | -2.2% | 15,280 | 18,340 | 1.2% | $53,404 | -0.5% |
| 447 | Gasoline Stations | 24,154 | 22,883 | -0.4% | 22,600 | 20,450 | -0.7% | $16,862 | -0.5% |
| 711 | Performing Arts, Spectator Sports, and Related Industries | 10,402 | 7,463 | -2.2% | 7,350 | 8,720 | 1.1% | $65,717 | -0.5% |
| 454 | Non-store Retailers | 24,212 | 19,538 | -1.4% | 20,470 | 21,610 | 0.4% | $34,806 | -0.5% |
| 512 | Motion Picture and Sound Recording Industries | 3,763 | 3,342 | -0.8% | 3,690 | 3,440 | -0.5% | $17,945 | -0.6% |
| 492 | Couriers and Messengers | 9,485 | 8,307 | -0.9% | 8,310 | 7,430 | -0.7% | $37,869 | -0.8% |
| 333 | Machinery Manufacturing | 91,427 | 66,531 | -2.1% | 58,970 | 59,890 | 0.1% | $60,235 | -1.0% |
| 336 | Transportation Equipment Manufacturing | 37,969 | 26,484 | -2.4% | 25,640 | 26,030 | 0.1% | $60,071 | -1.1% |
| 323 | Printing and Related Support Activities | 36,985 | 28,968 | -1.6% | 28,490 | 25,590 | -0.7% | $45,212 | -1.2% |
| 481 | Air Transportation | 3,574 | 2,237 | -3.1% | 2,490 | 2,510 | 0.1% | $44,216 | -1.5% |
| 322 | Paper Manufacturing | 50,945 | 30,797 | -3.3% | 31,770 | 32,830 | 0.2% | $60,320 | -1.5% |
| 339 | Miscellaneous Manufacturing | 20,114 | 13,765 | -2.5% | 13,460 | 12,140 | -0.7% | $46,127 | -1.6% |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | 33,973 | 22,468 | -2.7% | 20,970 | 18,040 | -1.0% | $65,353 | -1.9% |
| 314 | Textile Product Mills | 2,793 | 1,575 | -3.7% | 1,490 | 1,300 | -0.9% | $29,487 | -2.3% |
| 315 | Apparel Manufacturing | 3,942 | 839 | -9.8% | 810 | 780 | -0.3% | $29,977 | -5.0% |
| 316 | Leather and Allied Product Manufacturing | 5,281 | 1,172 | -9.5% | 1,100 | 840 | -1.8% | $37,940 | -5.7% |

## D. Competitive Growth Rate Index

For our second base case, we also rely on the average annual employment growth rate measures for each sector (98 sectors in the 1997–2012 actual estimate; 54 sectors in the 2010–2020 projected estimate). Following other studies seeking to identify sectors with high potential growth, we supplement these sector-specific employment growth rate estimates with sector-specific measures of "wealth creation" and "competitive advantage."[16] For wealth creation, we use the 2012 average annual wages in that sector. For competitive advantage, we use the 2012 location quotient, indicating the extent to which production in each sector is concentrated in Wisconsin relative to its concentration in the rest of the nation.

We then identify the 10 top ranked sectors using this method, and compare these sectors with the 10 sectors that we have identified in our first base case estimate.

In calculating this Competitive Growth Rate Index, we assign equal weight to: (1) the average wage (relative to the overall average wage) in 2012, (2) the location quotient in 2012, (3) the *actual* annual employment growth rate from 1997–2012, and (4) the *projected* annual growth rate from 2010–2020. Because of different metrics for these variables, each of the four variables is normalized around its mean and the normalized values are then given equal weight. This formula is applied to each detailed sector, and then the sectors are ranked.[17] We present the critical variables and this ranking in Table 2.

The Competitive Growth Rate Index across all 54 of the sectors ranges from +3.17 to -4.29. The 10 sectors that we identified in our first base case estimate are in the top 14 in this four-variable growth rate index. These sectors are highlighted in Table 2. The other four sectors that are included in the top 14 are Support Activities for Transportation (488), Fabricated Metal Product Manufacturing (332), Merchant Wholesalers-Durable Goods (423), and Credit Intermediation and Related Activities (522). Because of its small size, we eliminate Support Activities for Transportation. In the ranking for our first base case estimate shown in Table 1, which is based on the Average Annual Employment Growth Rate Index, the three sectors not included in our list of 10 sectors rank 25, 14, and 17, respectively.

We interpret this ranking as supportive of the first base estimate. Hence, in Table 2 we shade in the top 10 sectors as ranked by the first base estimate.

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[16] For example, the EMSI report for Oklahoma used three criteria—wealth generation, growth potential (past trends and projections), and competitive advantage—to identify the high potential sectors for Oklahoma on which it concentrated. (See Joshua Wright, "Oklahoma Establishes Statewide Economic Development Strategy after In-Depth Data Analysis," EMSI, March 14, 2013, http://www.economicmodeling.com/2013/03/14/oklahoma-establishes-statewide-economic-development-strategy-after-in-depth-data-analysis/.) Oklahoma Department of Commerce analysts used the EMSI database to perform the analysis, which they started by analyzing 72 variables across 669 industries, reflecting the use of the five-digit NAICS level sector identifiers. The analysts then identified five clusters of industries, namely aerospace and defense; energy; agriculture and bioscience; information and financial services; and transportation and distribution. The analysts then "balanced three factors: 1. Wealth generation (sales revenue, export share, and wages); 2. Growth potential (new markets, industry trends, and number of establishments); and 3. Competitive advantage (location quotient, physical assets, workforce)" in identifying their clusters of sectors.

[17] The ranking based on the Competitive Growth Rate Index is obtained by imposing the following criterion: Index = 0.25 x normalized average annual employment growth rate for 1997–2012 + 0.25 x normalized projected annual employment growth rate for 2010–2020 + 0.25 x normalized location quotient in 2012 + 0.25 x normalized weighted average wage (relative to the average weighted average wage) in 2012. This index is calculated for each sector of the 54 sectors for which we have employment projections.

## Table 2: Competitive Growth Rate Index

Competitive Growth Rate Index (CGRI) = (0.25)(1997–2012 normalized Average Annual Employment Growth Rate) + (0.25)(2010–2020 normalized Projected Annual Employment Growth Rate) + (0.25)(2012 normalized Average Wage) + (0.25)(2012 normalized Location Quotient)

| NAICS Code | Code Description | 1997-2012 Average Annual Employment Growth Rate | 2010-2020 Projected Annual Employment Growth Rate | 2012 Average Wage | 2012 Location Quotient | CGRI |
|---|---|---|---|---|---|---|
| 551 | Management of Companies and Enterprises | 4.0% | 1.2% | $86,642 | 1.29 | 3.17 |
| 622 | Hospitals | 2.1% | 1.9% | $52,217 | 1.00 | 2.88 |
| 621 | Ambulatory Health Care Services | 2.0% | 2.1% | $51,910 | 0.89 | 2.78 |
| 524 | Insurance Carriers and Related Activities | 1.7% | 1.6% | $80,187 | 1.50 | 2.49 |
| 541 | Professional, Scientific, and Technical Services | 1.0% | 2.3% | $61,359 | 0.60 | 2.35 |
| 624 | Social Assistance | 3.5% | 0.6% | $28,061 | 1.12 | 2.25 |
| 561 | Administrative and Support Services | 1.3% | 2.4% | $29,025 | 0.86 | 2.18 |
| 488 | Support Activities for Transportation | 2.1% | 3.5% | $43,212 | 0.41 | 2.10 |
| 623 | Nursing and Residential Care Facilities | 1.4% | 2.3% | $31,681 | 1.22 | 2.04 |
| 722 | Food Services and Drinking Places | 1.0% | 2.1% | $15,156 | 0.93 | 1.81 |
| 332 | Fabricated Metal Product Manufacturing | -0.3% | 1.3% | $48,378 | 2.51 | 1.51 |
| 423 | Merchant Wholesalers, Durable Goods | 0.5% | 1.4% | $39,128 | 1.12 | 1.38 |
| 522 | Credit Intermediation and Related Activities | 0.5% | 1.1% | $57,311 | 0.95 | 1.28 |
| 713 | Amusement, Gambling, and Recreation Industries | 1.5% | 0.9% | $23,386 | 0.96 | 1.26 |
| 813 | Religious, Grant-making, Civic, Professional, and Similar Organizations | 0.9% | 1.2% | $41,520 | 1.06 | 1.20 |
| 311 | Food Manufacturing | 0.0% | 0.3% | $42,875 | 2.08 | 1.10 |
| 238 | Specialty Trade Contractors | -1.1% | 2.8% | $43,392 | 0.83 | 1.07 |
| 452 | General Merchandise Stores | 0.5% | 1.1% | $18,827 | 0.97 | 1.02 |
| 562 | Waste Management and Remediation Services | 0.7% | 1.6% | $39,669 | 0.68 | 0.99 |
| 721 | Accommodation | 0.2% | 1.5% | $19,919 | 0.78 | 0.85 |
| 326 | Plastics and Rubber Products Manufacturing | -0.7% | 1.0% | $45,893 | 2.22 | 0.81 |
| 485 | Transit and Ground Passenger Transportation | 0.2% | 1.0% | $26,770 | 1.11 | 0.72 |
| 812 | Personal and Laundry Services | 0.2% | 0.7% | $37,701 | 0.97 | 0.70 |
| 712 | Museums, Historical Sites, and Similar Institutions | 0.2% | 1.4% | $36,792 | 0.45 | 0.65 |
| 333 | Machinery Manufacturing | -2.1% | 0.2% | $60,235 | 2.96 | 0.63 |
| 441 | Motor Vehicle and Parts Dealers | -0.2% | 0.7% | $36,928 | 1.00 | 0.62 |
| 517 | Telecommunications | 0.2% | 0.8% | $57,104 | 0.69 | 0.61 |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | -0.1% | 1.2% | $16,915 | 0.96 | 0.61 |
| 448 | Clothing and Clothing Accessories Stores | 0.2% | 0.9% | $16,335 | 0.66 | 0.58 |
| 811 | Repair and Maintenance | -0.3% | 1.0% | $44,347 | 0.86 | 0.56 |
| 444 | Building Material and Garden Equipment and Supplies Dealers | -0.5% | 1.2% | $25,879 | 1.04 | 0.56 |
| 337 | Furniture and Related Product Manufacturing | -1.1% | 1.3% | $41,396 | 2.02 | 0.56 |
| 446 | Health and Personal Care Stores | 0.3% | 0.3% | $32,794 | 0.78 | 0.52 |
| 443 | Electronics and Appliance Stores | 0.2% | 0.4% | $32,406 | 0.79 | 0.43 |
| 331 | Primary Metal Manufacturing | -2.2% | 1.8% | $53,404 | 2.15 | 0.33 |
| 511 | Publishing Industries (except Internet) | -0.7% | 0.4% | $61,804 | 1.21 | 0.33 |
| 531 | Real Estate | -0.8% | 1.1% | $33,023 | 0.60 | 0.28 |
| 327 | Nonmetallic Mineral Product Manufacturing | -1.5% | 1.7% | $46,078 | 1.12 | 0.24 |
| 454 | Nonstore Retailers | -1.4% | 0.5% | $34,806 | 2.16 | 0.23 |
| 322 | Paper Manufacturing | -3.3% | 0.3% | $60,320 | 3.97 | 0.05 |
| 323 | Printing and Related Support Activities | -1.6% | -1.1% | $45,212 | 3.06 | 0.00 |
| 447 | Gasoline Stations | -0.4% | -1.0% | $16,862 | 1.33 | -0.05 |
| 711 | Performing Arts, Spectator Sports, and Related Industries | -2.2% | 1.7% | $65,717 | 0.87 | -0.08 |
| 312 | Beverage and Tobacco Product Manufacturing | -1.1% | 0.6% | $39,937 | 0.72 | -0.09 |
| 532 | Rental and Leasing Services | -1.9% | 1.3% | $32,693 | 0.64 | -0.18 |
| 512 | Motion Picture and Sound Recording Industries | -0.8% | -0.7% | $17,945 | 0.44 | -0.42 |
| 336 | Transportation Equipment Manufacturing | -2.4% | 0.2% | $60,071 | 0.86 | -0.44 |
| 492 | Couriers and Messengers | -0.9% | -1.1% | $37,869 | 0.77 | -0.46 |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | -2.7% | -1.5% | $65,353 | 2.95 | -0.59 |
| 339 | Miscellaneous Manufacturing | -2.5% | -1.0% | $46,127 | 1.16 | -0.95 |
| 481 | Air Transportation | -3.1% | 0.1% | $44,216 | 0.24 | -1.18 |
| 314 | Textile Product Mills | -3.7% | -1.4% | $29,487 | 0.67 | -1.80 |
| 315 | Apparel Manufacturing | -9.8% | -0.4% | $29,977 | 0.28 | -4.12 |
| 316 | Leather and Allied Product Manufacturing | -9.5% | -2.7% | $37,940 | 1.95 | -4.29 |

## E. Identifying "Clusters" of High-Growth Potential Sectors

We identify three clusters of high potential growth sectors among these 10 high-growth sectors. Each cluster consists of the set of similar sectors identified by their sector groups and codes.

These four 500-level sectors form a natural group that we have named the **Management and Professional Support Services to Business** cluster:

> Administrative and Support Systems (561); Professional, Scientific, and Technical Services (541), Management of Companies and Enterprises (551); and Insurance Carriers and Related Activities (524) are in the top 10 sectors as ranked by first base case estimate, the Average Annual Employment Growth Rate Index. They are also included in the top 10 sectors as ranked by the four-variable index used in the second base case estimate, the Competitive Growth Rate Index.

These four 600-level sectors also form a cluster that we call **Health-Care and Social Services:**

> Ambulatory Health-Care Services (621); Hospitals (622); Nursing and Residential Care Facilities (623); and Social Assistance (624) are in our top 10 sectors as ranked by the Average Annual Employment Growth Rate Index. They are also included in the top 10 sectors as ranked by the four-variable index used in the Competitive Growth Rate Index.

These two 700-level sectors make up our **Leisure and Recreation Services** cluster:

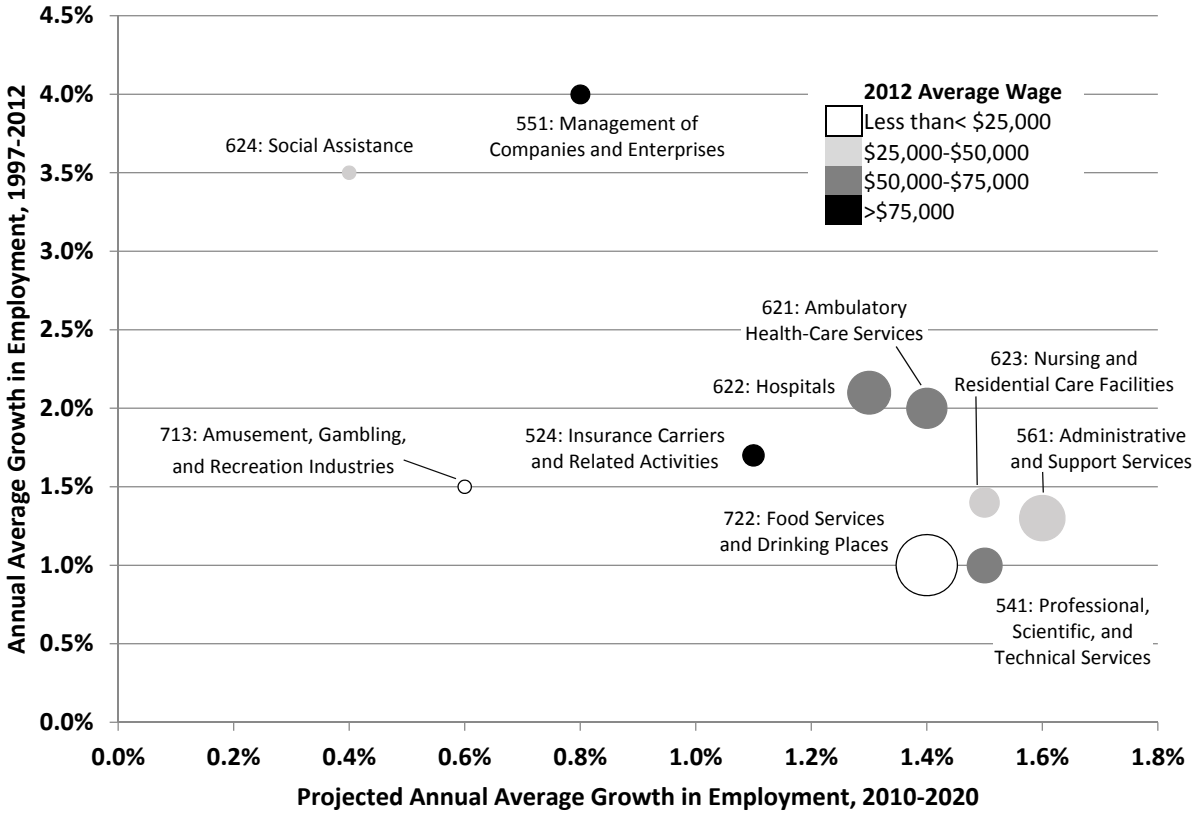
> Amusement, Gambling, and Recreation Industries (713), and Food Services and Drinking Places (722) are in the top 10 sectors as ranked by the Average Annual Employment Growth Rate Index. They rank 10th and 14th in the four-variable Competitive Growth Rate Index.

A detailed description of each sector and important statistics are in Appendix D. Table F5 provides information on education and wages for each of the 10 sectors.

Figure 1 illustrates important aspects of the 10 high employment growth sectors we identified. The circles indicate combined actual annual growth of the 10 sectors from 1997 to 2012 (vertical axis) and their projected growth (horizontal axis). The size of each circle represents the size of the sector in terms of 2012 employment. And the shade of each circle represents the 2012 average wage level for jobs in that sector.

Several features are worth noting. First, all 10 sectors have positive actual annual growth rates and positive projected annual growth rates. Second, for four of the largest sectors—Professional, Scientific and Technical Services (541), Administrative and Support Services (561), Nursing and Residential Care Services (623), and Food Services and Drinking Places (722)—the projected growth rate exceeds the past growth rate. These four sectors account for 53% total employment among the 10 sectors in 2012. The two highest wage sectors of the 54 total sectors—Insurance Carriers and Related Activities (524), and Management of Companies and Enterprises (551)—are included in our list of 10 sectors.

**Figure 1: Industry Sector Employment Growth by NAICS Code**




## F. Alternative Methods for Identifying High Employment Growth Sectors

Our procedure for identifying high employment growth sectors in Wisconsin is but one of several that could be used. We used alternative methods to establish the robustness of our procedure and our selection of the 10 sectors and three clusters of potential growth sectors. In Appendix A, we summarize the results of these alternative analyses.

## G. Subsector Analysis

To this point, our analysis has utilized three-digit sectors. Next we break those 10 sectors, down by the NAICS four-digit subsectors, as Table 3 shows.

## Table 3: Breakdown of Selected High-Growth Industries

| Industry | Description | 1997 Employment | Percentage of 1997 Employment | 1997 Annual Salary (2012 Dollars) | 2012 Employment | Percentage of 2012 Employment | 2012 Annual Salary | 1997-2012 Change in Employment | 1997-2012 Percent Change in Employment | 1997-2012 Average Annual Percent Change in Employment | 1997-2012 Change in Salary (Real Dollars) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **524** | **Insurance Carriers and Related Activities** | **49,028** | | **$65,408** | **63,538** | | **$80,187** | **14,510** | **30%** | **1.7%** | **$14,778** |
| 5241 | Insurance Carriers | 32,881 | 67% | $66,678 | 44,097 | 69% | $82,199 | 11,216 | 34% | 2.0% | $15,521 |
| 5242 | Agencies, Brokerages, and Other Insurance Related Activities | 16,147 | 33% | $43,527 | 19,441 | 31% | $55,192 | 3,294 | 20% | 1.2% | $11,665 |
| **541** | **Professional, Scientific, and Technical Services** | **84,847** | | **$58,338** | **98,652** | | **$61,359** | **13,805** | **16%** | **1.0%** | **$3,021** |
| 5413 | Architectural, Engineering, and Related Services | 16,804 | 20% | $55,489 | 18,722 | 19% | $65,534 | 1,918 | 11% | 0.7% | $10,045 |
| 5415 | Computer Systems Design and Related Services | 14,960 | 18% | $68,344 | 17,149 | 17% | $72,509 | 2,189 | 15% | 0.9% | $4,164 |
| 5411 | Legal Services | 14,527 | 17% | $59,723 | 14,729 | 15% | $75,178 | 202 | 1% | 0.1% | $15,455 |
| 5412 | Accounting, Tax Preparation, Bookkeeping, and Payroll Services | 12,878 | 15% | $42,776 | 12,273 | 12% | $51,508 | (605) | -5% | -0.3% | $8,732 |
| 5416 | Management, Scientific, and Technical Consulting Services | 5,350 | 6% | $59,456 | 11,168 | 11% | $56,133 | 5,818 | 109% | 5.0% | -$3,323 |
| 5419 | Other Professional, Scientific, and Technical Services | 8,569 | 10% | $53,719 | 10,994 | 11% | $55,158 | 2,425 | 28% | 1.7% | $1,439 |
| 5418 | Advertising and Related Services | 8,157 | 10% | $41,272 | 6,247 | 6% | $48,705 | (1,910) | -23% | -1.8% | $7,433 |
| 5417 | Scientific Research and Development Services | 2,323 | 3% | $59,827 | 5,611 | 6% | $74,706 | 3,288 | 142% | 6.1% | $14,879 |
| 5414 | Specialized Design Services | 1,228 | 1% | $46,124 | 1,576 | 2% | $52,676 | 348 | 28% | 1.7% | $6,552 |
| **551** | **Management of Companies and Enterprises** | **29,424** | | **$70,104** | **52,752** | | **$86,642** | **23,328** | **79%** | **4.0%** | **$16,538** |
| 5511 | Management of Companies and Enterprises | 29,424 | 100% | $70,104 | 52,752 | 100% | $86,642 | 23,328 | 79% | 4.0% | $16,538 |
| **561** | **Administrative and Support Services** | **110,528** | | **$27,228** | **134,291** | | **$29,025** | **23,763** | **21%** | **1.3%** | **$1,797** |
| 5613 | Employment Services | 53,052 | 48% | $19,757 | 61,124 | 46% | $23,084 | 8,072 | 15% | 0.9% | $3,327 |
| 5617 | Services to Buildings and Dwellings | 26,302 | 24% | $30,929 | 32,995 | 25% | $27,359 | 6,693 | 25% | 1.5% | -$3,571 |
| 5614 | Business Support Services | 9,495 | 9% | $25,102 | 15,959 | 12% | $28,055 | 6,464 | 68% | 3.5% | $2,953 |
| 5619 | Other Support Services | 6,761 | 6% | $30,837 | 8,602 | 6% | $27,800 | 1,841 | 27% | 1.6% | -$3,037 |
| 5616 | Investigation and Security Services | 7,528 | 7% | $19,698 | 7,367 | 5% | $23,138 | (161) | -2% | -0.1% | $3,440 |
| 5611 | Office Administrative Services | 1,523 | 1% | $60,508 | 4,662 | 3% | $60,306 | 3,139 | 206% | 7.7% | -$202 |
| 5615 | Travel Arrangement and Reservation Services | 5,194 | 5% | $28,665 | 2,586 | 2% | $42,284 | (2,608) | -50% | -4.5% | $13,619 |
| 5612 | Facilities Support Services | 520 | 0% | $69,865 | 645 | 0% | $50,031 | 125 | 24% | 1.4% | -$19,834 |
| **621** | **Ambulatory Health-Care Services** | **86,127** | | **$54,722** | **116,557** | | **$51,910** | **30,430** | **35%** | **2.0%** | **-$2,812** |
| 6211 | Offices of Physicians | 27,314 | 32% | $84,340 | 47,069 | 40% | $82,377 | 19,755 | 72% | 3.7% | -$1,963 |
| 6212 | Offices of Dentists | 14,409 | 17% | $38,864 | 16,999 | 15% | $50,979 | 2,590 | 18% | 1.1% | $12,115 |
| 6214 | Outpatient Care Centers | 18,007 | 21% | $56,256 | 15,626 | 13% | $47,768 | (2,381) | -13% | -0.9% | -$8,488 |
| 6213 | Offices of Other Health Practitioners | 10,923 | 13% | $37,933 | 14,282 | 12% | $34,018 | 3,359 | 31% | 1.8% | -$3,915 |
| 6216 | Home Health Care Services | 8,921 | 10% | $23,031 | 13,643 | 12% | $24,802 | 4,722 | 53% | 2.9% | $1,771 |
| 6219 | Other Ambulatory Health-Care Services | 4,927 | 6% | $15,214 | 5,943 | 5% | $21,003 | 1,016 | 21% | 1.3% | $5,789 |
| 6215 | Medical and Diagnostic Laboratories | 2,414 | 3% | $46,117 | 2,602 | 2% | $50,019 | 188 | 8% | 0.5% | $3,902 |
| **622** | **Hospitals** | **90,294** | | **$43,501** | **123,749** | | **$52,217** | **33,455** | **37%** | **2.1%** | **$8,716** |
| 6221 | General Medical and Surgical Hospitals | 82,256 | 91% | $45,905 | 110,042 | 89% | $57,073 | 27,786 | 34% | 2.0% | $11,167 |
| 6222 | Psychiatric and Substance Abuse Hospitals | 840 | 1% | $42,916 | 2,480 | 2% | $52,897 | 1,640 | 195% | 7.5% | $9,981 |
| 6223 | Specialty (except Psychiatric and Substance Abuse) Hospitals | | 0% | $0 | 1,575 | 1% | $42,582 | 1,575 | N/A | N/A | $42,582 |
| **623** | **Nursing and Residential Care Facilities** | **69,087** | | **$25,815** | **84,674** | | **$31,681** | **15,587** | **23%** | **1.4%** | **$5,866** |
| 6231 | Nursing Care Facilities | 45,318 | 66% | $25,926 | 39,256 | 46% | $28,000 | (6,062) | -13% | -1.0% | $2,074 |
| 6233 | Community Care Facilities for the Elderly | 12,381 | 18% | $22,369 | 26,126 | 31% | $20,343 | 13,745 | 111% | 5.1% | -$2,026 |
| 6232 | Residential Mental Retardation, Mental Health and Substance Abuse Facilities | 9,198 | 13% | $23,804 | 13,453 | 16% | $21,759 | 4,255 | 46% | 2.6% | -$2,045 |
| 6239 | Other Residential Care Facilities | 1,742 | 3% | $24,503 | 2,283 | 3% | $22,566 | 541 | 31% | 1.8% | -$1,937 |
| **624** | **Social Assistance** | **38,208** | | **$27,910** | **64,395** | | **$28,061** | **26,187** | **69%** | **3.5%** | **$151** |

| Industry | Description | 1997 Employment | Percentage of 1997 Employment | 1997 Annual Salary (2012 Dollars) | 2012 Employment | Percentage of 2012 Employment | 2012 Annual Salary | 1997-2012 Change in Employment | 1997-2012 Percent Change in Employment | 1997-2012 Average Annual Percent Change in Employment | 1997-2012 Change in Salary (Real Dollars) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6241 | Individual and Family Services | 13,686 | 36% | $29,007 | 36,033 | 56% | $28,162 | 22,347 | 163% | 6.7% | -$845 |
| 6244 | Child Day Care Services | 13,224 | 35% | $15,954 | 17,565 | 27% | $23,437 | 4,341 | 33% | 1.9% | $7,483 |
| 6243 | Vocational Rehabilitation Services | 9,529 | 25% | $30,007 | 8,689 | 13% | $29,115 | (840) | -9% | -0.6% | -$893 |
| 6242 | Community Food and Housing, and Emergency and Other Relief Services | 1,762 | 5% | $21,831 | 2,109 | 3% | $21,953 | 347 | 20% | 1.2% | $121 |
| **713** | **Amusement, Gambling, and Recreation Industries** | **27,179** | | **$16,753** | **33,900** | | **$23,386** | **6,721** | **25%** | **1.5%** | **$6,633** |
| 7139 | Other Amusement and Recreation Industries | 22,237 | 82% | $16,025 | 27,083 | 80% | $20,601 | 4,846 | 22% | 1.3% | $4,576 |
| 7132 | Gambling Industries | 4,312 | 16% | $26,770 | 5,950 | 18% | $30,660 | 1,638 | 38% | 2.2% | $3,890 |
| 7131 | Amusement Parks and Arcades | 623 | 2% | $21,837 | 867 | 3% | $15,380 | 244 | 39% | 2.2% | -$6,457 |
| **722** | **Food Services and Drinking Places** | **163,321** | | **$13,377** | **190,177** | | **$15,156** | **26,856** | **16%** | **1.0%** | **$1,779** |
| 7225* | Restaurants and Other Eating Places | 136,447 | 84% | $12,262 | 160,746 | 85% | $15,129 | 24,299 | 18% | 1.1% | $2,867 |
| 7224 | Drinking Places (Alcoholic Beverages) | 20,009 | 12% | $9,955 | 19,084 | 10% | $10,517 | (925) | -5% | -0.3% | $562 |
| 7223 | Special Food Services | 6,866 | 4% | $14,738 | 10,348 | 5% | $16,356 | 3,482 | 51% | 2.8% | $1,618 |

* NAICS Industry 7225-Restaurants and Other Eating Places was created in 2007 to combine previous NAICS codes 7221-Full-Service Restaurants and 7222-Limited-Service Eating Places into one NAICS category

## H. Sector Overview

The 10 top *industry* sectors that we identify in this report are primarily service sectors, with the *jobs* created being primarily service sector jobs. These 10 sectors represent 36% of the current level of employment in Wisconsin. Arrayed in three clusters, all 10 showed strong employment growth from 1997 to 2012 and strong projected employment growth from 2010 to 2020. Also common is that almost all employment in these sectors is private. Only two sectors, as noted in Appendix D, have more than 10% of jobs in the public sector. Finally, many of the sectors we identify have high wages relative to their sector comparisons.

However, the sectors vary on a number of dimensions. For example, insurance, professional services, management, and ambulatory care are high-paying service sectors, well above the state average wage of $45,912. But the remaining sectors in our list are considerably below the state average wage. The sectors vary widely in the education and training levels that they require. This variation is a strength because it indicates that the Wisconsin economy will grow across a range of incomes, occupations, and educational levels. However, attracting and retaining workers in the higher paying sectors and occupations within sectors should be emphasized. We do so in our discussion of occupations below and in Appendix D where we provide details on each of the 10 sectors.

Missing from our list of top sectors are manufacturing, dairy, and food-related industries—all traditionally strong sectors in Wisconsin. But these sectors have been in decline in terms of jobs since 1997 and are projected to decline into the future. There are clearly areas in these sectors that may blossom, either in terms of jobs or in terms of state image. For example, while not employing many workers, fish farms and specialty cheese and brewing companies are increasing in the state and garnering national and sometimes international attention. Farms, as well, employ relatively few workers.

Manufacturing is different. In the past it drove Wisconsin employment and paid high wages. Many would argue that the American economy and middle class were built around these jobs in our major industries—automobiles, steel, machines and tools, etc. But data indicate these jobs have been reduced in the nation and the state, as have the wages paid in the manufacturing sectors. The Dallas Federal Reserve Bank came to exactly the same conclusion in a 2014 newsletter: “Expanding US industrial employment would require an increase in world demand for American manufactured goods, which can be achieved only by reductions in US wages and living standards. Instead, policymakers should acknowledge the importance of a growing service sector and consider focusing resources on compensating displaced manufacturing workings and incentivizing them to acquire skill to engage in higher value added activities.”[18] We recommend that policymakers acknowledge the shift of employment in our state economy toward service sectors.[19]

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[18] Michael Sposi and Valerie Grossman, “Deindustrialization Redeploys Workers to Growing Service Sector,” Federal Reserve Bank of Dallas *Economic Letter*, September 2014.

[19] One comparison is between Wisconsin and Minnesota. A 2007 report by University of Wisconsin–Madison economist Donald Nichols concluded: “In the early 1980’s, Wisconsin's income fell 5 percent below the national average, and it has never fully recovered. In recent years this gap has averaged 3 percent. Minnesota, in contrast, has fared well in recent years. Minnesota has a concentration of industries—more heavily into electronics than

Finally, a number of the service sectors we highlight affect the more traditional sectors of Wisconsin's economy. For example, dairy, broadly defined, has in part declined in terms of jobs because scientific technology has dramatically increased productivity in that sector. Thus promotion of professional, scientific, and technical services will continue to aid dairy farming, production, and product development. Similarly, a number of our sectors will directly and indirectly aid and modernize manufacturing in the state.

## III. Occupational Employment Growth

We have identified 10 rapid employment growth sectors in the Wisconsin economy. While each sector has a unique structure of occupational requirements, jobs in any occupational category exist at some level in other sectors. For example, "office and administrative support" occupations are present in most sectors and in all three of our clusters. By using the DWD occupation by industry matrix,[20] we are able to translate the aggregate employment growth patterns for each of the 10 sectors that make up the three high employment growth clusters into occupation-specific employment growth estimates. We can then aggregate these sector-specific occupational demand estimates over our 10 sectors (three clusters) to obtain the breakdown of the actual and projected employment demands by 770 detailed four-digit occupations. Finally, we aggregate these detailed occupational employment demands into 21 broad occupational groups.

This pattern of employment demand is shown in Table 4, with occupations ordered from the highest to the lowest wage level. Overall, the 10 high employment growth sectors that we have identified account for an additional 168,260 jobs in the Wisconsin economy. This number is equal to nearly one-half of the total growth in Wisconsin employment over this period.

machinery—and it has Minneapolis/St. Paul, which has emerged as an important financial sector at a time when finance has become increasingly important as a source of high-income jobs. Minnesota's per-capita personal income has pulled well ahead of the national average while Wisconsin has remained a bit behind." And, "Minneapolis/St. Paul employs more people in highly paid business-type occupations than Milwaukee and the history of Minnesota as being home to technology firms long before the boom of the late twentieth century are two of the forces that have worked in Minnesota's favor in the past twenty-five years. … Minnesota's employment has been much greater in a rapidly growing sector, namely a sector that employs highly paid professionals in mathematical and computer occupations." Donald Nichols, "The Gap in Employment of High-Income Professionals in Wisconsin" (La Follette School Working Paper No. 2007-010, University of Wisconsin–Madison, 2007). http://www.lafollette.wisc.edu/images/publications/workingpapers/nichols2007-010.pdf

[20] DWD's employment by industry and occupation matrix shows the occupational breakdown of employment for approximately 90 industries by NAICS classification and 770 occupations. The 770 occupations in the matrix represent detailed occupations at the four-digit level of the Standard Occupational Classification system. This matrix is described and access to it is available at http://worknet.wisconsin.gov/worknet/progdesc_long.aspx?menuselection=da#PROJ

**Table 4: Projected Employment Change 2010-2020 by Occupation Class**

Occupation classes in bold have average annual wages above the Wisconsin average of $45,912.

| Occupation Class | Projected Employment Change in High-Growth Clusters | Projected Employment Change in All Wisconsin Sectors | Percentage of Projected Total Growth in High-Growth Clusters | 2012 Mean Annual Wage |
|---|---|---|---|---|
| **Management Occupations** | **4,730** | **10,550** | **44.8%** | **$96,500** |
| **Legal Occupations** | **670** | **1,340** | **50.0%** | **$79,770** |
| **Health-care Practitioners and Technical Occupations** | **27,090** | **31,480** | **86.1%** | **$73,260** |
| **Computer and Mathematical Occupations** | **8,130** | **13,100** | **62.1%** | **$68,220** |
| **Architecture and Engineering Occupations** | **3,440** | **4,170** | **82.5%** | **$65,770** |
| **Business and Financial Operations Occupations** | **9,440** | **22,020** | **42.9%** | **$59,680** |
| **Life, Physical, and Social Science Occupations** | **1,110** | **2,890** | **38.4%** | **$56,990** |
| **Education, Training, and Library Occupations** | **110** | **11,950** | **0.9%** | **$49,420** |
| **Construction and Extraction Occupations** | **390** | **18,820** | **2.1%** | **$48,060** |
| Arts, Design, Entertainment, Sports, and Media Occupations | 1,570 | 5,570 | 28.2% | $44,230 |
| Installation, Maintenance, and Repair Occupations | 1,060 | 12,060 | 8.8% | $43,590 |
| Community and Social Service Occupations | 2,130 | 4,060 | 52.5% | $43,490 |
| Protective Service Occupations | 2,210 | 3,660 | 60.4% | $39,380 |
| Sales and Related Occupations | 4,380 | 23,500 | 18.6% | $36,240 |
| Production Occupations | 5,290 | 21,490 | 24.6% | $34,910 |
| Office and Administrative Support Occupations | 22,030 | 36,890 | 59.7% | $33,030 |
| Transportation and Material Moving Occupations | 3,070 | 25,670 | 12.0% | $32,150 |
| Health-care Support Occupations | 12,220 | 19,190 | 63.7% | $27,750 |
| Building and Grounds Cleaning and Maintenance Occupations | 5,300 | 13,020 | 40.7% | $25,540 |
| Personal Care and Service Occupations | 11,420 | 20,350 | 56.1% | $23,110 |
| Food Preparation and Serving Related Occupations | 42,470 | 44,750 | 94.9% | $20,060 |
| **Total** | **168,260** | **346,680** | **48.5%** | **$41,920** |

The group with the largest projected growth is the Food Preparation and Serving Related Occupations, up 42,000 jobs from 2010 to 2020, 25% of the total growth projected and 12% of total projected employment growth in Wisconsin in this period for our 10 sectors. Health-care Practitioners and Technical Occupations accounts for another 27,000 jobs and the Office and Administrative Support Occupations accounts for 22,000 more. These three occupations are projected to account for 57% of the total employment growth projected for this period for our 10 high-growth sectors and 28% of total growth in the Wisconsin economy.

In terms of wages, the highest paying general occupations across sectors are managerial ($96,500), legal ($79,770), and health-care practitioners and technical workers ($73,260). Other occupations with wages considerably above the state average of $45,912 are computer and mathematical ($68,220), architecture and engineering ($65,770), and business and financial occupations ($59,680).

Table F2 shows the detailed pattern of occupational growth demands for our three clusters of 10 sectors by Standard Occupational Classification codes. Table F3 shows the occupational growth patterns for 94 more detailed occupations in each of our three clusters. As seen there, the Health-Care and Social Services Cluster is projected to account for 64,000 new jobs from 2010 to 2020. Table F3, which is ordered by wages, provides more detailed higher income occupations. Notable both for high wages and a large number of jobs are: managerial and supervisory occupations, health-care practitioners, engineers and computer occupations, financial specialists, and sales and business operations.

## IV. Summary

This report has identified 10 service sectors that have and will continue to produce a large number of jobs with relatively high wages in many occupations. These sectors are in three clusters: management and business services, health care and social services, and leisure and recreation. Six statistical methods consistently identified these sectors based on past and future job growth, wages, and location quotient.

Although these sectors do not include traditional sectors of economic strength in Wisconsin, namely dairy and food processing and manufacturing, we anticipate that the growth of service sectors will have spillover effects for those traditional sectors. However, we do not dispute that if policymakers act in part on the conclusions of this report, their decisions will indicate a new direction for economic growth in the state.

# Appendix A: Alternative Methods for Identifying High-Growth Sectors

Section II of this paper identifies 10 potential high employment growth sectors using two growth indices. The Average Annual Employment Growth Rate Index gave equal weight to both the past (1997–2012) and projected (2010–2020) average annual percent growth rate. The Competitive Growth Rate Index also considered past and projected annual average annual percent growth rates, and gave weight to each sector's 2012 average wage and 2012 location quotient. From these indices, we identified 10 sectors that were substantial in size and could be described as potential high employment-growth sectors.

Our procedure for identifying these sectors in Wisconsin was one of many techniques that could be used. We used alternative procedures to establish the robustness of our procedure and the robustness of our identification of the 10 sectors and three clusters. In this appendix, we show four of these alternative methods and their results. The 10 sectors are:

| NAICS Code | Sector |
|---|---|
| 524 | Insurance Carriers and Related Activities |
| 541 | Professional, Scientific, and Technical Services |
| 551 | Management of Companies and Enterprises |
| 561 | Administrative and Support Services |
| 621 | Ambulatory and Health Care Services |
| 622 | Hospitals |
| 623 | Nursing and Residential Care Facilities |
| 624 | Social Assistance |
| 713 | Amusement, Gambling, and Recreation Industries |
| 722 | Food Services and Drinking Places |

## 1. Equal Weighting of the Unit Change Index and Percent Change Index

Instead of the average annual percent growth rate used in section II, this alternative uses the absolute unit change of past (1997–2012) and projected (2010–2020) growth to create a "unit index," and the percent change of past and projected employment growth during these same time periods to create a "percent index." We then create a ranking system from these indices that gives equal weight to the unit and percent indices. (See Table A1.) The equation for this method is:

**Unit and Percent Change Index = 0.5(Unit Index[21]) + 0.5(Percent Index[22])**

The results of this method are summarized in the table below. *Of the 54 sectors included in this ranking, the sectors we identified in Section II as high potential growth sectors make up 10 of the top 11 ranked sectors.* The range of the index score from the 54 sectors included in this ranking is -6.33 to 9.16 (26 positive and 28 negative) with an average of 0.50 and median of -0.02. The average index score of our 10 selected sectors is 6.78. From these results, we conclude that this

[21] $\{[0.5(\text{2012 Employment-1997 Employment})_i] + [0.5(\text{2020 Projected Employment-2010 Employment})_i]\}$

[22] $\{[0.5((\text{2012 Employment-1997 Employment})/(\text{1997 Employment}))_i] + [0.5((\text{2020 Projected Employment-2010 Employment})/(\text{2010 Employment}))_i]\}$

alternative method supports our selection of 10 sectors and three clusters as having high potential growth.

### Table A1: Unit and Percent Change Index

| Unit and Percent Change Index (UPCI)= 0.5(Unit Index) + 0.5(Percent Index) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| NAICS Code | Code Description | 1997-2012 Employment Change | 1997-2012 % Employment Change | 2010-2020 Employment Change | 2010-2020 % Employment Change | *Unit Index* | *Percent Index* | UPCI |
| 551 | Management of Companies and Enterprises | 23,328 | 79.3% | 6,190 | 13.2% | 7.25 | 11.08 | 9.16 |
| 622 | Hospitals | 33,455 | 37.1% | 25,270 | 21.3% | 11.92 | 6.00 | 8.96 |
| 624 | Social Assistance | 26,187 | 68.5% | 3,730 | 6.0% | 7.83 | 9.28 | 8.56 |
| 621 | Ambulatory Health Care Services | 30,430 | 35.3% | 24,770 | 22.8% | 11.01 | 5.86 | 8.44 |
| 722 | Food Services and Drinking Places | 26,856 | 16.4% | 43,230 | 23.2% | 11.72 | 3.42 | 7.57 |
| 561 | Administrative and Support Services | 23,763 | 21.5% | 32,810 | 26.5% | 9.86 | 4.26 | 7.06 |
| 623 | Nursing and Residential Care Facilities | 15,587 | 22.6% | 19,220 | 25.0% | 6.25 | 4.31 | 5.28 |
| 524 | Insurance Carriers and Related Activities | 14,510 | 29.6% | 11,870 | 17.1% | 5.26 | 4.80 | 5.03 |
| 541 | Professional, Scientific, and Technical Services | 13,805 | 16.3% | 23,680 | 25.4% | 6.16 | 3.52 | 4.84 |
| 488 | Support Activities for Transportation | 1,478 | 37.0% | 2,220 | 41.4% | 0.63 | 7.09 | 3.86 |
| 713 | Amusement, Gambling, and Recreation Industries | 6,721 | 24.7% | 2,240 | 8.8% | 2.13 | 3.71 | 2.92 |
| 813 | Religious, Grantmaking, Civic, Professional, and Similar Organizations | 3,625 | 14.1% | 11,140 | 12.2% | 2.08 | 2.52 | 2.30 |
| 423 | Merchant Wholesalers, Durable Goods | 5,037 | 8.5% | 9,140 | 14.9% | 2.29 | 1.92 | 2.11 |
| 452 | General Merchandise Stores | 4,904 | 8.6% | 7,200 | 11.8% | 2.07 | 1.76 | 1.92 |
| 522 | Credit Intermediation and Related Activities | 3,331 | 7.1% | 6,090 | 11.7% | 1.52 | 1.56 | 1.54 |
| 562 | Waste Management and Remediation Services | 584 | 11.5% | 890 | 16.8% | 0.25 | 2.42 | 1.34 |
| 721 | Accommodation | 1,076 | 3.7% | 4,690 | 15.9% | 0.75 | 1.35 | 1.05 |
| 712 | Museums, Historical Sites, and Similar Institutions | 61 | 3.0% | 270 | 15.4% | 0.04 | 1.24 | 0.64 |
| 448 | Clothing and Clothing Accessories Stores | 466 | 2.6% | 1,910 | 9.9% | 0.31 | 0.87 | 0.59 |
| 485 | Transit and Ground Passenger Transportation | 415 | 2.8% | 1,430 | 10.2% | 0.25 | 0.92 | 0.58 |
| 812 | Personal and Laundry Services | 684 | 2.7% | 1,840 | 7.1% | 0.37 | 0.74 | 0.55 |
| 446 | Health and Personal Care Stores | 787 | 5.2% | 460 | 2.9% | 0.27 | 0.84 | 0.55 |
| 517 | Telecommunications | 288 | 2.5% | 1,120 | 8.6% | 0.19 | 0.79 | 0.49 |
| 443 | Electronics and Appliance Stores | 197 | 2.4% | 370 | 4.0% | 0.09 | 0.54 | 0.31 |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | (181) | -1.5% | 1,520 | 13.0% | 0.09 | 0.51 | 0.30 |
| 311 | Food Manufacturing | 37 | 0.1% | 1,980 | 3.3% | 0.20 | 0.19 | 0.19 |
| 811 | Repair and Maintenance | (868) | -4.0% | 2,080 | 10.2% | -0.05 | 0.04 | -0.01 |
| 441 | Motor Vehicle and Parts Dealers | (1,112) | -3.0% | 2,450 | 7.4% | -0.09 | 0.01 | -0.04 |
| 332 | Fabricated Metal Product Manufacturing | (3,843) | -5.1% | 9,070 | 14.2% | -0.25 | 0.12 | -0.07 |
| 444 | Building Material and Garden Equipment and Supplies Dealers | (1,811) | -6.8% | 3,270 | 13.2% | -0.21 | -0.17 | -0.19 |
| 531 | Real Estate | (2,183) | -10.9% | 2,060 | 12.0% | -0.43 | -0.77 | -0.60 |
| 326 | Plastics and Rubber Products Manufacturing | (3,305) | -10.1% | 2,980 | 10.7% | -0.67 | -0.74 | -0.70 |
| 238 | Specialty Trade Contractors | (10,578) | -15.1% | 19,180 | 32.0% | -1.23 | -0.23 | -0.73 |
| 511 | Publishing Industries (except Internet) | (2,051) | -10.1% | 680 | 3.9% | -0.52 | -1.11 | -0.81 |
| 337 | Furniture and Related Product Manufacturing | (2,557) | -15.0% | 2,030 | 13.7% | -0.54 | -1.21 | -0.88 |
| 447 | Gasoline Stations | (1,271) | -5.3% | (2,150) | -9.5% | -0.56 | -1.21 | -0.89 |
| 312 | Beverage and Tobacco Product Manufacturing | (521) | -15.6% | 170 | 5.8% | -0.13 | -1.72 | -0.92 |
| 512 | Motion Picture and Sound Recording Industries | (421) | -11.2% | (250) | -6.8% | -0.14 | -1.83 | -0.99 |
| 327 | Nonmetallic Mineral Product Manufacturing | (2,142) | -20.4% | 1,560 | 18.4% | -0.47 | -1.66 | -1.06 |
| 492 | Couriers and Messengers | (1,178) | -12.4% | (880) | -10.6% | -0.42 | -2.20 | -1.31 |
| 532 | Rental and Leasing Services | (2,195) | -24.9% | 1,000 | 14.2% | -0.53 | -2.48 | -1.51 |
| 711 | Performing Arts, Spectator Sports, and Related Industries | (2,939) | -28.3% | 1,370 | 18.6% | -0.71 | -2.67 | -1.69 |
| 454 | Nonstore Retailers | (4,674) | -19.3% | 1,140 | 5.6% | -1.23 | -2.22 | -1.72 |
| 331 | Primary Metal Manufacturing | (7,141) | -28.8% | 3,060 | 20.0% | -1.75 | -2.67 | -2.21 |
| 481 | Air Transportation | (1,337) | -37.4% | 20 | 0.8% | -0.38 | -4.85 | -2.61 |
| 323 | Printing and Related Support Activities | (8,017) | -21.7% | (2,900) | -10.2% | -2.56 | -3.39 | -2.98 |
| 339 | Miscellaneous Manufacturing | (6,349) | -31.6% | (1,320) | -9.8% | -1.94 | -4.66 | -3.30 |
| 314 | Textile Product Mills | (1,218) | -43.6% | (190) | -12.8% | -0.37 | -6.40 | -3.38 |
| 336 | Transportation Equipment Manufacturing | (11,485) | -30.2% | 390 | 1.5% | -3.25 | -3.87 | -3.56 |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | (11,505) | -33.9% | (2,930) | -14.0% | -3.56 | -5.19 | -4.38 |
| 333 | Machinery Manufacturing | (24,896) | -27.2% | 920 | 1.6% | -7.03 | -3.47 | -5.25 |
| 322 | Paper Manufacturing | (20,148) | -39.5% | 1,060 | 3.3% | -5.66 | -4.99 | -5.32 |
| 315 | Apparel Manufacturing | (3,103) | -78.7% | (30) | -3.7% | -0.89 | -10.49 | -5.69 |
| 316 | Leather and Allied Product Manufacturing | (4,109) | -77.8% | (260) | -23.6% | -1.20 | -11.46 | -6.33 |

## 2. Equal Weighting of the Unit Change Index, Percent Change Index, 2012 Industry Average Wage, and 2012 Location Quotient

The method used in Section IIC, Average Annual Employment Growth Rate Index, includes the actual average annual and projected average growth rates, and each sector's average annual wage and 2012 location quotient.[23] This second alternative method uses a similar approach, but replaces the actual and projected annual average percent growth rates with the unit index and percent index (the same unit and percent indices used in the first alternative method, equal weighting of the unit change index and the percent change index. This second method then gives equal weight to the unit index, percent index, 2012 average annual wages, and 2012 location quotient. (See Table A2.) The equation for this method is:

**Competitive Unit and Percent Change Index = 0.25(Unit Index[24]) + 0.25(Percent Index[25]) + 0.25(2012 Weighted Average Annual Wage Index[26]) + 0.25(2012 Location Quotient[27])**

The results of this method are summarized in the table below. *Of the 54 sectors included in this ranking, the sectors we identified in the body of the paper again are among the 10 of the top 11 ranked sectors.* The range of this index score is -2.77 to 5.88 (35 positive and 19 negative) with an average of 0.82 and median of 0.43. The average of our 10 selected sectors is 4.37. From these results, we again conclude that this alternative method supports our 10 selected sectors and three clusters as having characteristics of high potential jobs growth.

[23] We note in Section IIC, Average Annual Employment Growth Rate Index, that the 2012 average annual wage provides an indicator for the wealth generation associated with a sector and that the 2012 location quotient serves as an indicator for any sort of competitive advantage Wisconsin may have in that sector when compared to the rest of the United States.

[24] $\{[0.5(2012\ \text{Employment}-1997\ \text{Employment})_i] + [0.5(2020\ \text{Projected Employment}-2010\ \text{Employment})_i]\}$

[25] $\{[0.5((2012\ \text{Employment}-1997\ \text{Employment})/(1997\ \text{Employment}))_i] + [0.5((2020\ \text{Projected Employment}-2010\ \text{Employment})/(2010\ \text{Employment}))_i]\}$

[26] $\{2012\ \text{Weighted Wage}=[(2012\ \text{Average Annual Wage})*(2012\ \text{Employment})_i]*(1/(2012\ \text{Average of all Wisconsin Sector Employment}))]\}$ / {Average of all Wisconsin 2012 Weighted Wage}

[27] (Percentage of Wisconsin's Total Workforce in Sector i) / (Percentage of United States' Total Workforce in Sector i)

## Table A2: Competitive Unit and Percent Change Index

**Competitive Unit and Percent Change Index (CUGI)**=
0.25(Unit Index) + 0.25(% Index) + 0.25(2012 Average Wage) + 0.25(Location Quotient)

| NAICS Code | Code Description | Unit Index | Percent Index | 2012 Average Wages | 2012 Location Quotient | CUGI |
|---|---|---|---|---|---|---|
| 622 | Hospitals | 11.92 | 6.00 | $52,217 | 1.00 | 5.88 |
| 551 | Management of Companies and Enterprises | 7.25 | 11.08 | $86,642 | 1.29 | 5.72 |
| 621 | Ambulatory Health Care Services | 11.01 | 5.86 | $51,910 | 0.89 | 5.52 |
| 624 | Social Assistance | 7.83 | 9.28 | $28,061 | 1.12 | 4.88 |
| 722 | Food Services and Drinking Places | 11.72 | 3.42 | $15,156 | 0.93 | 4.53 |
| 561 | Administrative and Support Services | 9.86 | 4.26 | $29,025 | 0.86 | 4.44 |
| 524 | Insurance Carriers and Related Activities | 5.26 | 4.80 | $80,187 | 1.50 | 3.79 |
| 541 | Professional, Scientific, and Technical Services | 6.16 | 3.52 | $61,359 | 0.60 | 3.65 |
| 623 | Nursing and Residential Care Facilities | 6.25 | 4.31 | $31,681 | 1.22 | 3.42 |
| 488 | Support Activities for Transportation | 0.63 | 7.09 | $43,212 | 0.41 | 2.07 |
| 713 | Amusement, Gambling, and Recreation Industries | 2.13 | 3.71 | $23,386 | 0.96 | 1.84 |
| 423 | Merchant Wholesalers, Durable Goods | 2.29 | 1.92 | $39,128 | 1.12 | 1.78 |
| 813 | Religious, Grant-making, Civic, Professional, and Similar Organizations | 2.08 | 2.52 | $41,520 | 1.06 | 1.63 |
| 522 | Credit Intermediation and Related Activities | 1.52 | 1.56 | $57,311 | 0.95 | 1.52 |
| 452 | General Merchandise Stores | 2.07 | 1.76 | $18,827 | 0.97 | 1.41 |
| 332 | Fabricated Metal Product Manufacturing | -0.25 | 0.12 | $48,378 | 2.51 | 1.21 |
| 311 | Food Manufacturing | 0.20 | 0.19 | $42,875 | 2.08 | 1.09 |
| 562 | Waste Management and Remediation Services | 0.25 | 2.42 | $39,669 | 0.68 | 0.88 |
| 721 | Accommodation | 0.75 | 1.35 | $19,919 | 0.78 | 0.83 |
| 812 | Personal and Laundry Services | 0.37 | 0.74 | $37,701 | 0.97 | 0.69 |
| 485 | Transit and Ground Passenger Transportation | 0.25 | 0.92 | $26,770 | 1.11 | 0.64 |
| 446 | Health and Personal Care Stores | 0.27 | 0.84 | $32,794 | 0.78 | 0.56 |
| 517 | Telecommunications | 0.19 | 0.79 | $57,104 | 0.69 | 0.54 |
| 448 | Clothing and Clothing Accessories Stores | 0.31 | 0.87 | $16,335 | 0.66 | 0.51 |
| 441 | Motor Vehicle and Parts Dealers | -0.09 | 0.01 | $36,928 | 1.00 | 0.46 |
| 712 | Museums, Historical Sites, and Similar Institutions | 0.04 | 1.24 | $36,792 | 0.45 | 0.45 |
| 326 | Plastics and Rubber Products Manufacturing | -0.67 | -0.74 | $45,893 | 2.22 | 0.44 |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | 0.09 | 0.51 | $16,915 | 0.96 | 0.42 |
| 443 | Electronics and Appliance Stores | 0.09 | 0.54 | $32,406 | 0.79 | 0.40 |
| 811 | Repair and Maintenance | -0.05 | 0.04 | $44,347 | 0.86 | 0.38 |
| 238 | Specialty Trade Contractors | -1.23 | -0.23 | $43,392 | 0.83 | 0.30 |
| 444 | Building Material and Garden Equipment and Supplies Dealers | -0.21 | -0.17 | $25,879 | 1.04 | 0.28 |
| 337 | Furniture and Related Product Manufacturing | -0.54 | -1.21 | $41,396 | 2.02 | 0.18 |
| 511 | Publishing Industries (except Internet) | -0.52 | -1.11 | $61,804 | 1.21 | 0.10 |
| 447 | Gasoline Stations | -0.56 | -1.21 | $16,862 | 1.33 | -0.04 |
| 531 | Real Estate | -0.43 | -0.77 | $33,023 | 0.60 | -0.05 |
| 327 | Nonmetallic Mineral Product Manufacturing | -0.47 | -1.66 | $46,078 | 1.12 | -0.18 |
| 454 | Non-store Retailers | -1.23 | -2.22 | $34,806 | 2.16 | -0.20 |
| 312 | Beverage and Tobacco Product Manufacturing | -0.13 | -1.72 | $39,937 | 0.72 | -0.26 |
| 512 | Motion Picture and Sound Recording Industries | -0.14 | -1.83 | $17,945 | 0.44 | -0.37 |
| 331 | Primary Metal Manufacturing | -1.75 | -2.67 | $53,404 | 2.15 | -0.40 |
| 492 | Couriers and Messengers | -0.42 | -2.20 | $37,869 | 0.77 | -0.41 |
| 323 | Printing and Related Support Activities | -2.56 | -3.39 | $45,212 | 3.06 | -0.49 |
| 711 | Performing Arts, Spectator Sports, and Related Industries | -0.71 | -2.67 | $65,717 | 0.87 | -0.54 |
| 532 | Rental and Leasing Services | -0.53 | -2.48 | $32,693 | 0.64 | -0.56 |
| 333 | Machinery Manufacturing | -7.03 | -3.47 | $60,235 | 2.96 | -1.17 |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | -3.56 | -5.19 | $65,353 | 2.95 | -1.19 |
| 481 | Air Transportation | -0.38 | -4.85 | $44,216 | 0.24 | -1.23 |
| 339 | Miscellaneous Manufacturing | -1.94 | -4.66 | $46,127 | 1.16 | -1.25 |
| 336 | Transportation Equipment Manufacturing | -3.25 | -3.87 | $60,071 | 0.86 | -1.28 |
| 322 | Paper Manufacturing | -5.66 | -4.99 | $60,320 | 3.97 | -1.34 |
| 314 | Textile Product Mills | -0.37 | -6.40 | $29,487 | 0.67 | -1.52 |
| 316 | Leather and Allied Product Manufacturing | -1.20 | -11.46 | $37,940 | 1.95 | -2.67 |
| 315 | Apparel Manufacturing | -0.89 | -10.49 | $29,977 | 0.28 | -2.77 |

## 3. Average Annual Growth Rate Index (Past Growth Only)

The methods used for identifying high potential growth sectors in Section II in both cases give weight to past and projected employment growth in each sector. This third alternative methodology omits consideration of the DWD's projected employment numbers and only considers the *past average annual percent growth rate* from 1997 to 2012 (50% weighting), the 2012 average annual wage in each sector (25% weighting), and the 2012 location quotient (25% weighting). (See Table A3.) The equation for this method is:

**Competitive Past Growth Rate Index = 0.5(1997–2012 Average Annual Employment Growth Rate[28]) + 0.25(2012 Weighted Average Annual Wage Index[29]) + 0.25(2012 Location Quotient[30])**

**Table A3: Competitive Past Growth Rate Index**

**Competitive Past Growth Rate Index (CPGRI)** = (0.5)(1997-2012 Average Annual Growth Rate) + (0.25)(2012 Location Quotient) + (0.25)(2012 Average Wage)

| NAICS Code | Code Description | 1997-2012 Average Annual Growth Rate | 2012 Average Wages | 2012 Location Quotient | CPGRI |
|---|---|---|---|---|---|
| 551 | Management of Companies and Enterprises | 4.0% | $86,642 | 1.29 | 4.44 |
| 624 | Social Assistance | 3.5% | $28,061 | 1.12 | 3.55 |
| 622 | Hospitals | 2.1% | $52,217 | 1.00 | 3.17 |
| 621 | Ambulatory Health Care Services | 2.0% | $51,910 | 0.89 | 3.00 |
| 524 | Insurance Carriers and Related Activities | 1.7% | $80,187 | 1.50 | 2.73 |
| 541 | Professional, Scientific, and Technical Services | 1.0% | $61,359 | 0.60 | 2.07 |
| 561 | Administrative and Support Services | 1.3% | $29,025 | 0.86 | 2.00 |
| 623 | Nursing and Residential Care Facilities | 1.4% | $31,681 | 1.22 | 1.92 |
| 488 | Support Activities for Transportation | 2.1% | $43,212 | 0.41 | 1.91 |
| 713 | Amusement, Gambling, and Recreation Industries | 1.5% | $23,386 | 0.96 | 1.62 |
| 722 | Food Services and Drinking Places | 1.0% | $15,156 | 0.93 | 1.60 |
| 813 | Religious, Grant-making, Civic, Professional, and Similar Organizations | 0.9% | $41,520 | 1.06 | 1.22 |
| 423 | Merchant Wholesalers, Durable Goods | 0.5% | $39,128 | 1.12 | 1.18 |
| 522 | Credit Intermediation and Related Activities | 0.5% | $57,311 | 0.95 | 1.13 |
| 311 | Food Manufacturing | 0.0% | $42,875 | 2.08 | 1.00 |
| 332 | Fabricated Metal Product Manufacturing | -0.3% | $48,378 | 2.51 | 0.96 |
| 452 | General Merchandise Stores | 0.5% | $18,827 | 0.97 | 0.91 |
| 562 | Waste Management and Remediation Services | 0.7% | $39,669 | 0.68 | 0.82 |
| 446 | Health and Personal Care Stores | 0.3% | $32,794 | 0.78 | 0.57 |
| 812 | Personal and Laundry Services | 0.2% | $37,701 | 0.97 | 0.56 |
| 721 | Accommodation | 0.2% | $19,919 | 0.78 | 0.50 |
| 485 | Transit and Ground Passenger Transportation | 0.2% | $26,770 | 1.11 | 0.50 |
| 517 | Telecommunications | 0.2% | $57,104 | 0.69 | 0.43 |
| 443 | Electronics and Appliance Stores | 0.2% | $32,406 | 0.79 | 0.38 |
| 448 | Clothing and Clothing Accessories Stores | 0.2% | $16,335 | 0.66 | 0.36 |
| 441 | Motor Vehicle and Parts Dealers | -0.2% | $36,928 | 1.00 | 0.31 |
| 712 | Museums, Historical Sites, and Similar Institutions | 0.2% | $36,792 | 0.45 | 0.29 |
| 326 | Plastics and Rubber Products Manufacturing | -0.7% | $45,893 | 2.22 | 0.20 |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | -0.1% | $16,915 | 0.96 | 0.19 |
| 811 | Repair and Maintenance | -0.3% | $44,347 | 0.86 | 0.15 |

[28]{[(2012 actual employment/1997 actual employment)$_i$]^[1/(15 years)] – 1}

[29]{2012 Weighted Wage=[(2012 Average Annual Wage)*(2012 Employment)$_i$]*(1/(2012 Average of all Wisconsin Sector Employment))]} / {Average of all Wisconsin 2012 Weighted Wage}

[30](Percentage of Wisconsin's Total Workforce in Sector i) / (Percentage of United States' Total Workforce in Sector i)

| NAICS Code | Code Description | 1997-2012 Average Annual Growth Rate | 2012 Average Wages | 2012 Location Quotient | CPGRI |
|---|---|---|---|---|---|
| 447 | Gasoline Stations | -0.4% | $16,862 | 1.33 | 0.10 |
| 444 | Building Material and Garden Equipment and Supplies Dealers | -0.5% | $25,879 | 1.04 | -0.02 |
| 511 | Publishing Industries (except Internet) | -0.7% | $61,804 | 1.21 | -0.09 |
| 238 | Specialty Trade Contractors | -1.1% | $43,392 | 0.83 | -0.24 |
| 337 | Furniture and Related Product Manufacturing | -1.1% | $41,396 | 2.02 | -0.28 |
| 333 | Machinery Manufacturing | -2.1% | $60,235 | 2.96 | -0.29 |
| 323 | Printing and Related Support Activities | -1.6% | $45,212 | 3.06 | -0.35 |
| 531 | Real Estate | -0.8% | $33,023 | 0.60 | -0.38 |
| 492 | Couriers and Messengers | -0.9% | $37,869 | 0.77 | -0.48 |
| 454 | Nonstore Retailers | -1.4% | $34,806 | 2.16 | -0.52 |
| 512 | Motion Picture and Sound Recording Industries | -0.8% | $17,945 | 0.44 | -0.54 |
| 312 | Beverage and Tobacco Product Manufacturing | -1.1% | $39,937 | 0.72 | -0.73 |
| 327 | Nonmetallic Mineral Product Manufacturing | -1.5% | $46,078 | 1.12 | -0.91 |
| 331 | Primary Metal Manufacturing | -2.2% | $53,404 | 2.15 | -1.16 |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | -2.7% | $65,353 | 2.95 | -1.27 |
| 532 | Rental and Leasing Services | -1.9% | $32,693 | 0.64 | -1.38 |
| 322 | Paper Manufacturing | -3.3% | $60,320 | 3.97 | -1.43 |
| 336 | Transportation Equipment Manufacturing | -2.4% | $60,071 | 0.86 | -1.48 |
| 711 | Performing Arts, Spectator Sports, and Related Industries | -2.2% | $65,717 | 0.87 | -1.52 |
| 339 | Miscellaneous Manufacturing | -2.5% | $46,127 | 1.16 | -1.68 |
| 481 | Air Transportation | -3.1% | $44,216 | 0.24 | -2.49 |
| 314 | Textile Product Mills | -3.7% | $29,487 | 0.67 | -2.95 |
| 316 | Leather and Allied Product Manufacturing | -9.5% | $37,940 | 1.95 | -7.46 |
| 315 | Apparel Manufacturing | -9.8% | $29,977 | 0.28 | -8.09 |

The ranking methodology yielding the patterns shown in the table again reveals *our selected sectors comprising 10 of the top 11 sectors (out of 54).* The range of this third ranking index is -8.09 to 4.44 (31 positive, 23 negative) with an average of 0.07 and median of 0.20. The average of our 10 selected sectors shown in the table below is 2.61. These results again support our selection of 10 sectors and three clusters as having characteristics of high potential growth.

### 4. Average Annual Growth Rate Index (Projected Growth Only)

Parallel to alternative method three, we omit past growth and only consider DWD's *projected annual average percent growth rate* of employment from 2010–2020 (50% weighting), the 2012 average annual wage in each sector (25% weighting) and the 2012 location quotient (25% weighting). (See Table A4.) The equation for this method is:

**Competitive Projected Growth Rate Index = 0.5(2010–2020 Projected Average Annual Employment Growth Rate[31]) + 0.25(2012 Weighted Average Annual Wage Index[32]) + 0.25(2012 Location Quotient[33])**

[31]{[(2020 actual employment/2010 actual employment)$_i$]^[1/(10 years)] – 1}
[32]{2012 Weighted Wage=[(2012 Average Annual Wage)*(2012 Employment)$_i$]*(1/(2012 Average of all Wisconsin Sector Employment))]} / {Average of all Wisconsin 2012 Weighted Wage}
[33](Percent of Wisconsin's Total Workforce in Sector i) / (Percent of United States' Total Workforce in Sector i)

## Table A4: Competitive Projected Growth Rate Index

**Competitive Projected Growth Rate Index = (0.5)(2010-2020 Average Annual Growth Rate) + (0.25)(2012 Location Quotient) + (0.25)(2012 Average Wage)**

| (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| NAICS Code | Code Description | 2010-2020 Average Annual Growth Rate | 2012 Average Wage | 2012 Location Quotient | CPGRI |
| 541 | Professional, Scientific, and Technical Services | 2.3% | $61,359 | 0.60 | 2.62 |
| 622 | Hospitals | 1.9% | $52,217 | 1.00 | 2.58 |
| 621 | Ambulatory Health Care Services | 2.1% | $51,910 | 0.89 | 2.56 |
| 238 | Specialty Trade Contractors | 2.8% | $43,392 | 0.83 | 2.38 |
| 561 | Administrative and Support Services | 2.4% | $29,025 | 0.86 | 2.36 |
| 488 | Support Activities for Transportation | 3.5% | $43,212 | 0.41 | 2.29 |
| 524 | Insurance Carriers and Related Activities | 1.6% | $80,187 | 1.50 | 2.25 |
| 623 | Nursing and Residential Care Facilities | 2.3% | $31,681 | 1.22 | 2.15 |
| 332 | Fabricated Metal Product Manufacturing | 1.3% | $48,378 | 2.51 | 2.06 |
| 722 | Food Services and Drinking Places | 2.1% | $15,156 | 0.93 | 2.03 |
| 551 | Management of Companies and Enterprises | 1.2% | $86,642 | 1.29 | 1.89 |
| 331 | Primary Metal Manufacturing | 1.8% | $53,404 | 2.15 | 1.83 |
| 423 | Merchant Wholesalers, Durable Goods | 1.4% | $39,128 | 1.12 | 1.58 |
| 333 | Machinery Manufacturing | 0.2% | $60,235 | 2.96 | 1.55 |
| 322 | Paper Manufacturing | 0.3% | $60,320 | 3.97 | 1.52 |
| 522 | Credit Intermediation and Related Activities | 1.1% | $57,311 | 0.95 | 1.43 |
| 326 | Plastics and Rubber Products Manufacturing | 1.0% | $45,893 | 2.22 | 1.41 |
| 337 | Furniture and Related Product Manufacturing | 1.3% | $41,396 | 2.02 | 1.40 |
| 327 | Nonmetallic Mineral Product Manufacturing | 1.7% | $46,078 | 1.12 | 1.38 |
| 711 | Performing Arts, Spectator Sports, and Related Industries | 1.7% | $65,717 | 0.87 | 1.35 |
| 721 | Accommodation | 1.5% | $19,919 | 0.78 | 1.21 |
| 311 | Food Manufacturing | 0.3% | $42,875 | 2.08 | 1.19 |
| 813 | Religious, Grantmaking, Civic, Professional, and Similar Organizations | 1.2% | $41,520 | 1.06 | 1.19 |
| 562 | Waste Management and Remediation Services | 1.6% | $39,669 | 0.68 | 1.16 |
| 444 | Building Material and Garden Equipment and Supplies Dealers | 1.2% | $25,879 | 1.04 | 1.13 |
| 452 | General Merchandise Stores | 1.1% | $18,827 | 0.97 | 1.13 |
| 451 | Sporting Goods, Hobby, Musical Instrument, and Book Stores | 1.2% | $16,915 | 0.96 | 1.02 |
| 532 | Rental and Leasing Services | 1.3% | $32,693 | 0.64 | 1.01 |
| 712 | Museums, Historical Sites, and Similar Institutions | 1.4% | $36,792 | 0.45 | 1.01 |
| 454 | Nonstore Retailers | 0.5% | $34,806 | 2.16 | 0.99 |
| 811 | Repair and Maintenance | 1.0% | $44,347 | 0.86 | 0.98 |
| 624 | Social Assistance | 0.6% | $28,061 | 1.12 | 0.96 |
| 531 | Real Estate | 1.1% | $33,023 | 0.60 | 0.95 |
| 485 | Transit and Ground Passenger Transportation | 1.0% | $26,770 | 1.11 | 0.94 |
| 441 | Motor Vehicle and Parts Dealers | 0.7% | $36,928 | 1.00 | 0.92 |
| 713 | Amusement, Gambling, and Recreation Industries | 0.9% | $23,386 | 0.96 | 0.90 |
| 812 | Personal and Laundry Services | 0.7% | $37,701 | 0.97 | 0.84 |
| 517 | Telecommunications | 0.8% | $57,104 | 0.69 | 0.80 |
| 448 | Clothing and Clothing Accessories Stores | 0.9% | $16,335 | 0.66 | 0.79 |
| 511 | Publishing Industries (except Internet) | 0.4% | $61,804 | 1.21 | 0.74 |
| 336 | Transportation Equipment Manufacturing | 0.2% | $60,071 | 0.86 | 0.59 |
| 312 | Beverage and Tobacco Product Manufacturing | 0.6% | $39,937 | 0.72 | 0.55 |
| 443 | Electronics and Appliance Stores | 0.4% | $32,406 | 0.79 | 0.48 |
| 446 | Health and Personal Care Stores | 0.3% | $32,794 | 0.78 | 0.46 |
| 323 | Printing and Related Support Activities | -1.1% | $45,212 | 3.06 | 0.35 |
| 481 | Air Transportation | 0.1% | $44,216 | 0.24 | 0.13 |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing | -1.5% | $65,353 | 2.95 | 0.09 |
| 315 | Apparel Manufacturing | -0.4% | $29,977 | 0.28 | -0.16 |
| 447 | Gasoline Stations | -1.0% | $16,862 | 1.33 | -0.20 |
| 339 | Miscellaneous Manufacturing | -1.0% | $46,127 | 1.16 | -0.22 |
| 512 | Motion Picture and Sound Recording Industries | -0.7% | $17,945 | 0.44 | -0.30 |
| 492 | Couriers and Messengers | -1.1% | $37,869 | 0.77 | -0.43 |
| 314 | Textile Product Mills | -1.4% | $29,487 | 0.67 | -0.65 |
| 316 | Leather and Allied Product Manufacturing | -2.7% | $37,940 | 1.95 | -1.12 |

The ranking shown in the table yields results that are similar to, but not completely consistent with, the results of the other methodologies. Our 10 sectors include eight of the top 11 with the two other sectors—Social Assistance (624) and Amusement, Gambling, and Recreation Industries (713)—ranking 32 and 36 respectively out of 54 sectors. While this methodology yields slightly different results, they are generally supportive of the 10-sector choice based on results from the two primary methods.[34] The range of this index ranking is -1.12 to 2.62 (47 positive and seven negative) with an average of 1.07 and 1.02. The average of our 10 selected sectors remains well above the mean and median at 2.03.

[34] The DWD develops its industry employment projections based on a compilation of statistical methodologies and expert input. DWD then uses the average of these results as its projection. While we place confidence in DWD's labor projection methodology, these are best-guess estimates for a range of potential economic outcomes (for a more detailed description of DWD's labor projection methodology, see Appendix C). Given that slight changes in these projection numbers could have significant impacts on the overall rankings output in this fourth alternative methodology, we do not feel placing significant weight on these outcomes is appropriate. Two of our 10 selected sectors do fall below average in this ranking methodology, but these sectors place near the top in all other ranking methodologies. Furthermore, the range of index scores in this method is significantly smaller than all other index ranges, which suggests small changes in the projection numbers would cause sectors to make large jumps up and down the rankings. For both of these reasons, we feel this fourth and final robustness test generally still supports our 10 selected sectors and three clusters as having high potential growth.

## Appendix B: Description of Employment Data and Sources

This report contains data from the BLS Quarterly Census of Employment and Wages. This census gathers employment information on a quarterly basis from 97% of employers in the United States, Puerto Rico, and the U.S. Virgin Islands. Every employment establishment reports the number of positions it has filled for each quarter. BLS defines an establishment as a single economic unit, such as a farm, a mine, a factory, or a store, that produces goods or services. A company or firm can have multiple establishments within and across many different states.[35]

Establishments are counted by state, which means that for statewide totals, only establishments located within the state are counted toward employment, even if the firm is headquartered in another state. For temporary positions, defined as lasting less than 12 months or that are worked at physically dispersed locations on a routine basis, employment is counted in the state where the main branch office is located that is directly responsible for supervision.[36]

This analysis uses the Quarterly Census of Employment and Wages employment and wage data from 1997 through 2012. Data are separated by NAICS three-digit sub-sector identification codes. There are 98 sub-sectors in total. Data from 1997 are classified under the NAICS 2002 coding system, and data from 2012 are classified under the 2012 system. The differences between the two systems are relatively small.[37] Data are also separated by federal, state, local, or private ownership.

Employment is defined as the average number of positions filled in the sub-sector over the four quarters of the year. Average wages include the average salary, bonuses, stock options, severance pay, profit distributions, cash value of meals and lodging, and tips and other gratuities for an employee working in each subsector. Wages are adjusted for inflation to 2012 dollars using BLS's All Urban Consumer Price Index for a Midwest urban city. The index used for 1997 is 139.8%.

[35] Bureau of Labor Statistics, "Quarterly Census of Employment and Wages: Frequently Asked Questions (FAQs)," January 12, 2015, http://www.bls.gov/cew/cewfaq.htm#Q14.
[36] Bureau of Labor Statistics, "Quarterly Census of Employment and Wages: The Multiple Worksite Report FAQs," January 12, 2015, http://www.bls.gov/cew/cewmwr01.htm.
[37] U.S. Census Bureau, "North American Industry Classification System: Concordances," January 12, 2015, https://www.census.gov/eos/www/naics/concordances/concordances.html

## Appendix C: Methodology of DWD's Industry Labor Projections

The DWD completes Wisconsin industry employment projections through a four-step process.

The first step involves collecting and examining historical employment levels collected by the BLS's Quarterly Census of Employment and Wages.[38]

The second step is creating a set of preliminary short-term (two years) and long-term (10 years) projections using a variety of statistical methods. The long-term projections are based upon ordinary least squares regression and a shift-share model. DWD forms the short-term projections based upon several complementary methods—trend line, ordinary least squares, autoregressive moving-average, vector autoregressive, and Bayesian vector autoregressive models.

Third, DWD disburses the historical data and preliminary projections to business and government analysts and academics for review. They adjust the projections based upon their economic, social, and technological expertise. The analysts' projections are then averaged and used as the final industrial employment projections.

Finally, DWD calculates employment projections at the level of the three- and four-digit of NAICS codes based on the BLS's projected ratios. These projections assume Wisconsin will grow at the same rate as the nation. The BLS completes its industry employment projections by projecting industry demand and then imputing the number of hours of work needed to meet that demand.[39]

[38] Wisconsin's Worknet, "Program Descriptions," May 2013, http://worknet.wisconsin.gov/worknet/progdesc_long.aspx?menuselection=da#PROJ.
[39] Bureau of Labor Statistics, "Employment Projections: Projections Methodology," January 2, 2015, http://www.bls.gov/emp/ep_projections_methods.htm#Industry_employment.

# Appendix D. Detailed Sector Descriptions

Appendix D summarizes the 10 sectors that should have strong employment growth into 2020. Data for these 10 sectors are in Tables 1, 2, and 4, and Table F1.

**Insurance Carriers and Related Activities (524)**

2012 Jobs: 63,538
2012 Average Wages: $80,187
2012 Education (Percentage with Some College and Degrees): 70.0%
2012 Location Quotient: 1.50
1997–2012 Job Increase: 14,510
1997–2012 Average Annual Percent Job Increase: 1.7%
1997–2012 Real Wage Increase: $14,778
2010–2020 *Projected* Average Annual Percent Job Increase: 1.6%

*BLS Sector Description*: Industries in this sector are primarily engaged in one of the following activities: (1) underwriting (assuming the risk, assigning premiums, and so forth) annuities and insurance policies or (2) facilitating such underwriting by selling insurance policies, and by providing other insurance and employee-benefit related services.

Insurance has been a premier business in Wisconsin since the first half of the 20th century. As indicated by location quotient (1.5), Wisconsin is home to, on average, 50% more insurance-related businesses than the rest of the country. The industry has also had large employment growth in the past and has a projected growth through 2020 of 1.6% per year. Insurance Carriers and Related Activities is a high-wage sector with an average wage in 2012 of $80,187 or 175% of the state average wage of $45,912. High wage jobs, as indicated in Table F7, include management positions, sales executives, computer occupations, and financial specialists. The sector also has the highest level of education of our 10 sectors with 70% of employees having some college, an associate degree, or a four-year college or post-graduate degree. The primary subsectors in Table 3 are Insurance Carriers, and Agencies and Brokerages, and Other Insurance Related Activities. Office and administrative support (42%) and business and financial operations (24%) are the most prevalent occupations in the sector.

**Professional, Scientific, and Technical Services (541)**

2012 Jobs: 98,652
2012 Average Wages: $61,359
2012 Location Quotient: 0.60
2012 Education (Percentage with Some College and Degrees): 63.1%
1997–2012 Job Increase: 13,805
1997–2012 Average Annual Percent Job Increase: 1.0%
1997–2012 Real Wage Increase: $3,021
2010–2020 *Projected* Average Annual Percent Job Increase: 2.3%

*BLS Sector Description*: This sector comprises establishments that specialize in performing professional, scientific, and technical activity for others. Requiring a high degree of expertise and training, these activities include: legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer sciences; consulting services; research services; advertising services; photographic services; translation, and interpretation services; veterinary services; and other professional, scientific, and technical services.

This relatively high wage and education sector comprised almost 100,000 jobs in 2012 and is slated to grow at annual rate of 1% per year through 2020. High wage jobs, as indicated in Table F7, include management positions, engineers, mathematical science and computer occupations, architects, drafters, and engineering technicians. At the present, Wisconsin is not as competitive as other states in these activities as indicated by a location quotient of 0.60. However, given the appropriate education infrastructure, the state can become more competitive, and retain and grow these jobs.

**Management of Companies and Enterprises (551)**

2012 Jobs: 52,752
2012 Average Wages: $86,642
2012 Location Quotient: 1.29
2012 Education (Percentage with Some College and Degrees): 58.5%
1997–2012 Job Increase: 23,328
1997–2012 Average Annual Percent Job Increase: 4.0%
1997–2012 Real Wage Increase: $16,538
2010–2020 *Projected* Average Annual Percent Job Increase: 1.3%

*BLS Sector Description*: This sector comprises (1) establishments that hold securities of (or other equity interests in) companies and enterprises for the purpose of owning a controlling interest or influencing management decisions or (2) establishments (except government establishments) that administer, oversee, and manage establishments of the company or enterprise and that normally undertake the strategic or organizational planning and decision-making role of the company or enterprise.

Management of companies and enterprises was the fastest growing sector in Wisconsin from 1997–2012, at a 4% annual rate, from 29,424 jobs in 1997 to 52,752 jobs in 2012. In addition, the sector has the highest average wages of our 10 top sectors ($86,642). High wage jobs, as indicated in Table F3, include management positions, sales executives, computer occupations, business operations, and financial specialists. Although the education level of 58.5% with some college or more is high, it is not as high as several other sectors, indicating that jobs in this area may not require college or advance degrees as much as other technical or health-related sectors. Prevalent occupations in this sector include office managers and administrators, sales managers, as well as those working in banks, for venture capitalists, and at other financial companies. The fact that the location quotient is 1.29 means that Wisconsin has some competitive advantage in this very important sector.

**Administrative and Support Services (561)**

2012 Jobs: 134,291
2012 Average Wages: $29,025
2012 Location Quotient: 0.86
2012 Education (Percentage with Some College and Degrees): 39.1%
1997–2012 Job Increase: 23,763
1997–2012 Average Annual Percent Job Increase: 1.3%
1997–2012 Real Wage Increase: $1,797
2010–2020 *Projected* Average Annual Percent Job Increase: 2.4%

*BLS Sector Description*: Industries in this sector are engaged in activities that support the day-to-day operations of other organizations. The processes employed (e.g., general management personnel administration, clerical activities, cleaning) are often integral parts of activities of establishments found in all sectors of the economy. The establishments classified in this subsector have specialized in one or more of these activities and can, therefore, provide services to clients in a variety of industries and, in some cases, households. Many of the activities performed in this subsector are ongoing routine support functions that all businesses and organizations must do and have traditionally done for themselves. Recent trends, however, are to contract or purchase such services from businesses that specialize in such activities and can, therefore, provide such services more efficiently.

Contracted administrative support services employ many people in Wisconsin at relatively low wages. Those wages have increased by 6.6% from 1997 to 2012. The jobs do not usually require a high degree of training or education (39.1% some college or more), but do provide entry-level jobs. Management and supervisory positions in this sector are above the state average in wages. The sector is projected to grow at a very high rate of 2.4% per year, increasing by an estimated 32,810 jobs from 2010 to 2020. Other states are somewhat more competitive in this sector, undoubtedly due to the larger employment base in those states.

**Ambulatory Health-Care Services (621)**

2012 Jobs: 116,557
2012 Average Wages: $51,910
2012 Location Quotient: 0.89
2012 Education (Percentage with Some College and Degrees): 62.8%
1997–2012 Job Increase: 30,430
1997–2012 Average Annual Percent Job Increase: 2.0%
1997–2012 Real Wage Increase: -$2,812
2010–2020 *Projected* Average Annual Percent Job Increase: 2.1%

*BLS Sector Description*: Industries in this sector provide health-care services directly or indirectly to ambulatory patients and do not usually provide inpatient services. Health practitioners in this subsector provide outpatient services, with facilities and equipment usually being the most significant part of the production process.

Although job growth in this area is about 2% per year from 1997 to 2020, and the sector has above state average wages, it is the only sector in our list that lost wages (-$2,812) from 1997 to 2012. The education level of employees in this sector are relatively high (62.8% have some college or more). The reason for the loss is unclear, but the sector is heavily supported by private or public medical insurance, and forced reduction in reimbursement rates may have carried over to wages. Higher paying jobs in addition to management and supervisory jobs include health diagnosing and treatment practitioners, and computer occupations.

**Hospitals (622)**

2012 Jobs: 123,749
2012 Average Wages: $52,217
2012 Location Quotient: 1.00
2012 Education (Percentage with Some College and Degrees): 64.0%
1997–2012 Job Increase: 33,455
1997–2012 Average Annual Percent Job Increase: 2.1%
1997–2012 Real Wage Increase: $8,716
2010–2020 *Projected* Average Annual Percent Job Increase: 2.0%

*BLS Sector Description*: Industries in the Hospitals NAICS subsector provide medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialized accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Establishments in the Hospitals subsector provide inpatient health services, many of which can only be provided using the specialized facilities and equipment that form a significant and integral part of the production process.

Hospitals are a higher-than-average wage sector that has grown and will continue to grow at about 2% per year. Subsectors include primarily general medical and surgical hospitals (89%), but also psychiatric and specialty hospitals. Hospitals are one of the two sectors that have substantial employment in the public sector at 13%. Those public employees make approximately 25% more money than private hospital workers. Major occupations include health-care practitioners and technical occupations (53%), office and administrative support (14%), and health-care support (13%). In addition to managers and supervisors, health-care practitioners and technical occupations are among the higher wage jobs in this sector.

**Nursing and Residential Care Facilities (623)**

2012 Jobs: 84,674
2012 Average Wages: $31,681
2012 Location Quotient: 1.22
2012 Education (Percentage with Some College and Degrees): 45.4%
1997–2012 Job Increase: 15,587
1997–2012 Average Annual Percent Job Increase: 1.4%
1997–2012 Real Wage Increase: $5,866
2010–2020 *Projected* Average Annual Percent Job Increase: 2.3%

*BLS Sector Description*: Industries in the Nursing and Residential Care Facilities sector provide residential care combined with nursing, supervisory, or other types of care as residents require. In this subsector, the facilities are a significant part of the production process, and the care is a mix of health and social services with the health services being largely some level of nursing services.

Nursing and residential care facilities provide increasing employment in a relatively low-wage sector. That wage level reflects the relatively low level of education of many workers in this sector. Wages increased 22.7% from 1997 to 2012. The number of jobs is anticipated to increase 2.3% through 2020. The majority of services are provided in nursing care facilities (66% of employees), with the rest in community elder care or mental health facilities. Unlike other health-care sectors in our list, nursing homes are relatively competitive with other states with a location quotient of 1.22. Health-care support and personal care and service occupations outnumber (56%) the higher paying health-care practitioners and technical occupations (15%). The latter includes nurses.

**Social Assistance (624)**

2012 Jobs: 64,395
2012 Average Wages: $28,061
2012 Location Quotient: 1.12
2012 Education (Percentage with Some College and Degrees): 46.5%
19977–2012 Job Increase: 26,187
1997–2012 Average Annual Percent Job Increase: 3.5%
1997–2012 Real Wage Increase: $151
2010–2020 *Projected* Average Annual Percent Job Increase: 0.6%

*BLS Sector Description*: Industries in the Social Assistance NAICS subsector provide a wide variety of social assistance services directly to their clients. These services do not include residential or accommodation services, except on a short-stay basis.

The social assistance sector had remarkable growth in employment averaging 3.5% from 1997 to 2012. However, that growth is predicted to be considerably lower in the decade beginning in 2010. In addition, since 1997, there has been essentially no wage increase in an already relatively low-wage sector. That wage level reflects the modest level of education of many employees. Social scientists and related workers are an exception to the low wages paid in general in this sector.

**Amusement, Gambling, and Recreation Industries (713)**

2012 Jobs: 33,900
2012 Average Wages: $28,386
2012 Location Quotient: 0.96
2012 Education (Percentage with Some College and Degrees): 35.0%
1997–2012 Job Increase: 6,721
1997–2012 Average Annual Percent Job Increase: 1.5%
1997–2012 Real Wage Increase: $6,633
2010–2020 *Projected* Average Annual Percent Job Increase: .6%

*BLS Sector Description*: Industries in this sector operate facilities where patrons can primarily engage in sports, recreation, amusement, or gambling activities and/or provide other amusement and recreation services, such as supplying and servicing amusement devices in places of business operated by others; operating sports teams, clubs, or leagues engaged in playing games for recreational purposes; and guiding tours without using transportation equipment. The industry groups in this subsector highlight particular types of activities: amusement parks and arcades, gambling industries, and other amusement and recreation industries.

This sector is part of Wisconsin's important tourism industry. It has experienced above average growth in the last 15 years but slower growth is projected in the next decade. Real-wage increases have been respectable but the average annual wage still is considerably below the state average of $45.931. That in part is reflected in the part-time nature of a number of jobs and probably of higher than average employment of young workers on amusement parks and arcades. It also is affected by the lower levels of education in the industry (35% have some college or more). This sector also has by far the most public employees with 22.1% of employees as local government workers. Those workers averaged $26,012 in annual wages compared to $14,601 for the 77.2% of the workforce in the private sector. Other than managers and supervisors, there are few distinctive high paying jobs in this sector.

**Food Services and Drinking Places (722)**

2012 Jobs: 190,177
2012 Average Wages: $15,156
2012 Location Quotient: 0.93
2012 Education (Percentage with Some College and Degrees): 23.7%
1997–2012 Job Increase: 26,856
1997–2012 Average Annual Percent Job Increase: 1.0%
1997–2012 Real Wage Increase: $1,779
2010–2020 *Projected* Average Annual Percent Job Increase: 2.0%

*BLS Sector Description*: Industries in the Food Services and Drinking Places subsector prepare meals, snacks, and beverages to customer order for immediate on- and off-premises consumption. There is a wide range of establishments in these industries. Some provide food and drink only; while others provide various combinations of seating space, waiter/waitress services and incidental amenities, such as limited entertainment.

The largest of our 10 top, this sector is expected to grow about 10% from 2010 to 2020. It is also the lowest paying sector, but that may well be partly due to the under-reporting of tip income and the part-time nature of much of the work in full- and limited-service restaurants that make up, respectively, 47% and 37% of the sector employment. The sector also has by far the lowest level of education with 23.1% of workers having some college or more. However, that share reflects the number of young workers, perhaps with entry-level job experiences, who have not ended their education. In Table F1 that trend is indicated by the 48.8% “educational attainment not available” category for 2012. Other than managers and supervisors, there are few distinctive high paying jobs in this sector. However, this sector is an important part of the tourism industry, which remains important in the state.

## Appendix E: Methodology of DWD's Occupation Employment Projections

This report uses DWD's long-term occupational employment projections. DWD's occupational employment projections are based on BLS's national occupation employment projections, the Occupational Employment Statistics survey, and Wisconsin's actual industry employment at the four-digit NAICS code level. The projections process involves three main steps[40]:

First, DWD uses the Occupational Employment Statistics survey to estimate current (base year) Wisconsin employment by occupation.

Second, DWD receives a job "replacement rate" from BLS, which estimates the expected rate at which jobs will become available due to workers permanently leaving their positions over the projection period.[41] BLS also provides a set of "change factors" that attempts to estimate how the number of job openings in each occupation will expand or contract over the projection period.[42]

Finally, DWD creates a matrix comprised of base-year industry (NAICS code) employment on one axis and Standard Occupational Classification employment estimates on the other axis, also known as the industry-occupation matrix. DWD then factors in its long-term industry employment projections,[43] BLS "replacement rates," and BLS "change factors" to create a set of long-term occupation projections.

[40] Wisconsin's Worknet, "Program Descriptions," May 2013, http://worknet.wisconsin.gov/worknet/progdesc_long.aspx?menuselection=da#PROJ
[41] Bureau of Labor Statistics, "Employment Projections: Estimating Occupational Replacement Needs," January 2, 2015, http://www.bls.gov/emp/ep_replacements.htm
[42] Bureau of Labor Statistics, "Employment Projections: Projections Methodology," January 2, 2015, http://www.bls.gov/emp/ep_projections_methods.htm#occfactors
[43] DWD's industry employment projections methodology is described in Appendix C.

# Appendix F: Tables

## Table F1: Education Breakdown of Selected High-Growth Industries

| Industry | Description | Percentage of 1997 Employment | 1997 Salary in 2012 Dollars | Percentage of 2012 Employment | 2012 Salary | Average Annual Growth Rate | 1997-2012 Salary Change |
|---|---|---|---|---|---|---|---|
| **524** | **Insurance Carriers and Related Activities** | | | | | | |
| E1 | Less than high school | 2.3% | $31,493 | 4.0% | $43,392 | 5.1% | $11,899 |
| E2 | High school or equivalent, no college | 21.1% | $35,922 | 21.7% | $47,448 | 1.6% | $11,526 |
| E3 | Some college or Associate degree | 29.2% | $42,754 | 31.8% | $55,539 | 2.1% | $12,785 |
| E4 | Bachelor's degree or advanced degree | 38.3% | $65,858 | 38.2% | $86,193 | 1.4% | $20,335 |
| E5 | Educational attainment not available (workers 24 or younger) | 9.0% | $23,285 | 4.3% | $28,524 | -3.5% | $5,239 |
| **541** | **Professional, Scientific, and Technical Services** | | | | | | |
| E1 | Less than high school | 3.3% | $31,057 | 5.7% | $44,007 | 4.7% | $12,950 |
| E2 | High school or equivalent, no college | 18.2% | $36,945 | 20.9% | $47,424 | 1.9% | $10,479 |
| E3 | Some college or Associate degree | 25.5% | $47,371 | 28.0% | $56,367 | 1.6% | $8,996 |
| E4 | Bachelor's degree or advanced degree | 39.0% | $76,981 | 35.1% | $87,885 | 0.2% | $10,904 |
| E5 | Educational attainment not available (workers 24 or younger) | 13.9% | $23,654 | 10.4% | $25,197 | -1.0% | $1,543 |
| **551** | **Management of Companies and Enterprises** | | | | | | |
| E1 | Less than high school | 5.6% | $38,518 | 6.2% | $49,902 | 4.3% | $11,384 |
| E2 | High school or equivalent, no college | 25.5% | $44,775 | 24.3% | $57,741 | 3.3% | $12,966 |
| E3 | Some college or Associate degree | 26.6% | $54,337 | 30.5% | $69,945 | 4.6% | $15,608 |
| E4 | Bachelor's degree or advanced degree | 27.1% | $91,798 | 28.0% | $119,430 | 3.9% | $27,632 |
| E5 | Educational attainment not available (workers 24 or younger) | 15.2% | $19,292 | 10.9% | $25,149 | 1.4% | $5,857 |
| **561** | **Administrative and Support Services** | | | | | | |
| E1 | Less than high school | 11.4% | $18,366 | 12.4% | $21,624 | 0.8% | $3,258 |
| E2 | High school or equivalent, no college | 24.9% | $23,239 | 26.0% | $25,719 | 0.5% | $2,480 |
| E3 | Some college or Associate degree | 22.2% | $27,731 | 25.0% | $29,958 | 1.0% | $2,227 |
| E4 | Bachelor's degree or advanced degree | 11.2% | $44,284 | 14.1% | $44,805 | 1.7% | $521 |
| E5 | Educational attainment not available (workers 24 or younger) | 30.2% | $15,195 | 22.5% | $16,209 | -1.8% | $1,014 |
| **621** | **Ambulatory Health Care Services** | | | | | | |
| E1 | Less than high school | 4.0% | $24,908 | 5.8% | $35,496 | 4.3% | $10,588 |
| E2 | High school or equivalent, no college | 21.9% | $30,121 | 23.1% | $37,449 | 2.1% | $7,328 |
| E3 | Some college or Associate degree | 35.3% | $39,537 | 35.0% | $48,003 | 1.7% | $8,466 |
| E4 | Bachelor's degree or advanced degree | 28.4% | $101,063 | 27.8% | $116,226 | 1.6% | $15,163 |
| E5 | Educational attainment not available (workers 24 or younger) | 10.4% | $17,732 | 8.2% | $17,484 | 0.2% | -$248 |
| **622** | **Hospitals** | | | | | | |
| E1 | Less than high school | 3.7% | $26,884 | 5.2% | $36,759 | 4.1% | $9,875 |
| E2 | High school or equivalent, no college | 21.2% | $30,985 | 23.0% | $39,114 | 2.2% | $8,129 |
| E3 | Some college or Associate degree | 37.1% | $37,251 | 36.9% | $46,635 | 1.6% | $9,384 |
| E4 | Bachelor's degree or advanced degree | 29.4% | $53,788 | 27.1% | $68,400 | 1.1% | $14,612 |
| E5 | Educational attainment not available (workers 24 or younger) | 8.6% | $20,706 | 7.7% | $24,360 | 0.9% | $3,654 |
| **623** | **Nursing and Residential Care Facilities** | | | | | | |
| E1 | Less than high school | 7.0% | $20,513 | 7.9% | $22,680 | 1.8% | $2,167 |
| E2 | High school or equivalent, no college | 25.7% | $23,440 | 25.5% | $25,011 | 1.0% | $1,571 |
| E3 | Some college or Associate degree | 30.9% | $27,676 | 30.1% | $29,031 | 0.9% | $1,355 |
| E4 | Bachelor's degree or advanced degree | 16.3% | $37,251 | 15.3% | $37,545 | 0.6% | $294 |
| E5 | Educational attainment not available (workers 24 or younger) | 20.0% | $14,637 | 21.2% | $14,433 | 1.4% | -$204 |
| **624** | **Social Assistance** | | | | | | |
| E1 | Less than high school | 7.8% | $16,776 | 10.2% | $18,066 | 5.1% | $1,290 |
| E2 | High school or equivalent, no college | 24.4% | $19,582 | 26.0% | $20,286 | 3.7% | $704 |
| E3 | Some college or Associate degree | 28.2% | $23,134 | 29.7% | $23,412 | 3.7% | $278 |
| E4 | Bachelor's degree or advanced degree | 17.4% | $30,826 | 16.8% | $29,712 | 3.0% | -$1,114 |
| E5 | Educational attainment not available (workers 24 or younger) | 22.1% | $13,022 | 17.3% | $12,402 | 1.6% | -$620 |
| **713** | **Amusement, Gambling, and Recreation Industries** | | | | | | |
| E1 | Less than high school | 6.8% | $19,846 | 7.4% | $21,186 | 1.6% | $1,340 |
| E2 | High school or equivalent, no college | 22.1% | $21,951 | 21.9% | $22,245 | 1.0% | $294 |
| E3 | Some college or Associate degree | 19.8% | $24,728 | 21.8% | $23,817 | 1.7% | -$911 |
| E4 | Bachelor's degree or advanced degree | 11.2% | $29,924 | 13.2% | $25,311 | 2.2% | -$4,613 |
| E5 | Educational attainment not available (workers 24 or younger) | 40.1% | $10,036 | 35.8% | $9,204 | 0.3% | -$832 |
| **722** | **Food Services and Drinking Places** | | | | | | |
| E1 | Less than high school | 7.1% | $14,553 | 8.4% | $15,759 | 1.6% | $1,206 |
| E2 | High school or equivalent, no college | 18.8% | $15,920 | 19.1% | $16,287 | 0.6% | $367 |
| E3 | Some college or Associate degree | 14.1% | $17,309 | 16.1% | $17,055 | 1.4% | -$254 |
| E4 | Bachelor's degree or advanced degree | 5.9% | $19,963 | 7.6% | $18,192 | 2.2% | -$1,771 |
| E5 | Educational attainment not available (workers 24 or younger) | 54.1% | $8,065 | 48.8% | $8,760 | -0.2% | $695 |

## Table F2: Projected Occupation Employment Change 2010–2020 by High-Growth Cluster

Note: SOC is Standard Occupational Classification.

| Management and Professional Support Services to Business Cluster | | | |
|---|---|---|---|
| **SOC** | **Occupation Class** | **2010-2020 Projected Growth** | **Percent of Cluster Growth** |
| 43 | Office and Administrative Support Occupations | 13,530 | 22.2% |
| 13 | Business and Financial Operations Occupations | 8,700 | 14.3% |
| 15 | Computer and Mathematical Occupations | 7,400 | 12.2% |
| 51 | Production Occupations | 5,130 | 8.4% |
| 41 | Sales and Related Occupations | 4,270 | 7.0% |
| 37 | Building and Grounds Cleaning and Maintenance Occupations | 3,580 | 5.9% |
| 17 | Architecture and Engineering Occupations | 3,440 | 5.7% |
| 11 | Management Occupations | 3,430 | 5.6% |
| 53 | Transportation and Material Moving Occupations | 2,510 | 4.1% |
| 33 | Protective Service Occupations | 1,910 | 3.1% |
| 29 | Healthcare Practitioners and Technical Occupations | 1,810 | 3.0% |
| 27 | Arts, Design, Entertainment, Sports, and Media Occupations | 1,240 | 2.0% |
| 19 | Life, Physical, and Social Science Occupations | 850 | 1.4% |
| 49 | Installation, Maintenance, and Repair Occupations | 710 | 1.2% |
| 23 | Legal Occupations | 670 | 1.1% |
| 31 | Healthcare Support Occupations | 510 | 0.8% |
| 39 | Personal Care and Service Occupations | 470 | 0.8% |
| 47 | Construction and Extraction Occupations | 390 | 0.6% |
| 25 | Education, Training, and Library Occupations | 130 | 0.2% |
| 21 | Community and Social Service Occupations | 90 | 0.1% |
| 35 | Food Preparation and Serving Related Occupations | 80 | 0.1% |
| | **Total Projected Cluster Growth 2010-2020:** | **60,850** | 100% |

| Health-Care and Social Services Cluster | | | |
|---|---|---|---|
| **SOC** | **Occupation Class** | **2010-2020 Projected Growth** | **Percent of Cluster Growth** |
| 29 | Healthcare Practitioners and Technical Occupations | 25,280 | 39.3% |
| 31 | Healthcare Support Occupations | 11,700 | 18.2% |
| 39 | Personal Care and Service Occupations | 10,230 | 15.9% |
| 43 | Office and Administrative Support Occupations | 8,320 | 12.9% |
| 21 | Community and Social Service Occupations | 2,040 | 3.2% |
| 35 | Food Preparation and Serving Related Occupations | 2,030 | 3.2% |
| 11 | Management Occupations | 1,300 | 2.0% |
| 37 | Building and Grounds Cleaning and Maintenance Occupations | 1,150 | 1.8% |
| 15 | Computer and Mathematical Occupations | 730 | 1.1% |
| 13 | Business and Financial Operations Occupations | 690 | 1.1% |
| 19 | Life, Physical, and Social Science Occupations | 260 | 0.4% |
| 49 | Installation, Maintenance, and Repair Occupations | 240 | 0.4% |
| 27 | Arts, Design, Entertainment, Sports, and Media Occupations | 140 | 0.2% |
| 51 | Production Occupations | 110 | 0.2% |
| 33 | Protective Service Occupations | 80 | 0.1% |
| 53 | Transportation and Material Moving Occupations | 60 | 0.1% |
| 41 | Sales and Related Occupations | 50 | 0.1% |
| 25 | Education, Training, and Library Occupations | (20) | 0.0% |
| | **Total Projected Cluster Growth 2010-2020:** | **64,390** | 100% |

| Leisure and Recreation Services Cluster | | | |
|---|---|---|---|
| **(1)** | **(2)** | **(3)** | **(4)** |
| **SOC** | **Occupation Class** | **2010-2020 Projected Growth** | **Percent of Cluster Growth** |
| 35 | Food Preparation and Serving Related Occupations | 40,360 | 93.8% |
| 39 | Personal Care and Service Occupations | 720 | 1.7% |
| 37 | Building and Grounds Cleaning and Maintenance Occupations | 570 | 1.3% |
| 53 | Transportation and Material Moving Occupations | 500 | 1.2% |
| 33 | Protective Service Occupations | 220 | 0.5% |
| 27 | Arts, Design, Entertainment, Sports, and Media Occupations | 190 | 0.4% |
| 43 | Office and Administrative Support Occupations | 180 | 0.4% |
| 49 | Installation, Maintenance, and Repair Occupations | 110 | 0.3% |
| 41 | Sales and Related Occupations | 60 | 0.1% |
| 13 | Business and Financial Operations Occupations | 50 | 0.1% |
| 51 | Production Occupations | 50 | 0.1% |
| 31 | Healthcare Support Occupations | 10 | 0.0% |
| | **Total Projected Cluster Growth 2010-2020:** | **43,020** | 100% |

## Table F3: Projected Employment Change 2010-2020 by Occupation

SOC is Standard Occupational Classification. The occupations in bold are those with average annual wages above Wisconsin's average of $45,912.

| SOC | Occupation | Projected Employment Change in High-Growth Clusters | Projected Employment Growth in All Wisconsin Sectors | Percentage of Total Projected Growth in High-Growth Clusters | 2012 Average Annual Wage |
|---|---|---|---|---|---|
| **111** | **Top Executives** | **680** | **1,180** | **57.63%** | **$108,087** |
| **112** | **Advertising, Marketing, Promotions, Public Relations, and Sales Managers** | **520** | **2,780** | **18.71%** | **$106,372** |
| **231** | **Lawyers, Judges, and Related Workers** | **280** | **1,400** | **20.00%** | **$103,330** |
| **113** | **Operations Specialties Managers** | **1,950** | **8,130** | **23.99%** | **$94,652** |
| **291** | **Health Diagnosing and Treating Practitioners** | **19,070** | **42,300** | **45.08%** | **$91,078** |
| **119** | **Other Management Occupations** | **1,580** | **9,040** | **17.48%** | **$81,941** |
| **532** | **Air Transportation Workers** | **-** | **270** | **0.00%** | **$80,138** |
| **152** | **Mathematical Science Occupations** | **120** | **910** | **13.19%** | **$79,219** |
| **172** | **Engineers** | **2,140** | **5,200** | **41.15%** | **$72,986** |
| **192** | **Physical Scientists** | **340** | **1,300** | **26.15%** | **$69,533** |
| **414** | **Sales Representatives, Wholesale and Manufacturing** | **310** | **7,440** | **4.17%** | **$68,426** |
| **151** | **Computer Occupations** | **8,010** | **25,280** | **31.69%** | **$67,828** |
| **193** | **Social Scientists and Related Workers** | **230** | **1,230** | **18.70%** | **$66,641** |
| **132** | **Financial Specialists** | **2,750** | **15,420** | **17.83%** | **$64,377** |
| **171** | **Architects, Surveyors, and Cartographers** | **530** | **1,330** | **39.85%** | **$64,181** |
| **471** | **Supervisors of Construction and Extraction Workers** | **20** | **2,460** | **0.81%** | **$63,640** |
| **491** | **Supervisors of Installation, Maintenance, and Repair Workers** | **80** | **1,380** | **5.80%** | **$61,600** |
| **191** | **Life Scientists** | **250** | **2,200** | **11.36%** | **$61,519** |
| **331** | **Supervisors of Protective Service Workers** | **-** | **70** | **0.00%** | **$60,538** |
| **413** | **Sales Representatives, Services** | **3,290** | **11,130** | **29.56%** | **$58,617** |
| **131** | **Business Operations Specialists** | **6,690** | **28,620** | **23.38%** | **$57,356** |
| **299** | **Other Healthcare Practitioners and Technical Occupations** | **340** | **930** | **36.56%** | **$56,094** |
| **511** | **Supervisors of Production Workers** | **80** | **1,800** | **4.44%** | **$55,780** |
| **252** | **Preschool, Primary, Secondary, and Special Education School Teachers** | **-** | **10,330** | **0.00%** | **$53,589** |
| **518** | **Plant and System Operators** | **10** | **650** | **1.54%** | **$51,859** |
| **531** | **Supervisors of Transportation and Material Moving Workers** | **30** | **2,520** | **1.19%** | **$50,771** |
| **173** | **Drafters, Engineering Technicians, and Mapping Technicians** | **770** | **1,800** | **42.78%** | **$49,774** |
| **431** | **Supervisors of Office and Administrative Support Workers** | **1,130** | **4,980** | **22.69%** | **$49,580** |
| **273** | **Media and Communication Workers** | **790** | **4,010** | **19.70%** | **$48,857** |
| **212** | **Religious Workers** | **20** | **250** | **8.00%** | **$48,551** |
| **472** | **Construction Trades Workers** | **220** | **31,870** | **0.69%** | **$48,329** |
| **411** | **Supervisors of Sales Workers** | **100** | **2,500** | **4.00%** | **$46,439** |
| 492 | Electrical and Electronic Equipment Mechanics, Installers, and Repairers | 200 | 1,760 | 11.36% | $44,164 |
| 312 | Occupational Therapy and Physical Therapist Assistants and Aides | 730 | 1,710 | 42.69% | $43,714 |
| 211 | Counselors, Social Workers, and Other Community and Social Service Specialists | 2,110 | 7,550 | 27.95% | $43,665 |
| 499 | Other Installation, Maintenance, and Repair Occupations | 740 | 14,710 | 5.03% | $43,308 |
| 292 | Health Technologists and Technicians | 7,680 | 19,700 | 38.98% | $43,009 |
| 271 | Art and Design Workers | 530 | 2,430 | 21.81% | $42,833 |
| 232 | Legal Support Workers | 390 | 1,270 | 30.71% | $42,657 |
| 254 | Librarians, Curators, and Archivists | 10 | 230 | 4.35% | $40,378 |
| 474 | Other Construction and Related Workers | 150 | 1,640 | 9.15% | $40,328 |
| 371 | Supervisors of Building and Grounds Cleaning and Maintenance Workers | 270 | 830 | 32.53% | $40,075 |
| 194 | Life, Physical, and Social Science Technicians | 290 | 860 | 33.72% | $39,785 |
| 493 | Vehicle and Mobile Equipment Mechanics, Installers, and Repairers | 40 | 6,160 | 0.65% | $39,120 |
| 274 | Media and Communication Equipment Workers | 50 | 790 | 6.33% | $38,891 |
| 391 | Supervisors of Personal Care and Service Workers | 150 | 570 | 26.32% | $37,793 |
| 514 | Metal Workers and Plastic Workers | 1,060 | 16,780 | 6.32% | $37,440 |
| 515 | Printing Workers | 70 | (1,870) | -3.74% | $37,112 |
| 272 | Entertainers and Performers, Sports and Related Workers | 200 | 3,860 | 5.18% | $36,513 |
| 436 | Secretaries and Administrative Assistants | 4,740 | 10,090 | 46.98% | $35,546 |
| 419 | Other Sales and Related Workers | 460 | 3,650 | 12.60% | $35,102 |
| 533 | Motor Vehicle Operators | 860 | 26,810 | 3.21% | $34,818 |
| 253 | Other Teachers and Instructors | 50 | 4,220 | 1.18% | $34,594 |
| 332 | Fire Fighting and Prevention Workers | 110 | 430 | 25.58% | $33,335 |
| 433 | Financial Clerks | 2,530 | 14,420 | 17.55% | $32,542 |
| 519 | Other Production Occupations | 1,530 | 13,550 | 11.29% | $32,434 |
| 435 | Material Recording, Scheduling, Dispatching, and Distributing Workers | 490 | (2,560) | -19.14% | $32,359 |
| 319 | Other Healthcare Support Occupations | 3,220 | 7,850 | 41.02% | $32,035 |
| 351 | Supervisors of Food Preparation and Serving Workers | 2,460 | 5,540 | 44.40% | $31,498 |

| SOC | Occupation | Projected Employment Change in High-Growth Clusters | Projected Employment Growth in All Wisconsin Sectors | Percentage of Total Projected Growth in High-Growth Clusters | 2012 Average Annual Wage |
|---|---|---|---|---|---|
| 434 | Information and Record Clerks | 7,610 | 27,030 | 28.15% | $31,400 |
| 512 | Assemblers and Fabricators | 2,280 | 7,110 | 32.07% | $31,034 |
| 439 | Other Office and Administrative Support Workers | 5,720 | 21,000 | 27.24% | $30,505 |
| 517 | Woodworkers | 10 | 2,740 | 0.36% | $29,907 |
| 259 | Other Education, Training, and Library Occupations | 50 | 2,220 | 2.25% | $29,694 |
| 513 | Food Processing Workers | 50 | 2,290 | 2.18% | $28,303 |
| 373 | Grounds Maintenance Workers | 410 | 9,200 | 4.46% | $27,874 |
| 537 | Material Moving Workers | 2,180 | 20,280 | 10.75% | $27,763 |
| 432 | Communications Equipment Operators | (190) | (1,130) | 16.81% | $26,940 |
| 516 | Textile, Apparel, and Furnishings Workers | 200 | 40 | 500.00% | $25,437 |
| 395 | Personal Appearance Workers | 40 | 5,290 | 0.76% | $24,871 |
| 311 | Nursing, Psychiatric, and Home Health Aides | 8,270 | 20,700 | 39.95% | $24,692 |
| 339 | Other Protective Service Workers | 2,100 | 6,760 | 31.07% | $24,615 |
| 372 | Building Cleaning and Pest Control Workers | 4,620 | 15,850 | 29.15% | $23,686 |
| 412 | Retail Sales Workers | 220 | 22,240 | 0.99% | $22,668 |
| 399 | Other Personal Care and Service Workers | 10,870 | 29,970 | 36.27% | $22,017 |
| 392 | Animal Care and Service Workers | 170 | 2,360 | 7.20% | $21,591 |
| 352 | Cooks and Food Preparation Workers | 7,360 | 14,220 | 51.76% | $21,263 |
| 393 | Entertainment Attendants and Related Workers | 190 | 1,780 | 10.67% | $19,941 |
| 353 | Food and Beverage Serving Workers | 29,970 | 62,070 | 48.28% | $18,787 |
| 359 | Other Food Preparation and Serving Related Workers | 2,680 | 7,600 | 35.26% | $18,025 |
| | **Grand Total** | **168,260** | **346,680*** | **48.53%*** | **$41,920** |