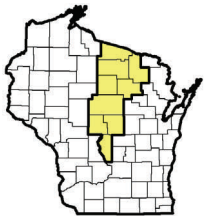
North Central Wisconsin Workforce Development Area

Labor Trends



Adams, Forest, Langlade, Lincoln, Marathon, Oneida, Portage, Vilas, & Wood Counties

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Manufacturing plays a significant role in the economies of central and northern Wisconsin. The region possesses a unique combination of comparative advantages conducive to manufacturing: a strong agricultural sector, close proximity to natural resources such as forests and waterways, well developed transportation networks, and a robust presence of educational institutions. The regional advantages give rise to an industry mix of manufacturing employment that is specific to the North Central Wisconsin Workforce Development Area.

Current Composition of Manufacturing in the North Central Wisconsin Workforce Development Area

Figure 1 depicts the composition of North Central Wisconsin Workforce Development Area (NCWWDA) employment by industry. The proportion of total employment by sector is listed to the right of each industry. The chart displays 2010 annual data.

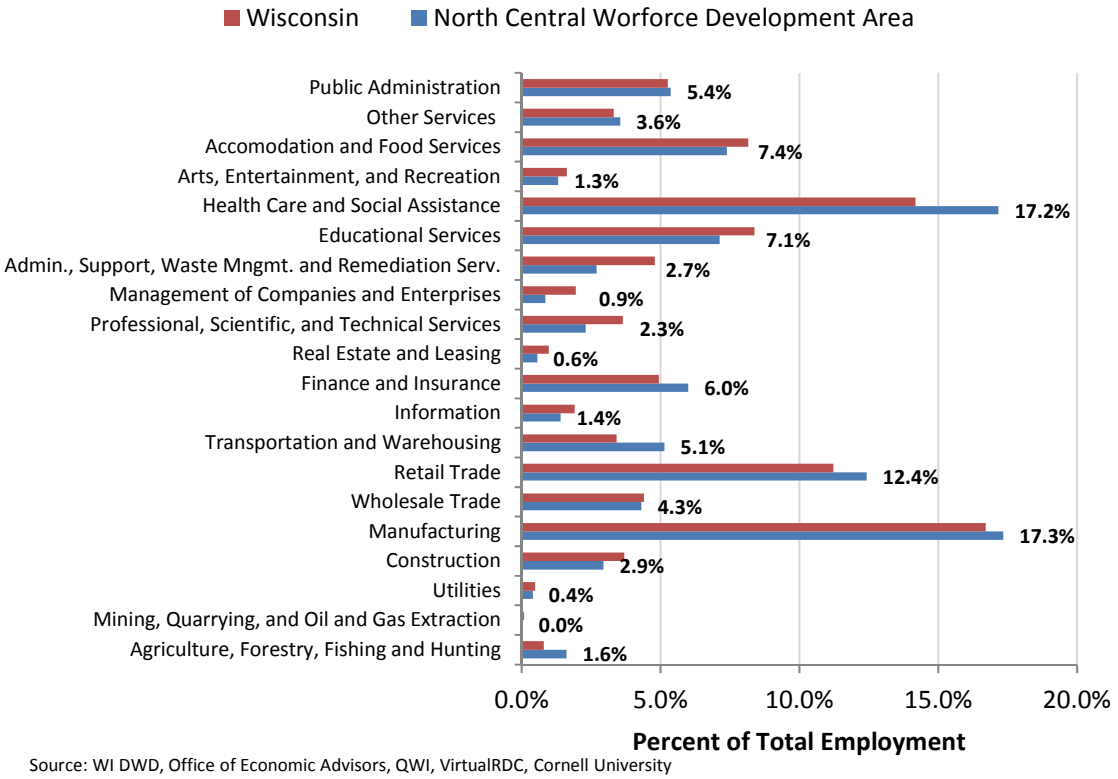
The manufacturing industry sector in the NCWWDA is one of the largest sectors in terms of employment. Manufacturing employs more than 17 percent of the regional workforce, a higher concentration than is found statewide.

In addition to employing a large share of the job base, the manufacturing sector pays well compared to other industries. Figure 2, in the following page contains average monthly earnings by industry sector.

Average monthly earnings for a worker employed in the manufacturing sector is $3,718 a month, 26 percent higher monthly earnings than the all industries average. In the following page, Figure 3 depicts employment totals for all manufacturing subsector industries in the NCWWDA.

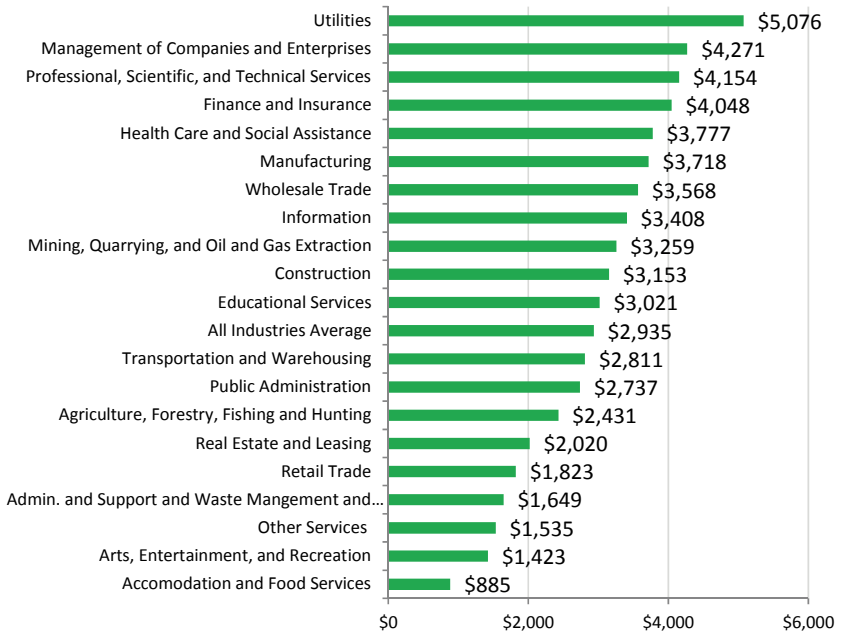
The specific industry mix of manufacturing sub-sectors defines manufacturing in this workforce development area. Of the 31,037 manufacturing jobs in the NCWWDA, 23,733 of those jobs are in: food, machinery, fabricated metal, wood product and paper manufacturing. Industry subsectors do not operate alone. Manufacturing subsectors such as furniture and related products, primary metal, and chemical manufacturing repre-

Figure 1: North Central WDA Share of Total Employment by Industry Sector



Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

Figure 2: Average Monthly Earnings by Industry in the North Central Wisconsin WDA



Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

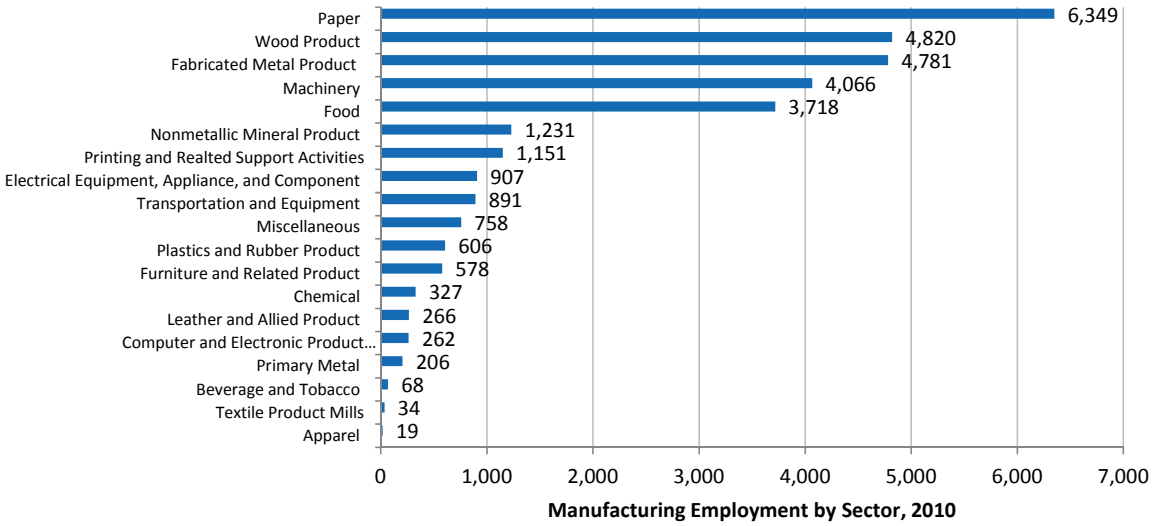
sent regional industry supply chains that work interdependently to produce intermediate goods needed as inputs by the manufacturers of final goods.

An example of a prominent manufacturing subsector that plays a role in a regional supply chain is the paper manufacturing sector, which employs the most workers within the larger manufacturing sector in the NCWWDA. Paper manufacturing includes establishments operating pulp, paper, and paperboard mills as well as those engaged in converting paper or paperboard into paperboard containers, bags, and coated and treated paper products. As an industry sector, paper manufacturing benefits from regional comparative advantages of close proximity to natural resources and well developed transportation infrastructure.

The large presence of paper manufacturing establishments creates opportunities for establishments in other manufacturing subsectors producing needed intermediate goods such as chemicals, machinery, and transportation goods and services. Final goods produced by paper manufacturers are utilized by other area subsectors. For example, packaging materials are used by food manufacturers and finished paper by printing and related support activities. As a composite of individual manufacturing subsectors, regional supply chains together create the manufacturing employment base in the NCWWDA.

More than 76 percent of total manufacturing employment is concentrated among five manufacturing subsectors: food, machinery, fabricated metal, wood product,

Figure 3:North Central Wisconsin Workforce Development Area Manufacuring Employment by Industry Sub-sector



Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

Figure 4: NCWWDA Employment by Select Industry Grouping

Industry	Avg. Quarterly Employment, 2010
Food Manufacturing	**3,718**
Animal Food	20
Sugar and Confectionery Product	35
Fruit and Vegetable Preserving and Specialty Food	1,212
Dairy Product	1,635
Animal Slaughtering and Processing	613
Bakeries and Tortilla	93
Other Food	110
Wood Product Manufacturing	**4,820**
Sawmills and Wood Preservation	359
Veneer, Plywood, and Engineered Wood Product	237
Other Wood Product	4,225
Paper Manufacturing	**6,349**
Pulp, Paper, and Paperboard Mills	5,080
Converted Paper Product	1,269
Fabricated Metal Manufacturing	**4,781**
Forging and Stamping	135
Cutlery and Handtool	Suppressed
Architectural and Structural Metals	1,679
Boiler, Tank, and Shipping Container	482
Hardware	Suppressed
Spring and Wire Product	340
Machine Shops; Turned Product; and Screw, Nut, and Bolt	584
Coating, Engraving, Heat Treating, and Allied Activities	356
Other Fabricated Metal Product	1,038
Machinery Manufacturing	**4,066**
Agriculture, Construction, and Mining Machinery	268
Industrial Machinery	424
Commercial and Service Industry Machinery	78
Ventilation, Heating, Air-Conditioning, and Commercial Refrig. Equip.	2,417
Metalworking Machinery	144
Engine, Turbine, and Power Transmission Equipment	227
Other General Purpose Machinery	511

Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

and paper manufacturing. Each of these five subsectors are in turn a composite of more granular industry groupings. Figure 4 provides a disaggregation of subsector employment among constituent industry groupings.

The food manufacturing sector draws a significant share of employment from both fruit and vegetable processing and dairy product manufacturing. More than 87 percent of wood product manufacturing employment comes from the 'other wood product' industry grouping. Establishments in this grouping produce a wide variety of goods such as prefabricated wood buildings, containers and pallets, and wood windows and doors. Paper manufacturing employment in the region is composed primarily of employment in establishments engaged in pulp, paper, and paperboard milling. Fabricated metal manufacturing employment draws from a variety of industry groupings but has a concentration of establishments engaged in architectural structural metals manufacturing. Architectural structural metals establishments produce goods such as prefabricated metal buildings, manufactured windows and doors. Machinery manufacturing employment is concentrated in a single industry grouping—ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing.

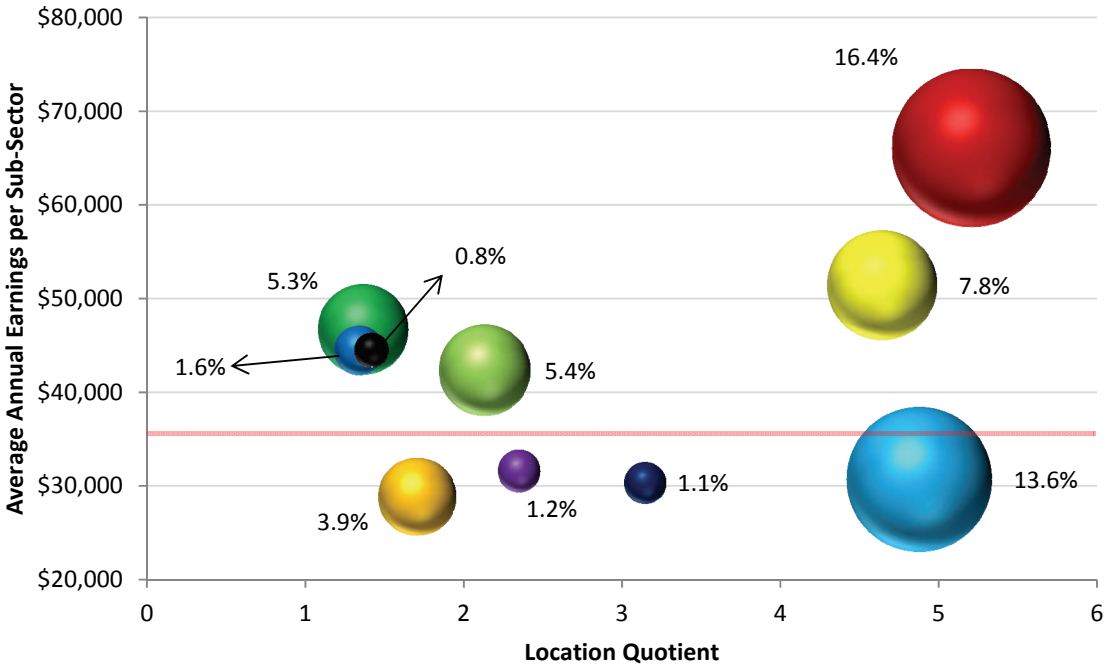
At the industry subsector and grouping levels is a concentration of regional manufacturing employment in industries creating intermediate and final goods used in construction. Subsectors and groupings in this list include wood products, architectural and structural metals, agriculture, construction, and mining machinery, industrial machinery, and ventilation, heating, air-conditioning manufacturing. Slow national growth in residential and nonresidential fixed investment has moderated demand for goods and services produced by these industries. The combination of international economic uncertainty, a frustratingly slow labor market recovery, and low consumer confidence create stiff economic headwinds for near term fixed residential and nonresidential investment growth.

High Employment Subsectors in Perspective

A natural question to ask about the structure of regional manufacturing employment in the NCWWDA is: 'How do key regional industry groupings compare to one another?' On the following page, Figure 5 depicts a comparison of select regional industry groupings across three basic measures.

On the horizontal axis is a measure known as a location quotient. A location quotient is a tool used by economists and economic developers to assess the relative concentration of employment in one region as compared to another. It is the ratio of the proportion of total employment in a NCWWDA industry sector to the proportion of total employment that grouping composes in the state as a whole. Location quotients larger than

Figure 5: NCWWDA Manufacturing Location Quotients



Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

one indicate that the industry grouping is found in a higher regional concentration than in the state as a whole. Only industry groupings with quotients greater than one were included in this chart. In the NCWWDA, many of the industry groupings with large employment totals are also found in very high regional concentrations. This is a measure of strong industry employment clusters in very specific industries within the WDA.

The percentage to the side of each bubble measures the percentage of total manufacturing employment that grouping composes. Percentages greater than one are indicative of groupings that play very large roles in the regional manufacturing job base.

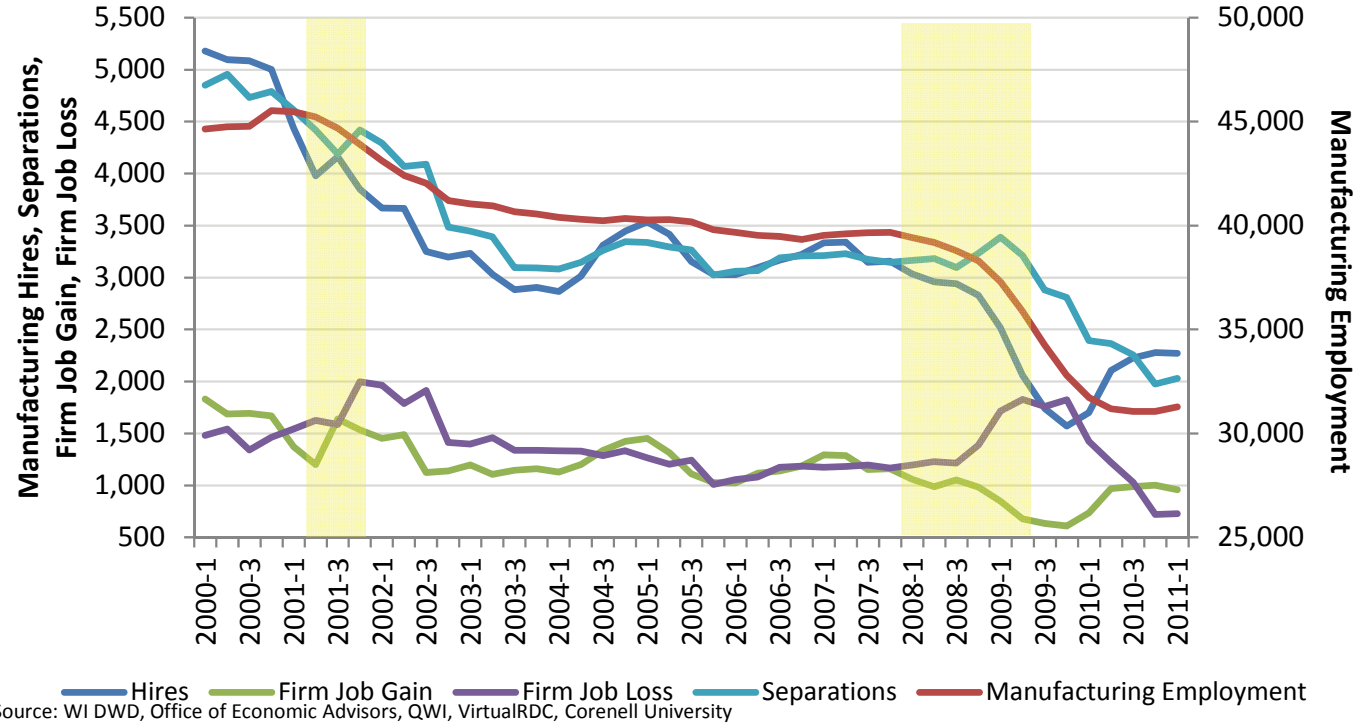
On the vertical axis is average annual earnings by industry grouping. The red line represents the all industry average annual earnings for the entire job base in the NCWWDA, which is $35,223 a year. The two highest paying industry groupings are pulp, paper, and paperboard mill manufacturing and ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing. Workers in these industry groupings earned on average $66,132 and $51,465 per year respectively.

Regional Economic Trends in Manufacturing

Manufacturing employment in the NCWWDA has been in decline since 2000, as demonstrated by the red line representing total WDA employment in Figure 6 on the following page. Recessions are highlighted in yellow. Close inspection of labor dynamics shows three phases of transition in manufacturing employment. Beginning in 2001, manufacturing employment experienced a period of contraction that ended in late 2003. From 2003 to 2007, manufacturing employment stabilized. From 2008 through 2010, manufacturing employment sharply contracted by approximately 20 percent. However, be-

Figure 6: North Central WDA Manufacturing Employment

Data Shown as 4 Quarter Moving Averages



Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Corenell University

ginning in 2009, core labor market indicators began to point to recovery.

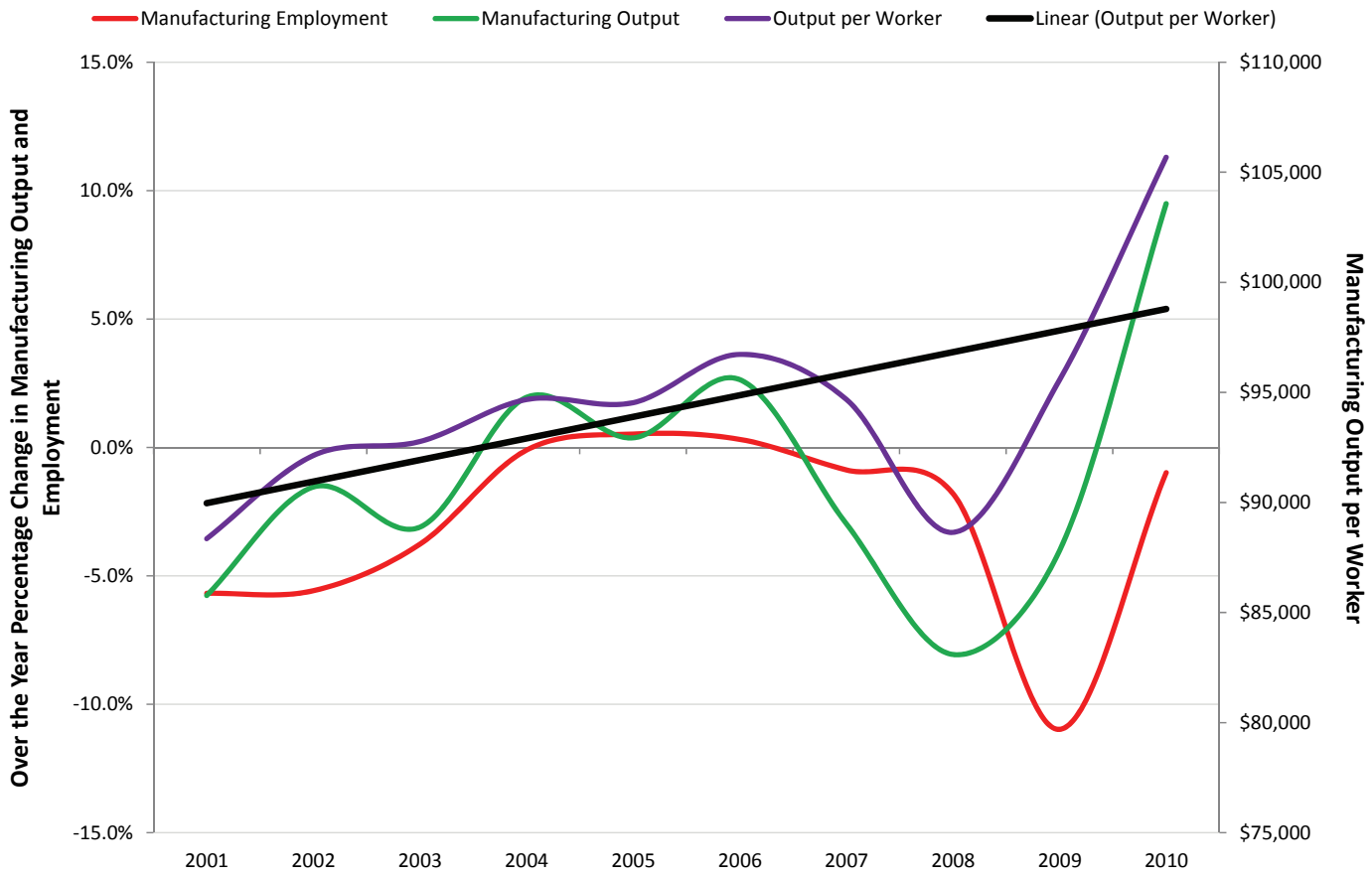
Hires represent both growth in employment at growing establishments and replacement of departed employees. Separations reflect both market-related employment contractions and voluntary departures of current employees. Growth hires, or firm job gain, refer to the employment growth resulting from expanding businesses. Employment decreasing business contraction, or firm job loss, is self explanatory. Net employment change of hires less separations has three economic components: growth hires, employment decreasing business contraction and labor market churn. Labor market churn refers to offsetting hires and separations in the labor market.

In late 2009, hires began to increase, separations continued to decrease, and firm job loss declined while firm job gain increased. At this time, external measures of manufacturing productivity such as the U.S. Industrial Production Index and the Chicago Fed Midwest Manufacturing Index began to point to a recovery among national and Midwestern manufacturers. Lagging these indices, regional manufacturing employment began to increase in early 2011.

The recovery following the most recent recession is different than the recovery that followed the recession in the early decade. After the end of the early decade recession in the fourth quarter of 2001, regional manufacturing employment continued to contract through 2003. Net employment change was negative due to elevated separations relative to hires. Separations were driven by high firm job loss and hires attenuated by anemic firm job gain.

The labor market dynamics early in the decade were a result of trends in manufacturing production. As seen in Figure 7 on the following page, Wisconsin manufacturing output (the green trend line) was in a sustained period of contraction that lasted through 2003. Reasons for the contraction include, but are not limited to, long-term adjustment in regional transportation equipment industries, competition from foreign manufacturers and offshoring of production jobs.

Figure 7: Wisconsin Manufacturing Output, Employment and Labor Productivity



Source: WI DWD, Office of Economic Advisors, Bureau of Economic Analysis

In the middle of the decade, Wisconsin manufacturing productivity began to increase until 2007, when the most recent recession began. In 2010, statewide manufacturing production experienced a sharp rebound. Manufacturing productivity is a leading indicator of manufacturing employment. The impact of the 2010 production increases can be seen in the stabilization and modest employment growth in 2011 displayed in Figure 6.

The long term increase in manufacturing labor productivity is very interesting. Labor productivity is measured on the right vertical axis and is represented by both the purple and the black trend lines. The black trend line represents the same data as the red, but has been smoothed.

During the last decade, productivity increases were due to both output increasing faster than employment at certain times, and decreases in employment outpacing decreases in output at other times.

The general, upward linear trend of manufacturing labor productivity has implications for the future manufacturing workforce. Technological innovation increases the productivity of labor. During periods of economic contraction, forces such as off-shoring free up resources for more efficient uses like capital investment, which also increases labor productivity. As a capital intensive industry sector, manufacturing needs skilled workers to operate the capital used in production. When production capital such as machinery evolves, so too does labor demand among manufacturers.

Anecdotal evidence of changes in labor demand can be seen in the changing educational attainment among the regional manufacturing workforce. Figure 8 displays educational attainment for manufacturing workers twenty-five years and older in the NCWWDA. The 'some college' educational attainment level is inclusive of individuals with associate degrees, those who attended col-

Figure 8: Educational Attainment of the Manufacturing Workforce in the NCWWDA

	1990		2000		2010	
Level of Educational Attainment	Number Employed	Proportion of Workforce	Number Employed	Proportion of Workforce	Number Employed	Proportion of Workforce
Less than High School	3,503	10.40%	3,593	8.86%	2,323	7.99%
High School	14,613	43.39%	17,055	42.05%	11,703	40.26%
Some College	10,383	30.83%	13,609	33.56%	10,189	35.05%
Bachelor's Degree or Greater	5,177	15.37%	6,299	15.53%	4,854	16.70%
Total	33,677	100%	40,557	100%	29,068	100%

Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

lege but did not complete a degree, and educational certificate holders. The proportion of the manufacturing workforce with either 'some college' or a Bachelor's degree or greater has steadily risen over time while the proportion of manufacturing workers with less than high school or a high school or equivalent has fallen.

As the proportional composition of educational attainment in the NCWWDA regional manufacturing workforce has changed, so too has the age composition. As seen in Figure 9, the region's manufacturing workforce became older over the last twenty years. In 2010, 52 percent of manufacturing workers were between 45 and 64 years of age. This is almost double the 27 percent of the workforce aged 45 to 64 in 1990. The changing age structure of manufacturing is largely attributable to the aging baby boomer cohort. As baby boomers begin to retire and exit the labor market, this will create demand to replace outgoing workers. The increasing share of older workers combined with the rising level of educational attainment points to opportunity for educated younger workers considering a career in the manufacturing industry sector.

Conclusion

Labor market dynamics following the most recent recession are different than dynamics experienced in earlier recessions among NCWWDA regional manufacturers. While employment losses sustained during the recession were large (20 percent of the manufacturing workforce), core labor market indicators point to a stabilization of the manufacturing job base.

Within manufacturing, worker productivity has increased over the last decade. Changing education attainment of the manufacturing workforce is suggestive of changing labor demand. The pattern of changing labor demand combined with an aging manufacturing workforce creates opportunities for educated younger workers considering careers in the manufacturing sector.

Figure 9: Age Composition of the Manufacturing Workforce in the NCWWDA

	1990		2000		2010	
Age Group	Number Employed	Proportion of Workforce	Number Employed	Proportion of Workforce	Number Employed	Proportion of Workforce
14 to 18 years of age	519	1.32%	581	1.28%	194	0.62%
19 to 21 years of age	2,274	5.79%	2,048	4.50%	689	2.22%
22 to 24 years of age	2,829	7.20%	2,350	5.16%	1,104	3.55%
25 to 34 years of age	12,211	31.07%	10,067	22.11%	5,145	16.57%
35 to 44 years of age	10,391	26.44%	14,405	31.63%	7,036	22.66%
45 to 54 years of age	6,787	17.27%	10,865	23.86%	10,207	32.87%
55 to 64 years of age	3,902	9.93%	4,638	10.19%	5,980	19.26%
65 to 99 years of age	386	0.98%	582	1.28%	701	2.26%
Total	39,299	100%	45,536	100%	31,056	100%

Source: WI DWD, Office of Economic Advisors, QWI, VirtualRDC, Cornell University

The Wisconsin Department of Workforce Development 's Office of Economic Advisors (OEA) is charged with assisting all interested parties in better understanding their local economies. OEA has labor economists positioned throughout Wisconsin to help those involved in economic and workforce development.

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