MONTANA MANUFACTURING EXTENSION CENTER

The State of Montana Manufacturing

2015 Edition

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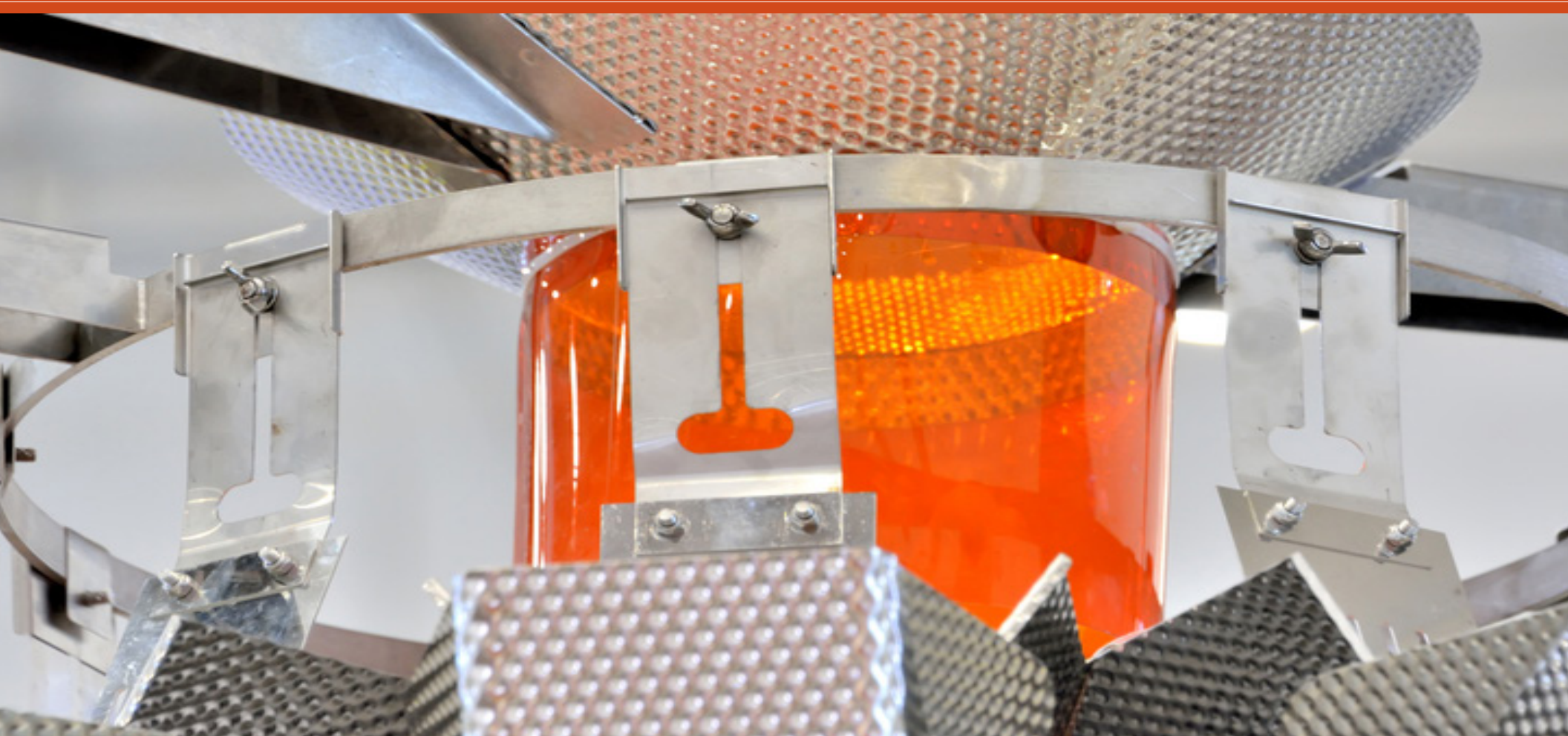

Acknowledgments

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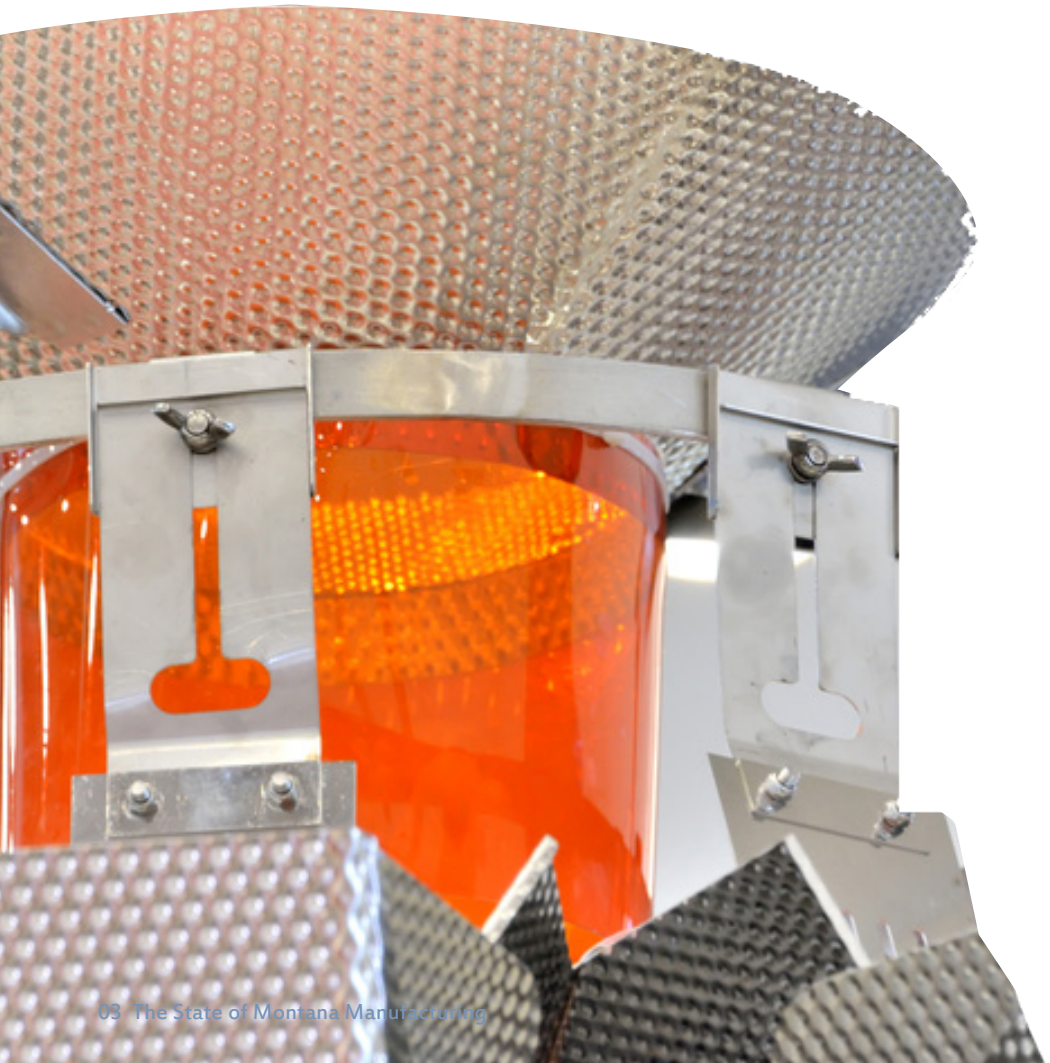


The U.S. economy has been mired in a slow growth mode since the business cycle trough in the second quarter of 2009. Annual growth in real GDP has consistently been below the long-run average of roughly 3.0 percent. The recent decline in the price of oil could spur consumer spending, but this stimulus has not yet appeared in the leading indicators released in the first half of 2015. One of the major causes of the slower growth has been the renewed recession and financial crisis in the EU combined with cooling of the growth rates in China and other developing countries. Nevertheless, a number of national forecasters are predicting the U.S. Federal Reserve will begin to raise short-term interest rates late in 2015.

U.S. manufacturing has been one of the few bright spots of the economy. Growth in durable goods production accounted for most of the comeback. Consumers should benefit from lower oil prices, and combined with improved confidence, may continue to make automobile and other major purchases. Similarly, a recovering housing market is stimulating the demand for furniture and appliances. Increased business and construction activity have also boosted demand for metals, machinery, and other equipment. There will be more about manufacturing exports later in this report, but the rising value of the dollar and slow worldwide growth may dampen foreign markets.

INTRODUCTION

Table 1
Manufacturing Employment, U.S. and Montana
2009Q2 and 2014Q3

	2009Q2	2014Q3	Percent Change
U.S. Manufacturing	11,812,000	12,240,400	3.6
Montana Manufacturing	17,500	19,000	8.6
Wood and Paper Products	3,450	2,900	-15.9
All Other Manufacturing	14,100	16,100	14.2

Note: Data does not include the self-employed.
Sources: U.S. Bureau of Labor Statistics. Bureau of Business and Economic Research, University of Montana.

The Montana economy has also posted sub-par performance, but with major differences between the eastern and the western portions of the state. With the exceptions of 2011 and 2012, Montana's overall growth has been less than 3.0 per year. This statewide figure hides dramatic regional differences. The Bakken oil boom has led to double-digit growth rates in eastern Montana and has boosted the economies of nearby towns such as Glendive, Miles City, and even Billings. Gallatin County stands out as the only non-Bakken related economy to experience robust growth. Flathead, Lewis and Clark, and Cascade counties have posted modest growth. Missoula and Ravalli counties in the western part of the state have finally started to turn upward. The recent lower oil prices are dampening the growth in the Bakken area, but the length and severity of the price declines are currently uncertain.

Table 1 presents manufacturing wage and salary employment for the U.S. and Montana during the second quarter of 2009 (the cycle trough) and the third quarter of 2014 (the latest data available). Comparing the trends in employment reveals how manufacturing has fared in the U.S. and Montana during the recovery phase of this business cycle.

U.S. manufacturing wage and salary employment rose slightly from 11.8 million workers in 2009Q2 to 12.1 million in 2013Q3, an increase of 2.1 percent. Montana manufacturing employment increased from 17,500 in 2009Q2 to 18,600 in 2013Q3, an increase of 6.3 percent. The data for 2013Q3 do not incorporate the impacts of the oil price decline on manufacturers of oil field equipment.

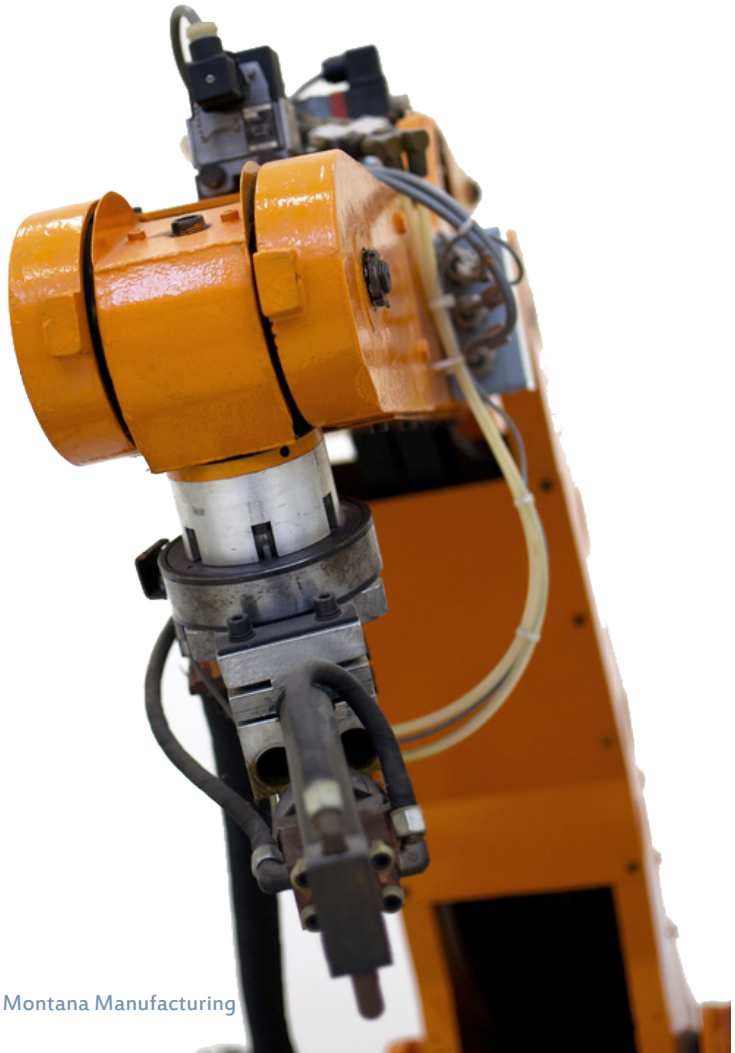
The strong growth in Montana manufacturing employment occurred despite permanent closures in several manufacturing industries. The Smurfit-Stone paper mill near Missoula permanently closed in early 2010. This facility was the largest manufacturing plant in the state. In addition, there were shutdowns and closures in the wood products industry. Even though the closures in both industries occurred during a period of poor markets, the long-term cause was a significant decrease in the supply of raw material due to the diminished harvests on federal and some industrial land. The paper mill and some sawmills have been dismantled, and these jobs will not return even when the economy fully recovers.

The Columbia Falls Aluminum Company also closed during this period. Employment at this facility has been gradually declining for years as the supply of appropriately priced electricity has become scarcer. The plant is currently being dismantled.

As shown in Table 1, employment in the wood and paper products industry decreased by 550 workers between 2009Q2 and 2013Q3. Employment in all the other components of Montana manufacturing increased by about 1,600 workers, or 11.3 percent.

In summary, since the start of the recovery Montana manufacturing employment has increased considerably faster than the national rate. This strong performance was in spite of permanent closures in the wood and paper products industries.

FUTURE TRENDS AFFECTING MANUFACTURING



The future prospects for energy in the U.S. have significantly brightened and this will impact manufacturing. The shale energy revolution is using advances in geophysics, nanotechnology, engineering, and production to dramatically increase the country's energy production. There have been significant increases in the supply of natural gas and crude oil from locations as varied as the mid-Atlantic states, the Bakken area on Montana-North Dakota border, and traditional supply areas such as Texas.

The growing supply of crude oil has dramatically reduced its price as well as the country's dependence on imports. From summer 2014 to January 2015 the world price of oil dropped by more than 40 percent. How long the price of oil will remain depressed and its future trend is uncertain. One school of thought has oil prices gradually rising and returning to the $90/barrel level by 2019. Past oil price forecasts have proven to be very unreliable.

The country's dependence on imported oil has been an important political and national security issue. As recently as 2005, the U.S. was importing 60 percent of our petroleum. The forecasts are for this figure to drop to 40 percent by 2017.

Increased U.S. supplies of natural gas have also reduced its price. From 2007 to 2013 the price of natural gas dropped from about $6.95 ($/MBtu) to roughly $3.71 ($/MBtu), a decrease of 53.3 percent. Unlike oil, there is no single worldwide price for natural gas because it is difficult to transport. There is some small international traffic in natural gas (after it has been liquefied) but most natural gas markets are limited to North America. The significant drop in the

U.S. price of natural gas has not been repeated elsewhere in the world.

The shale energy developments will impact manufacturing in a number of ways:

- The decrease in the price of natural gas will reduce energy costs;
- The availability of cheap natural gas will reduce other costs for manufacturers; and,
- Once the world oil prices return to former levels, the manufacturing firms producing drilling and other specialized equipment will see renewed demand for their products.

Each is described in detail below:

Reduced energy costs. The shale revolution will directly lower manufacturing energy costs via the price of natural gas and indirectly through the price of electricity.

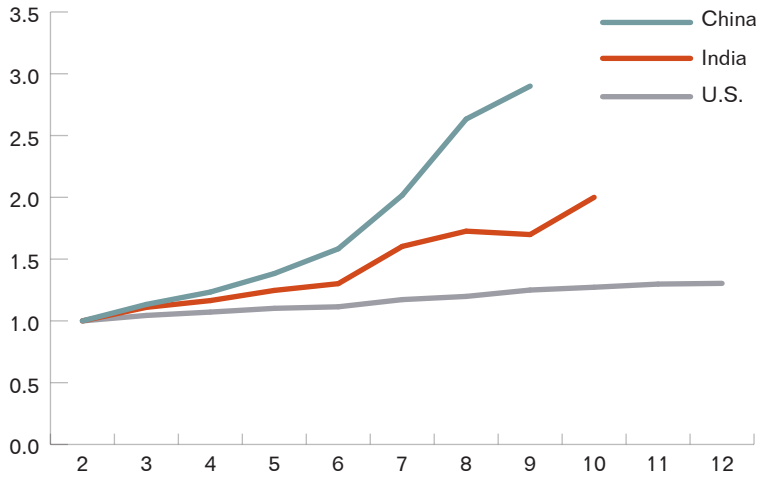
Manufacturers purchase large quantities of natural gas to be used as an energy source. The decreased price of natural gas will be directly translated into lower costs for manufacturer's. The U.S. Energy Information Agency reports that about 28 percent of the country's natural gas consumption in 2013 was by the "industrial" sector, which is dominated by manufacturing but includes several other industries.

Natural gas is increasingly being used to generate electricity, both because of its decline in price and its reduced emissions relative to coal. In 2013, electricity generation was the largest single use of natural gas, accounting for about 31.0 percent of total gas consumption. Manufacturers purchase large quantities of electricity. The 2013 Survey of Manufacturers reports that the value of electricity purchases by manufacturers was about 36 percent larger than the combined value of all other fuels. The increased amount of natural gas available due to shale technology means that electricity prices will increase more slowly. The international implications of U.S. electricity costs will be discussed later.

Other cost reductions. Before natural gas can be transported efficiently and sold commercially, the impurities must be extracted. The by-products are known as natural gas liquids (NGL) and include methane, ethane, propane, and butane.

FUTURE TRENDS AFFECTING MANUFACTURING

Figure 1
Manufacturing Wages, China, India and U.S. (2002 =1.00)



Sources: U.S. Bureau of Labor Statistics.

NGLs are themselves valued raw materials for petrochemical markets. For example, methane can be converted into ammonia and methanol, both valuable manufacturing inputs. Ethane can be refined into ethylene and then into polyethylene glycol which is an input into many products ranging from adhesives to plastics to paint. Currently ethylene sells for about $1,000 per ton. This price could drop to $300 a ton due to the increased supply.

Specialized manufacturers. Shale-energy extraction requires sizable amounts of large and specialized equipment. These include firms manufacturing items such as drilling equipment, oil and gas field machines (NAICS 333132), fabricated pipe and pipe fittings (NAICS 332996), and similar industries. There is also the modification of specialized trucks (NAICS 336211) to bring water and other material to the well site and to carry the crude oil to the collecting stations. Finally, there is the plethora of measuring instruments and meters (NAICS 334513 and others) used to guide the sophisticated drill bits down and then horizontal into the shale deposits. The 2014-2015 world oil price plummet quickly reduced drilling and exploration and there have been media reports of reductions by these upstream suppliers but detailed data are not yet available.

Rising Foreign Wages. Past offshore manufacturing moves were intended to take advantage of low wages in China, India, and other developing countries. The inevitable has happened. Increased domestic demand, labor militancy, more government regulations, and other factors led to rising local wages, and usually at a rapid rate. There still are significant differences between U.S. and foreign wages, but the differences are decreasing and providing less of an incentive to put up with lower productivity, higher transportation costs, and other issues associated with offshore production.

This situation is illustrated in Figure 1, which compares the growth (but

Table 2
Natural Gas Prices ($/million Btu)

Country	2007	2013
U.S. (Henry Hub)	6.95	3.71
Japan	7.73	16.17
Germany	8.03	10.72
U.K.	6.01	10.63

Source: BP Statistical Review.

Table 3
2014 Electricity Prices (U.S. cents per Kwh)

Country	Price
U.S.	10.00
Germany	19.21
U.K.	15.40

Source: www. Statista.com.

not levels) of manufacturing wages in the U.S., China, and India. Economic data from underdeveloped nations are out-of-date and incomplete. Nevertheless, the trend is obvious. Manufacturing wages in China and India doubled or even tripled while the U.S. increase was roughly 30 percent. Differential growth of this magnitude quickly erodes relative wage advantages.

Rising Energy Prices in Other Developed Countries. Emphasis on expensive alternative energy sources, concerns about nuclear power, and reluctance to develop shale resources are leading to much higher energy costs in other developed countries with large manufacturing sectors. This improves the attractiveness of the U.S. with its relatively lower and more stable energy costs.

As shown in Table 2, natural gas prices in developed countries were clustered together in a narrow range of $6 to $8 per million cubic feet as recently as 2007. By 2013, the U.S. price dropped to $3.71 per million Btus while the prices in the other countries rose 33 percent to more than 100 percent. Even allowing for a slow rise in the U.S. price, there are a significant cost differences between the developed countries.

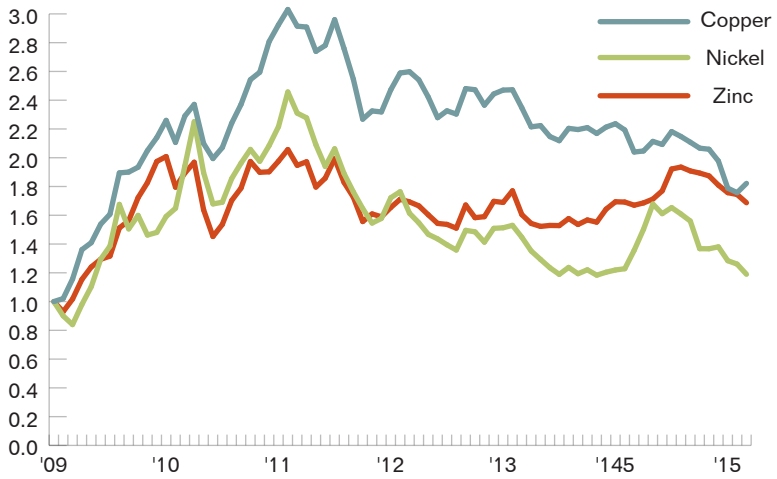
Much the same disparity is emerging in electricity. As shown in Table 3, there are already significant differences between the U.S. and several European electricity prices. In the future, the U.S. will benefit from low-cost shale natural gas while the other countries will have to rely on much more expensive fuel sources.

FUTURE TRENDS AFFECTING MANUFACTURING

Stable/Falling Commodity Prices. Manufacturing is the process of turning raw materials into products. Therefore the prices of commodities are crucial to manufacturing firms. The last decade and a half have been a roller coaster for commodity prices. The upswings have been fueled by the double-digit growth in China and other developing counties and the precipitous declines cause by the Great Recession. As shown in Figure 2, starting in 2009, commodity prices resumed their upward trend as the recession impacts waned. More recently, economic growth in developing countries, particularly China, has moderated. Commodity prices are down somewhat from their post-recession highs and have been relatively stable during 2014 and 2015.

Summary. Manufacturing is a major energy user and will benefit from the current price trend in oil and natural gas. The dramatic drop on world oil prices during late 2014 will directly translate into lower manufacturing costs. Even if world oil prices return to their previous levels, U.S. natural gas prices will remain well below those of other industrialized countries and offer domestic manufacturers a cost advantage in world markets. Finally, the worldwide commodity and resource boom is over. The prices for these crucial manufacturing inputs should remain below the levels of the last decade.

Figure 2
Selected Commodity Prices (1/1/2009 =1.00)



Source: International Monetary Fund.

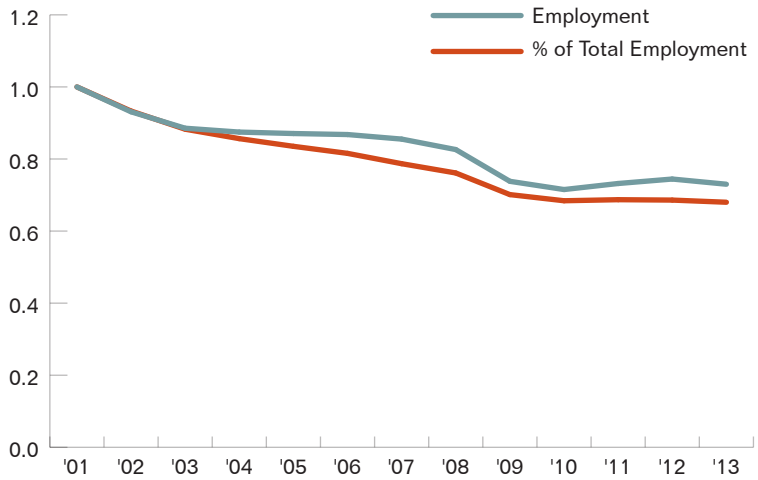
MEASURING & ANALYZING MANUFACTURING

U.S. manufacturing is sometimes pictured as an archaic and increasingly irrelevant activity in a knowledge-based and technological economy. The true story is much more subtle and complicated. New investments (often incorporating the latest technology) are particularly important for manufacturers as they constantly improve productivity and efficiency. In most cases, these new investments lead to more output being squeezed from a given amount of inputs or that fewer inputs are required to produce a certain output.

Improvements in productivity and efficiency change the relationships between inputs and outputs. Decreases in employment do not necessarily mean less output is produced or a 10 percent growth in output may not be associated with an equivalent change in some or all of the inputs. In other words, when analyzing manufacturing trends one must be very careful to note whether the indicator measures inputs or outputs.

MEASURING AND ANALYZING MANUFACTURING

Figure 3
U.S. Manufacturing Employment (2001 = 1.00)



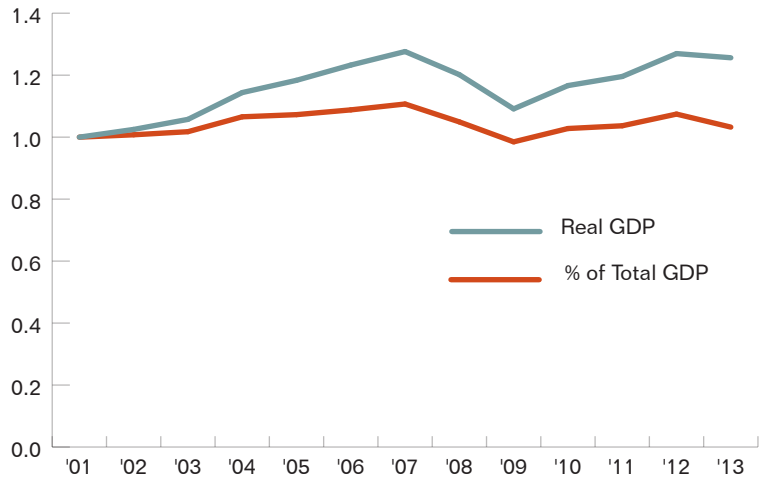
Source: U.S. Bureau of Economic Analysis.

The long-term decline in manufacturing employment is sometimes misinterpreted as an indicator of the overall health of the industry. Figure 3 presents U.S manufacturing employment. The graph is expressed in relative terms so that both employment and manufacturing's share of total employment can be presented side by side. Both show a very definite downward trend from 2001 to 2013. In absolute terms, manufacturing employment decreased from 16.9 million workers in 2001 to 12.7 million in 2013 while its share of total employment dropped from 10.2 percent to 7.0 percent during the same period.

A decline in employment (which is the labor input) does not mean decreasing output or production of manufactured goods. Figure 4 (page 13) presents two measures of manufacturing real Gross Domestic Product (GDP), which represents the value of output or production in inflation-adjusted terms. The first is manufacturing GDP in billions of constant dollars and the second in manufacturing real GDP as a percent of total real GDP. They have also been converted to relatives in order to easily present them side by side.

MEASURING AND ANALYZING MANUFACTURING

Figure 4
U.S. Manufacturing Real GDP (2001=1.00)



Source: U.S. Bureau of Economic Analysis.

Both measures have general upward trends along with obvious recession impacts in 2008 and 2009. Real manufacturing GDP rose from $1.5 trillion (2005$) in 2001 to $1.9 trillion (2005$) in 2013, a rise of 26.7 percent. Manufacturing represented 12.1 percent of total U.S. GDP in 2001 and 12.5 percent in 2013. In other words, manufacturing output has been rising after adjusting for inflation, and the growth in manufacturing has been faster than the economy-wide average as indicated by its rising share of total real GDP.

The following sections use a variety of data to analyze manufacturing as well as to compare manufacturing to other industries. Sometimes employment statistics will be analyzed; sometimes worker earnings; and sometimes output and production. Which data is chosen will depend on the purpose of the analysis. For example, comparing manufacturing with other industries requires that similar data be available for both. On the other hand, analysis of the latest trends for manufacturing requires figures with the most recent release date. In each case, the characteristics of the data will be discussed so that they may be interpreted correctly.

MANUFACTURING AND THE MONTANA ECONOMY

The trends in the Montana economy are primarily determined by the basic (or export) industries. Basic industries are those that are located in a state but sell most of their products elsewhere, or are otherwise influenced by factors beyond the state's borders. Basic industries inject new funds into a state economy and are responsible for creating further income and jobs, and these dollars are spent and re-spent. Manufacturing, mining, and agriculture are basic industries in every state. The federal government and rail/truck transportation industries do not export products, but are dependent on factors external to a single state and are usually classified as basic. Service industries may also be basic. For example, financial services in New York, insurance in Connecticut and Indiana, and amusement places (casinos) in Nevada all serve non-local markets and are part of their state's economic base.

The role of manufacturing in every state (plus the District of Columbia) is shown in Table 4 (page 16). Manufacturing's share of each state's economic base as measured by GDP was calculated for 1997 and 2013. The economic base of each state was estimated using a method developed by the U.S. Bureau of Economic Analysis. There are other methods of identifying the basic industries, and they may yield slightly different findings.

Table 4
Manufacturing as Percent of Economic Base Gross State Product for States, 1997 and 2010

1997			2010			1997, cont.			2010, cont.		
Rank	State	Percent	Rank	State	Percent	Rank	State	Percent	Rank	State	Percent
1	Indiana	75.2	1	Oregon	79.6	27	Texas	44.6	27	Idaho	37.3
2	North Carolina	72.8	2	Indiana	74.7	28	Idaho	42.3	28	Illinois	34.6
3	Wisconsin	70.6	3	South Carolina	64.4	29	Oklahoma	42.1	29	Nebraska	34.5
4	South Carolina	69.7	4	North Carolina	62.4	30	West Virginia	41.4	30	California	29.6
5	Oregon	67.6	5	Wisconsin	60.4	31	Rhode Island	40.2	31	Connecticut	28.5
6	Kentucky	66.8	6	Michigan	57.0	32	Illinois	40.1	32	Oklahoma	28.1
7	Pennsylvania	65.8	7	Alabama	56.0	33	California	39.1	33	Rhode Island	27.0
8	Ohio	65.4	8	Kentucky	54.7	34	Connecticut	36.8	34	West Virginia	26.9
9	Michigan	64.8	9	Louisiana	52.6	35	Nebraska	36.6	35	New Hampshire	22.8
10	Arkansas	62.5	10	Ohio	52.3	36	New Hampshire	34.9	36	Montana	22.4
11	New Hampshire	61.6	11	Kansas	51.8	37	South Dakota	34.1	37	South Dakota	21.9
12	Iowa	59.0	12	Pennsylvania	50.1	38	Virginia	31.3	38	Massachusetts	21.4
13	Arizona	58.2	13	Arkansas	48.4	39	Massachusetts	31.1	39	Virginia	20.9
14	Alabama	57.0	14	Iowa	47.2	40	Delaware	28.7	40	Delaware	18.9
15	Vermont	56.6	15	Minnesota	44.2	41	Montana	25.6	41	Florida	17.8
16	Maine	54.3	16	Washington	44.0	42	Colorado	24.8	42	New Mexico	16.7
17	Minnesota	52.5	17	Tennessee	43.6	43	Florida	24.6	43	Colorado	16.5
18	Kansas	52.3	18	Maine	43.1	44	North Dakota	23.6	44	Nevada	14.4
19	Tennessee	51.7	19	Georgia	43.0	45	Maryland	21.1	45	North Dakota	14.2
20	Missouri	51.4	20	New Hampshire	43.0	46	New York	17.8	46	Maryland	14.2
21	Georgia	50.1	21	Vermont	42.5	47	Nevada	15.7	47	New York	11.1
22	Mississippi	49.2	22	Missouri	41.9	48	Wyoming	14.3	48	Wyoming	10.6
23	Washington	47.9	23	Mississippi	39.4	49	Alaska	7.6	49	Hawaii	6.1
24	Utah	46.6	24	Texas	39.4	50	Hawaii	6.5	50	Alaska	5.3
25	New Mexico	45.6	25	Arizona	39.1	51	District of Columbia	0.8	51	District of Columbia	0.3
26	Louisiana	44.7	26	Utah	38.5						

Source: U.S. Bureau of Economic Analysis.

MANUFACTURING AND THE MONTANA ECONOMY

During 1997, the top five states in terms of manufacturing's share of the economic base were Indiana, North Carolina, Wisconsin, South Carolina, and Oregon. The major difference in the top-tier states between 1997 and 2013 was that Oregon vaulted to the top spot and North Carolina dropped to fourth. The reason for Oregon's rise was the rapid growth of computer and electronics manufacturing in that state.

Montana manufacturing has traditionally ranked relatively low in terms of its contribution to the economic base. Montana was 41st in 1997 when manufacturing accounted for 25.6 percent of the economic base. Sixteen years later in 2013, Montana had risen to 36th with about 22.4 percent of the economic base in manufacturing. Almost all states (with Oregon being the major exception) experienced declines in manufacturing's share of the economic base.

GDP data is not well-suited to analyzing trends in manufacturing from one year to the next. The disadvantages of GDP data is that it is not available prior to 1997, and the most current figures are usually several years old and do not provide detail for specific components of manufacturing.

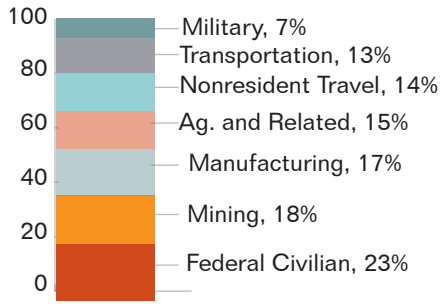
Earnings data are more appropriate for examining trends from one year to the next and for periods of a decade or more. But, earnings data also has its own characteristics. For example, net farm income of family-owned farms and ranches (a major component of farm earnings) is extremely volatile and not a reliable measure of output, revenues, and overall economic conditions in the agricultural sector. Consequently, the following sections will report nonfarm earnings to identify overall economic trends. Using nonfarm earnings does not imply that agriculture is ignored. Earnings in agricultural services are explicitly included. Excluding farm earnings eliminates an extremely volatile component that could mask important trends elsewhere in the economy.

Specific industries within manufacturing may themselves be changing due to evolving and improving practices. One example is the greater emphasis on supply chain management. Increased use of supply chain methods suggests that today's production processes may be very different from those of only a few years ago.

Manufacturing is a basic industry because most its output and production is shipped out of Montana. As shown later in Table 9, about 50 percent of the state's manufacturing earnings is produced in industries such as wood products, petroleum refining, and machinery where almost all of the products immediately leave the state. Even the smaller industries within manufacturing, such as fabricated

MANUFACTURING AND THE MONTANA ECONOMY

Figure 5
Worker Earnings in Basic Industries, Montana 2011-2013



Sources: Bureau of Business and Economic Research, University of Montana-Missoula; Bureau of Economic Analysis, U.S. Department of Commerce.

metal products and chemicals, include many firms that sell nationwide or even worldwide.

The Montana Department of Labor and Industry reported that the employment multiplier for manufacturing is 3.58. This means that there will be 2.58 new jobs created elsewhere in the economy as a result of one new manufacturing job. The earnings multiplier is 2.72, suggesting that an additional $1.72 will be created in other Montana industries for each $1.00 in new manufacturing earnings.

Earnings in each of Montana's basic industries are shown in Figure 5. Manufacturing accounts for about 17 percent of total earnings in basic industries. This percentage differs from that reported in Table 3 because GDP is a measure of the value of production or output while the data in Figure 4 refers to the earnings of workers. Manufacturing and mining are tied as the second component of the state's economic base ranking behind the federal government at 23 percent. Mining includes the oil and gas industry. The recent dramatic decline in oil prices will probably lead to fewer workers and reduce the size of this industry.

Manufacturing is a significant contributor to recent economic trends in Montana despite accounting for only 17 percent of the economic base. This importance is illustrated by the data in Figure 6, which presents the year-to-year changes in basic earnings by industry from 2009 to 2013. The changes in basic earnings may be decomposed by major sector, starting with the cycle trough in 2009, and are shown below.

2009-2010

The economic recovery began.

Total nonfarm basic earnings grew $210 million. The largest increases were in mining ($133 million) and nonresident travel ($48 million) Manufacturing declined about $20 million.

2010-2011

Total nonfarm basic earnings grew $355 million. The largest increases were in mining ($272 million) and transportation ($103 million). Manufacturing continued to decline (-$1 million) and the trend in the federal government turned negative (-$31 million).

2011-2012

Total nonfarm basic earnings increased $288 million. The largest increases were in mining ($114 million) and nonresident travel ($90 million). Manufacturing began to grow ($44 million) and the declines in federal government continued (-$29 million).

2012-2013

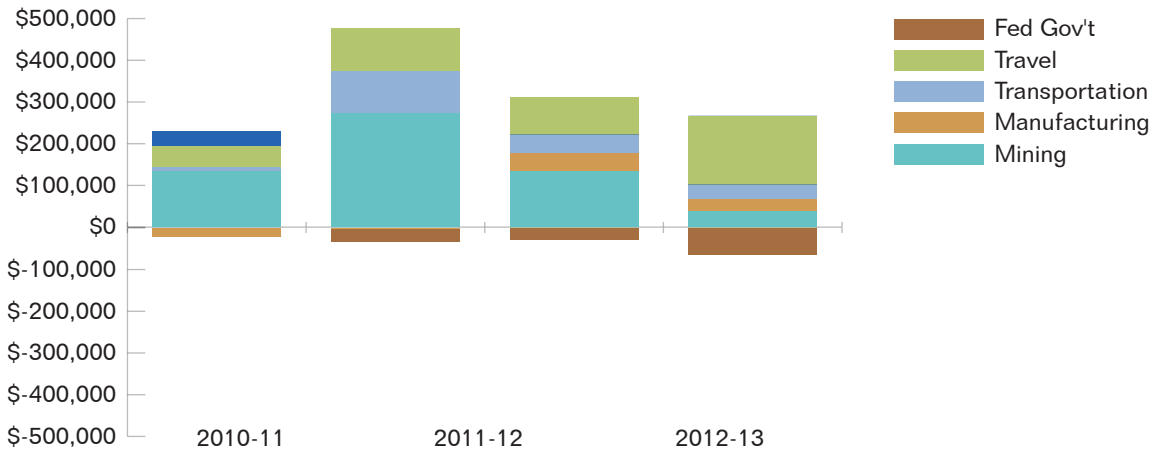
Total nonfarm basic earnings rose $204 million. The largest increase was in nonresident travel ($165 million). Mining, transportation and manufacturing each increased $30 to $38 million. The federal government continue to decline (-$64 million).

This analysis illustrates a number of important points about the causes of economic growth in Montana. First, overall growth or decline in the basic industries is the net result of events in each of the basic industries. There are always some industries that are growing (or declining) faster or slower than others.

Secondly, there is usually no single cause of growth. None of the nonfarm basic industries was consistently the fastest (or slowest) growing during this period.

Finally, and perhaps most importantly, industries that represent a relatively small share of the economic base - such as manufacturing - can be major contributors to overall economic growth or decline during specific periods. For example, during 2011-12, manufacturing ranked right behind mining and nonresident travel in terms of its contribution to the total increase in basic earnings. On the minus side, manufacturing was the second largest declining industry in 2009-10.

Figure 6
Change in Nonfarm Basic Earnings, Montana



Source: U.S. Bureau of Economic Analysis.

A CLOSER LOOK AT MONTANA MANUFACTURING

Table 5
Manufacturing Establishments by Employment Size, Montana, 2012

Employment	Number of Establishments
Total	1,231
1 to 4	636
5 to 9	254
10 to 19	160
20 to 49	108
50 to 99	33
100 to 249	35
250 to 499	5
500 to 999	0
1,000 or more	0

Source: U.S. Bureau of the Census.
Note: Does not include establishments with no employees.

Manufacturing Establishments

There were 3,262 manufacturing establishments in Montana during 2013, as shown in Table 6 (page 20). The largest category is miscellaneous manufacturing (NAICS 339) with 680 establishments. The next largest categories were fabricated metal manufacturing (NAICS 332) with 482 establishments and food products (NAICS 312) with 360 establishments.

Employment Size

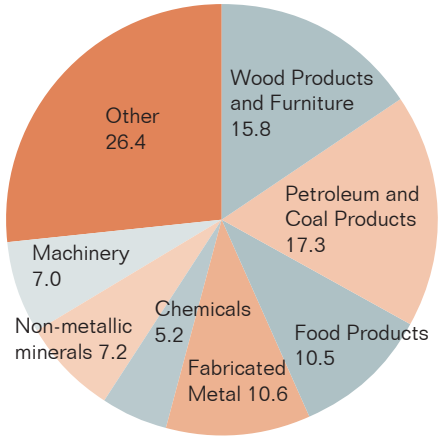
Montana manufacturers are mostly small businesses. As shown in Table 5, there were 636 establishments with one to four workers; they represented 51.7 percent of the 1,231 establishments with employees. There were 890 establishments with less than 10 workers, or 72.3 percent of the total. There were no Montana manufacturers with 500 employees or more. The 2013 Census Bureau data reports one establishment with more than 500 workers, but upon further investigation it was found to be incorrect.

Composition of Manufacturing

The composition of the Montana manufacturing industry is not the same as its national counterpart. Industries that are important in Montana are not necessarily the same as those that are important nationwide.

Figures 7 and 8 present the composition of manufacturing earnings in Montana and the United States during 2013. The recent increases in world energy prices have distorted value of output measures for certain industries (such as petroleum refining), consequently earnings becomes the best measure of the composition of manufacturing because it is the amount earned by manufacturing workers in the state.

Figure 7
Composition of Manufacturing, Montana, 2013
(Percent of Manufacturing Labor Income)



Source: U.S. Bureau of Economic Analysis.

Figure 8
Composition of Manufacturing, United States, 2013
(Percent of Manufacturing Labor Income)

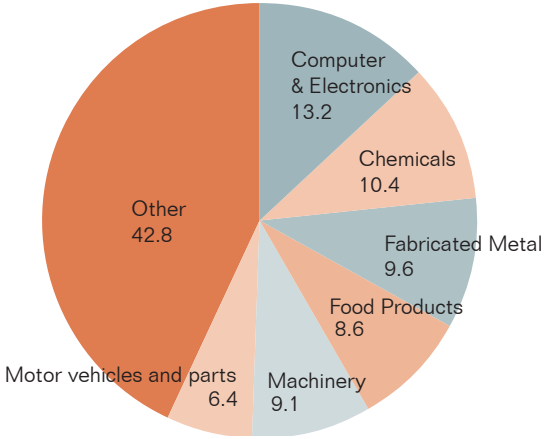


Table6
Manufacturing Establishments, Montana, 2012

NAICS Code	Industry	Number of Establishments
	Manufacturing	3,262
311	Food Products	360
312	Beverages & Tobacco	73
313	Textile Mills	19
314	Textile Product Mills	69
315	Apparel	129
316	Leather & Allied Products	128
321	Wood Products	344
322	Paper Manufacturing	6
323	Printing & Related	155
324	Petroleum & Coal Products	26
325	Chemicals	70
326	Rubber & Rubber Products	29
327	Nonmetalic Mineral Products	143
331	Primary Metals	39
332	Fabricated Metal Products	482
333	Machinery	111
334	Computer and Elec. Products	58
335	Elec. Equipment and Appliances	21
336	Transportation Equipment	62
337	Furniture and Related	258
339	Miscellaneous	680

Source: U.S. Bureau of the Census.
Note: Includes establishments with no employees.

The largest component of U.S. manufacturing during 2013 was computers and electronics, which accounted for 13.1 percent of total manufacturing earnings. The next four industries were chemical products (10.4 percent), fabricated metals (9.6 percent), machinery (9.1 percent) and food products (8.6 percent).

The two largest Montana manufacturing industries in 2013 were associated with the processing of crude oil and forest resources. Petroleum and coal products (primarily oil refining) was the largest manufacturing industry; it accounted for 17.3 percent of total manufacturing earnings in 2013. The next largest industry was wood products and furniture (the paper products industry is now miniscule due to the 2010 shutdown of Smurfit-Stone), representing 15.8 percent of earnings. The wood products and furniture industry is still in first place when measured by employment (see Table 8). Fabricated metals and food products are the third and fourth largest sectors, account for 10.6 percent and 10.5 percent, respectively. Earnings in nonmetallic mines represented 7.2 percent of the total and machinery (which includes Applied Materials, formerly Semitool) accounted for 7.0 percent.

Manufacturing Employment

The number of manufacturing workers in the U.S. has declined steadily from 2003 to 2013, as shown in Table 7 (page 22). In Montana, manufacturing employment technically increased slightly between these two endpoints, but has remained relatively stable except for recession impacts in a few industries.

U.S. manufacturing employment decreased from 15.0 million workers in 2003 to 12.7 million in 2013, a drop of 28.1 percent. Manufacturing's share of total employment declined from 9.0 percent to 7.0 percent during this period.

Montana manufacturing employment increased slightly from about 22,200 workers in 2003 to approximately 22,700 workers in 2013, an increase of roughly 3.2 percent. This modest overall increase masks decreases concentrated in a few industries: wood products, paper products, and primary metals refining. These declines occurred during the Great Recession of 2008 to 2010. As noted earlier, manufacturing employment has risen since the recession. The sectors experiencing the greatest increases will be identified later.

Manufacturing's share of total statewide employment decreased from 3.9 percent in 2003 to 3.6 percent in 2013. Montana's decrease in relative importance was 0.3 percentage points as compared to 2.0 percentage points nationwide.

Table 7
Full-and Part-Time Employment, Total and Manufacturing, Montana and United States

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total, United States (Millions of Workers)	166.0	169.0	172.6	176.1	179.7	179.6	174.2	173.0	176.3	179.6	182.3
Manufacturing (Millions of Workers)	15.0	14.8	14.7	14.7	14.5	14.0	12.5	12.1	12.4	12.6	12.7
Percent of Total	9.0	8.8	8.5	8.3	8.1	7.8	7.2	7.0	7.0	7.0	7.0
Total, Montana (Thousands of workers)	570.5	583.9	598.0	615.4	634.3	635.0	618.0	613.2	619.8	631.2	638.7
Manufacturing (Thousands of workers)	22.0	22.3	22.6	23.4	24.0	23.4	21.1	19.8	20.6	21.4	22.7
Percent of Total	3.9	3.8	3.8	3.8	3.8	3.7	3.4	3.2	3.3	3.4	3.6

Note: Includes the self-employed.
Source: U.S. Bureau of Economic Analysis.

Montana Manufacturing Employment by Industry

Detailed manufacturing employment from 2003 to 2013 is presented in Table 8 (page 24). Total manufacturing employment increased slightly by about 600 workers over this 10-year period. The following paragraphs concentrate on trends from 2010 to 2013. Although the national business cycle trough was in 2009, the data in Table 8 show that the low point for Montana manufacturing was 2010. Since then, total manufacturing employment has increased by 2,817 workers or almost 14.2 percent - a sizable increase that merits analysis. Detailed discussions of events prior to 2010 can be found in earlier editions of this publication.

Before looking at the individual sectors of Montana manufacturing, a major data reclassification needs to be explained because it impacts two large manufacturing industries. REC Silicon located near Butte is a Montana high-tech manufacturing firm. It has been reclassified from the chemicals industry to the nonmetallic mineral products industry. This reclassification accounts for much of the 597 worker increase in nonmetallic minerals and the modest decrease in chemicals between 2010 and 2013. REC Silicon produces raw materials for the international solar and electronic industries. It was formerly named ASiMi.

Fabricated metal products had the largest employment increase between 2010 and 2013. The number of workers grew from 1,890 in 2010 to 2,696 in 2013, a rise of 806 employees or 42.6 percent. Fabricated metals include a wide variety of firms producing everything from structural metal buildings to spring and wire products. Growth in small arms and ammunition manufacturing, which is concentrated in the western portion of the state, contributed most of the increase in fabricated metal products industry.

Table 8
Full and Part-Time Manufacturing Employment, Montana 2003 to 2013

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change 2010-2013
Manufacturing	22,009	22,273	22,596	23,372	23,962	23,360	21,157	19,802	20,622	21,510	22,619	2,817
Durable goods	14,165	14,084	14,413	14,901	15,311	14,638	12,648	11,792	12,317	13,220	13,793	2,001
Wood products	5,324	5,292	5,288	5,219	4,956	4,390	3,354	3,065	3,094	3,087	3,278	213
Nonmetallic mineral products	1,138	1,109	1,114	1,096	1,169	1,088	997	938	1,016	1,468	1,517	579
Primary metals	445	332	341	338	487	439	278	173	200	190	209	36
Fabricated metal products	1,521	1,549	1,595	1,784	1,986	2,051	1,988	1,890	2,152	2,565	2,696	806
Machinery manufacturing	1,303	1,288	1,432	1,580	1,608	1,548	1,206	1,168	1,231	1,310	1,219	51
Computer and electronic products	482	479	502	582	583	593	452	435	560	568	628	193
Electrical equipment and appliances	129	194	200	216	228	259	234	206	200	191	162	-44
Motor vehicles and parts	(D)	(D)	342	402	409	(D)	(D)	286	292	246	273	-13
Other transportation equipment	(D)	(D)	237	222	208	(D)	(D)	281	253	279	281	0
Furniture and related	1,310	1,348	1,331	1,305	1,233	1,251	1,085	971	965	911	957	-14
Miscellaneous	1,993	1,952	2,031	2,157	2,444	2,374	2,487	2,379	2,354	2,405	2,573	194
Nondurable goods	7,844	8,189	8,183	8,471	8,651	8,722	8,509	8,010	8,305	8,290	8,826	816
Food products	2,485	2,740	2,757	2,892	2,962	2,914	2,874	2,779	2,830	2,930	3,119	340
Beverage and tobacco	823	826	792	850	769	761	754	766	842	945	1,105	339
Textile mills	(D)	(D)	(D)	(D)	47	37	47	(D)	(D)	47	(D)	(D)
Textile product mills	230	223	201	209	238	238	238	226	219	211	213	-13
Apparel	272	298	314	338	(D)	(D)	(D)	(D)	(D)	(D)	249	(D)
Leather and allied products	196	201	213	220	176	209	210	203	283	296	389	186
Paper	(D)	(D)	(D)	(D)	(D)	(D)	(D)	180	(D)	(D)	(D)	(D)
Printing and related	1,173	1,205	1,216	1,296	1,338	1,339	1,177	1,099	1,130	1,149	1,186	87
Petroleum and coal	938	903	939	962	988	1,076	1,113	1,088	1,140	1,098	1,085	-3
Chemical	766	800	773	754	885	954	969	997	1,122	859	962	-35
Plastics and rubber products	333	365	376	365	374	395	336	317	364	378	428	111

Note: Includes the self-employed. (D) denotes not shown to avoid disclosure of confidential information.
Source: U.S. Burea of Economic Analysis.

The beverage and tobacco industry and food products are tied for second place, both increased about 340 workers between 2010 and 2012. Almost all of the increase in the beverage industry was in brewing and distilling of beer and liquor. Craft breweries, distilleries, and tasting rooms have opened in almost all the major urban areas and many of the smaller communities. The Hostess bakery in Billings closed in late 2012 but reopened under Franz ownership in early 2013.

Detailed data for the computer and electronic products and the leather and allied products industries are not available. Therefore, there is no further information concerning the 193 and 186 worker increases in these two sectors.

The Smurfit-Stone paper mill near Missoula, the largest manufacturing facility in the state, shut down in early 2010 due to a combination of market and structural factors. Although the exact number of jobs lost in the paper industry is not reported in the data, there were 500-600 jobs at this facility. This plant has been scrapped and will not reopen.

The wood products industry experienced modest growth from 2010 and 2013. This industry declined by more than 50 percent in the 2002 to 2009 period. The decrease was the result of the Great Recession, which was disproportionately concentrated in housing and construction, and the long-term reduction in the supply of timber from federal lands and some industrial lands in Montana. The most recent increases reflect the recovery in the national housing market. Montana's wood products industry in 2013 employed roughly 40 percent fewer workers than it did in 2003.

Manufacturing Earnings

Montana manufacturing earnings from 2003 to 2013 are presented in Table 9 (page 27). The earnings figures have been corrected for inflation by converting them to 2013 dollars. Earnings are the wages and salaries plus certain employer-paid fringe benefits (such as retirement and health insurance) paid to full and part-time manufacturing workers.

A comparison of the data in Tables 8 and 9 reveal both similar and different trends in manufacturing earnings and employment. Trends in employment and earnings may diverge for a number of reasons. Employment trends reflect improvements in labor productivity and structural changes. On the other hand, earnings trends more closely mirror those of production and value of output rather than just the labor input.

Overall, manufacturing employment increased twice as fast as earnings in the post-recession period. From 2010 to 2013, employment rose 14.2 percent while earning were up 8.4 percent. There are no obvious causes for this discrepancy, but it may be one more example of a major feature of this business cycle where employment has been growing much faster than wages.

The reclassification of REC Silicon explains the 93.1 percent increase in nonmetallic mineral products and the 23.3 percent decrease in the chemical industry. The 76.7 percent growth in the relatively small other transportation equipment industry is mostly due to the purchase by Boeing of a Helena firm and its subsequent expansion.

The 46.7 percent increase in fabricated metal products reflects the armaments industry and just about equals the 42.6 percent rise in employment during the 2010 to 2013 period. The 26.5 percent increase in beverages and tobacco can be attributed to the new craft breweries and distilleries appearing around the state.

The 1.3 percent decrease in food products earnings is surprising given the sizable growth in employment from 2010 to 2013. The detailed data are not yet available so there are no information on the 37.5 percent decline in electrical equipment or the 22.5 percent increase in plastics and rubber products.

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Table 9
Manufacturing Earnings, Montana (Thousands of 2013 Dollars)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Percent Change 2010-13
Manufacturing	1,086,124	1,091,829	1,121,223	1,162,837	1,199,100	1,167,317	1,033,143	1,005,504	1,016,681	1,058,394	1,089,971	8.4
Durable goods	647,910	645,081	669,263	685,006	713,216	668,681	537,814	520,038	537,441	593,600	626,606	20.5
Wood product	262,332	266,496	264,942	254,620	242,384	209,705	146,381	135,338	138,027	138,587	151,001	11.6
Nonmetallic minerals	56,318	54,168	55,462	51,523	57,360	54,050	45,027	41,908	43,224	76,983	80,935	93.1
Primary metals	26,605	17,858	17,710	18,370	30,582	28,036	13,907	4,899	6,894	6,389	7,707	57.3
Fabricated metals	62,071	61,868	64,660	73,514	84,467	88,317	79,458	79,886	89,862	112,017	117,122	46.6
Machinery manufacturing	68,900	70,749	79,087	91,024	84,967	84,087	68,655	74,937	73,343	74,457	73,901	-1.4
Computer and electronics	24,679	23,773	29,971	28,522	31,302	29,986	22,265	22,145	27,674	29,566	31,664	43.0
Electrical equipment and appliances	8,120	10,271	10,828	11,690	12,382	14,804	13,130	12,924	11,758	11,134	8,082	-37.5
Motor vehicles and parts	(D)	(D)	17,916	20,863	21,874	(D)	(D)	16,623	17,360	13,354	15,300	-8.0
Other transportation equipment	(D)	(D)	9,889	9,641	9,237	(D)	(D)	10,675	13,873	18,166	18,864	76.7
Furniture and related	40,113	40,499	40,636	40,893	39,934	40,058	30,736	27,480	27,214	26,368	27,675	0.7
Miscellaneous	73,521	72,051	78,162	84,345	98,726	93,015	95,166	93,222	88,212	86,578	94,355	1.2
Nondurable goods	438,214	446,747	451,960	477,831	485,884	498,635	495,329	485,467	479,240	464,794	463,365	-4.6
Food	99,895	108,815	108,239	113,059	114,337	115,168	115,052	115,552	112,467	111,579	114,091	-1.3
Beverages and tobacco	34,773	35,823	34,423	35,697	31,901	32,164	32,098	35,121	36,284	39,962	44,419	26.5
Textile mills	(D)	(D)	(D)	(D)	787	633	699	(D)	(D)	649	(D)	(D)
Textile product mills	5,610	5,730	5,328	5,621	6,343	6,545	6,230	6,333	6,162	5,716	5,537	-12.6
Apparel	7,785	10,175	9,680	10,456	(D)	(D)	(D)	(D)	(D)	(D)	2,473	(D)
Leather and allied products	9,914	5,730	3,189	3,566	2,717	2,698	2,850	2,894	2,776	2,973	3,678	27.1
Paper manufacturing	(D)	(D)	(D)	(D)	(D)	(D)	(D)	23,694	(D)	(D)	(D)	(D)
Printing and related	40,716	41,230	42,002	45,649	49,574	50,353	41,890	39,053	40,916	42,124	42,826	9.7
Petroleum and coal	125,622	119,656	127,939	148,026	145,744	156,945	168,123	167,687	172,040	182,983	173,204	3.3
Chemical manufacturing	52,188	55,879	58,724	52,961	65,761	68,148	69,406	73,965	82,690	53,051	56,745	-23.3
Plastics and rubber products	9,634	10,817	11,557	12,648	14,255	14,208	13,383	14,488	15,731	16,385	17,754	22.5

Note: Includes the income of the self-employed. (D) denotes not shown to avoid disclosure of confidential information.
Source: U.S. Bureau of Economic Analysis.

Wage and Salary Employment and Per Worker Wages

This section examines Montana employment and per worker wages and salaries in manufacturing and compares them to other industries in the state and to corresponding nationwide data. Montana 2013 employment and per worker wages and salaries are presented in Table 10 (page 29). These employment figures differ from those reported in Tables 7 and 8 because they do not include the self-employed.

Wages and salaries directly measure the payments to workers and represent the amount they have available for current spending. Other compensation measures (such as earnings) include estimates of employer-paid benefits that may not lead to local spending by workers.

The average Montana manufacturing worker earned $44,781 in 2013, about 18.8 percent higher than the average of $37,707 for all workers. The highest wages within manufacturing reported in Table 10 were the $107,151 in petroleum and coal products. This industry is dominated by highly skilled workers at the oil refineries near Billings and Great Falls.

After petroleum and coal products, the highest per worker wages and salaries were the $57,984 earned in other transportation equipment. Next was the $57,363 earned in machinery manufacturing. The lowest paying manufacturing jobs were in leather and allied products ($25,075) and textile product mills ($22,172), both very small sectors employing less than 200 Montanans.

Montana incomes are generally less than their corresponding U.S. averages. This is also true for wages and salaries per worker. Average wages and salaries for all Montana workers were $37,707 in 2013, about 75.4 percent of the national average. Montana manufacturing wages per worker were about 70.3 percent of the U.S. figure. Within manufacturing, only wood products and apparel workers had average wages above their respective national average. The apparel industry employed only 39 workers in 2013. The lowest was for computer and electronics workers, who earned only 41.4 percent of their national counterparts.

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Table 10
Employment and Wages and Salaries per Worker, By Industry, Montana, 2013

	Wage and Salary Employment	Wages and Salaries Per Worker (Current Dollars)	Wages and Salaries Per Worker (Percent of U.S.)
Total, All Industries	466,710	37,707	75.4
Farm	5,758	39,900	118.1
Nonfarm	460,952	37,679	75.2
Forestry, fishing, and Other	3,428	30,101	106.1
Mining	8,825	83,430	84.8
Utilities	3,178	78,702	81.0
Construction	24,983	44,781	83.3
Manufacturing	18,365	43,670	70.3
Durable goods	11,127	42,872	65.4
Wood products	2,789	42,063	105.3
Nonmetallic minerals	1,291	50,403	95.7
Primary metals	165	35,297	55.9
Fabricated metal products	2,236	39,574	75.1
Machinery	1,029	57,363	87.8
Computer and electronics	580	42,286	41.4
Electrical equipment and appliances	112	52,098	81.5
Motor vehicles and parts	271	43,649	73.3
Other transportation equipment	246	57,984	69.0
Furniture and related	626	33,644	81.7
Miscellaneous	1,782	35,803	60.4
Nondurable goods	7,238	44,897	79.9
Food	2,561	32,688	75.3
Beverage and tobacco	1,014	28,603	54.0
Textile mills	(D)	(D)	(D)
Textile product mills	186	22,172	58.7
Apparel	39	46,564	127.1
Leather and allied products	80	25,075	60.3
Paper	(D)	(D)	(D)
Printing and related	954	35,404	76.2
Petroleum and coal	1,068	107,151	99.2
Chemical	868	46,423	51.6
Plastics and rubber products	402	34,455	69.7
Wholesale trade	17,139	50,792	73.1
Retail trade	56,545	25,856	90.0
Transportation and warehousing	15,036	49,599	98.2
Information	6,916	43,991	50.1
Finance and insurance	15,961	55,558	60.0
Real estate and rental and leasing	5,433	30,432	60.8
Professional and technical services	20,261	54,362	64.6
Management of companies	1,973	73,024	66.0
Administrative and waste services	17,780	28,761	80.4
Educational services	5,924	21,712	55.7
Health care and social assistance	63,355	41,071	90.0
Arts, entertainment, and recreation	11,332	20,887	56.8
Accommodation and food services	49,077	16,996	83.4
Other services	20,643	26,835	82.8
Federal, civilian	13,076	61,794	84.2
Military	8,299	35,465	75.5
State and local	73,423	36,891	79.8

Note: ((D) denotes not shown to avoid disclosure of confidential information.
Source: U.S. Burea of Economic Analysis.

Montana's Manufacturing Exports

Montana manufacturers are competitive in international markets and have over the long-term been expanding internationally to broaden their markets and enhance their sales. Recently, however, deteriorating economic conditions in Europe and Asia have stunted demand in these important markets for Montana manufacturing exports.

Table 11 (page 30) presents manufacturing exports by industry for 2002 and 2007 along with the value of shipments for many of the same industries. The shipment data were reported in the Census of Manufacturers for 2002 and 2007. Montana manufacturing exports rose from $290.4 million in 2002 to $880.7 million in 2007, about tripling in nominal dollars. Overall, exports rose from 5.8 percent of shipments in 2002 to 8.3 percent of shipments in 2007.

The chemical industry exported 33.3 percent of it shipments in 2002 and 66.7 percent in 2007. There are no data for individual firms, but REC Silicon was then classified in chemicals and exports much of its production of polysilicon. Fertilizer and agricultural chemical manufacturers are also classified in chemicals, and they have traditionally served certain Canadian markets. Machinery exported about 36.5 percent of it shipments in 2002 and 58.0 percent in 2007. Applied Materials (formerly Semitool) is classified in machinery and sells its high-tech products to customers worldwide. Electrical equipment exported 60.6 percent of its shipments in 2002, but the value of shipments is not disclosed in 2007. This category includes an electrical power tool maker (Jore Corp), which underwent financial reorganization.

There may be a data error for the transportation equipment industry (NAICS 337). Reported exports exceed the value of shipments ($122.7 million vs. $113.3 million). Since the value of exports is derived from a sample while the value of shipments is based on a census, the error is more likely in the former than the latter.

With only a few exceptions, all Montana manufacturing industries increased exports between 2002 and 2007, both in nominal dollars and as a share of shipments. Chemical industry exports (which include REC Silicon) grew more than four-fold in nominal value, and their share of shipments doubled from 33.3 percent to 66.7 percent. Machinery industry exports (which include Applied Materials) more than doubled, and their share of shipments rose from 36.5 percent in 2002 to 58.0 percent in 2007.

Export data for 2009 and 2012 to 2014 are presented in Table 12. The value of shipments for 2012 is reported in the just released Census of Manufacturers. The value of shipments data for 2009

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Table 11
Exports and Value of Shipments, 2002 and 2007 (Thousands of Current Dollars)

		- 2002 -			- 2007 -		
NAICS Code	Industry	Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments
n/a	Manufacturing	290,417	4,987,577	5.8	880,704	10,638,145	8.3
311	Food Products	13,218	482,611	2.7	28,651	741,151	3.9
312	Beverages and Tobacco	5	(D)		42	164560	0.0
313	Textile Mills	235	(D)		114	(D)	
314	Textile and Fabrics	145	(D)		438	(D)	
315	Apparel	628	15,409	4.1	2,174	(D)	
316	Leather & Allied Products	416	(D)		1,320	(D)	
321	Wood Products	20,363	854,352	2.4	36,599	935,340	3.9
322	Paper Manufacturing	29,989	(D)		42,085	(D)	
323	Printing & Related	153	(D)		949	106,695	0.9
324	Petroleum & Coal Products	1,259	1,807,038	0.1	9,219	5,450,695	0.2
325	Chemicals	59,462	178,695	33.3	261,133	391,280	66.7
326	Plastic & Rubber Products	2,021	56,039	3.6	7,435	(D)	
327	Nonmetalic Mineral Products	27,794	167,927	16.6	43,400	291,377	14.9
331	Primary Metals	7,295	(D)		96,663	1,045,308	9.2
332	Fabricated Metal Products	3,027	198,579	1.5	7,274	278,351	2.6
333	Machinery	71,989	197,393	36.5	172,506	297,310	58.0
334	Computer & Elec. Products	17,042	(D)		24,287	(D)	
335	Electrical Equipment & Appliances	9,424	15,547	60.6	12,004	(D)	
336	Transportation Equipment	8,541	70,968	12.0	122,671	113,325	108.2
337	Furniture & Related	341	75,067	0.5	408	85,738	0.5
339	Miscellaneous	17,069	186,048	9.2	11,331	186,703	6.1

Note: (D) not shown to avoid disclosure of confidential information. N/A denotes "not available."
Sources: www.wisertrade.org (accessed April 4, 2011). U.S. Bureau of the Census, Census of Manufacturers 2002 and 2007.

and 2013 are reported in the Annual Survey of Manufacturers, which may be less complete than the Census of Manufacturers. The value of shipments for 2014 is not yet available. The data for the intermediate years 2010 and 2011 are not presented in the interest of brevity, but are available in earlier editions of this report.

Total manufacturing exports were at their recession low of about $876.5 million in 2009 and then increased 29.2 percent to roughly $1.1 billion by 2012. Manufacturing exports then began a slow decline; dropping 7.5 percent in 2013 and then a further 4.4 percent in 2014. Measured against the value of shipments, Montana manufacturing exports peaked in 2009 at 10.6 percent of shipments. The corresponding figures for 2012 and 2013 were 9.8 and 8.4 percent, respectively.

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Table 12
Exports and Value of Shipments, 2009 to 2013 (Thousands of Current Dollars)

		- 2009 -			-2012-			-2013-			-2014*-
NA-ICS Code	Industry	Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments	Exports
n/a	Manufacturing	876,500	8,293,186	10.6	1,132,600	11,535,236	9.8	1,047,011	12,443,029	8.4	1,012,772
311	Food Products	32,135	772,217	4.2	65,396	879,231	7.4	66,326	1,031,950	6.4	57,569
312	Beverages and Tobacco	28	(D)		10,876	170,855	6.4	42,499	217,318	19.5	45,375
313	Textile Mills	401	(D)		497	(D)		1,271	(D)		1,355
314	Textile and Fabrics	391	(D)		500	25,601	2.0	717	(D)		684
315	Apparel	1,793	(D)		2,887	577		3,658	1,087		4,521
316	Leather & Allied Products	2,855	(D)		2,713	(D)		3,843	(D)		4,721
321	Wood Products	19,751	580,252	3.4	36,105	616,712	5.9	33,291	917,912	3.6	35,178
322	Paper Manufacturing	32,805	(D)		455	(D)		379	(D)		236
323	Printing & Related	959	(D)		1,591	(D)		1,108	102,860	1.1	3,210
324	Petroleum & Coal Products	22,800	4,117,780	0.6	148,973	(D)		91,643	6,804,582	1.3	69,589
325	Chemicals	302,928	(D)		326,674	(D)		278,815	554,892	50.2	313,404
326	Plastic & Rubber Products	3,716	(D)		11,620	59,369	19.5	21,320	(D)		30,590
327	Nonmetalic Mineral Products	39,500	244,985	16.1	72,715	(D)		70,592	(D)		84,931
331	Primary Metals	121,453	(D)		28,371	(D)		50,235	(D)		50,119
332	Fabricated Metal Products	7,311	277,670	2.6	18,765	331,262	5.7	38,558	365,288	10.5	34,181
333	Machinery	156,425	195,022	80.2	219,288	326,465	67.1	163,292	244,460	66.8	120,526
334	Computer & Elec. Products	22,293	(D)		37,826	(D)		34,863	45980	75.8	43,968
335	Electrical Equipment & Appliances	16,305	(D)		14,702	(D)		16,058	(D)		17,006
336	Transportation Equipment	76,731	(D)		104,663	(D)		103,883	(D)		65,624
337	Furniture & Related	680	(D)		1,426	49,666	2.9	1,369	(D)		2,177
339	Miscellaneous	15,239	205,714	7.4	26,557	246,859	10.8	23,291	(D)		27,810

* 2012 shipments and exports as percent of shipments data not available.
Note: (D) not shown to avoid disclosure of confidential information. NA denotes not available.
Sources: www.wisertrade.org. U.S. Bureau of the Census, Annual Survey of Manufacturers 2009 and 2010.

The disappointing trends in both value of exports and their percentage of shipments are mostly due to international exchange rates and conditions in Montana's export markets rather than the ability of our firms to compete in the world market. Other data, which will be presented shorty, will show that Montana's major export markets are in Europe and Asia. Both of these regions are currently experiencing near recession conditions or much slower growth. In addition, the value of the U.S. dollar has risen sharply since mid-2014, which makes our products more expensive in foreign markets.

A closer look at the exports for individual manufacturing industries reveals a mixture of trends. Montana's largest exporting industry continues to be chemicals, consisting mostly of agricultural-related products to Canada. The reclassification of REC Silicon probably caused the slight decline between 2012 and 2013. The second largest exporter is machinery manufacturing, which includes Applied Materials in Kalispell. After peaking in 2012, these exports have declined almost 45.2 percent by 2014. The REC Silicon reclassification had the effect of lifting nonmetallic mineral products to third place among export industries. There is probably a data error in the 2013 entries for the apparel industry, where reported exports are great than reported shipments.

A somewhat different perspective of Montana manufacturing exports is presented in Table 13 which reports data prepared by the U.S. Census Bureau. These figures provide a somewhat broader picture of manufacturing exports and include export shipments themselves and also the value of supporting activities. The employment associated with these exports and supporting services are also presented. The shipments and employment data presented in Table 13 are not comparable to the figures elsewhere in this report. The value of manufacturing exports (plus supporting activities) rose from 8.2 percent of total shipments in 2006 to 21.0 percent in 2011. Similarly, the employment associated with these exports and supporting activities increased from 10.6 percent of total manufacturing employment in 2006 to 23.5 percent in 2011. The Census Bureau does not regularly update these estimates and the data for 2011 are the latest available. The 2011 data predate the slowdown in Montana's export markets and the recent rise in the value of the U.S. dollar.

Table 14 identifies the destination of Montana manufacturing exports. Canada consistently ranks number one as the major destination. Korea is second with an almost 14-fold increase between 2002 and 2014.

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China ranks third and also posted a 14-fold increase in value of exports between 2002 and 2014. Japan ranks fourth. Four of the top five export destinations for Montana manufacturing are Asian countries. The largest non-Asian destinations are Belgium, Germany and the United Kingdom, which rank 7th, 8th and 9th.

The orientation of Montana manufacturing exports has changed from Europe to Asia. In 2002, Germany ranked third and the United Kingdom seventh. Until recently, this new orientation has benefited Montana manufacturers because the strong Asian economies buffeted the impacts of the European economic malaise. The current moderating economic growth in Asia has made for challenging conditions in most of Montana manufacturing export markets.

Table 13
Export-Related Shipments and Employment, Montana, Selected Years

	2006	2009	2010	2011
Export-Related Shipments (Millions)	$788.00	$1,326	$1,468	$2,457
Percent of Manufacturing Shipments	8.2	16.0	15.4	21.0
Export-Related Employment	1,800	2,200	2,400	3,100
Percent of Manufacturing Employment	10.6	15.6	18.6	23.5

Note: Export estimates include both "direct" exports (exports manufactured in the U.S. and consumed in foreign markets)and supporting shipments (intermediate goods and services required to manufacture export goods). These figures also include estimates of employment associated with transporting manufactured goods for export from the plant of manufacture to the port of export.

Source: U.S. Bureau of the Census. "Exports from Manufacturing Establishments," (Accessed June 3, 2015).

Table 14
Montana Manufacturing Exports, by Country, Selected Years (Thousands of Current Dollars)

	-2002-		-2005-		-2011-		-2013-		-2014-		Perent Change 2002-2014
Country	Exports	Rank	Exports	Rank	Exports	Rank	Exports	Rank	Exports	Rank	2002-2014
Total, All Countries	290,417	–	512,327	–	1,162,911	–	1,047,009		1,012,771		248.7
Canada	155,787	1	219,182	1	500,362	1	512,657	1	452,634	1	190.5
Korea	6,343	8	24,296	3	90,205	3	57,628	4	92,306	2	1,355.2
China	5,064	10	25,378	8	110,654	2	74,610	2	78,247	3	1,445.2
Japan	26,459	2	53,169	6	61,993	5	42,559	6	50,760	4	91.8
Mexico	4,232	11	10,957	17	20,019	11	33,052	7	49,054	5	1,059.1
Taiwan	13,949	4	32,432	2	65,752	4	59,025	3	40,220	6	188.3
Belgium	3,370	12	1,877	9	30,681	8	47,015	5	27,516	7	716.5
Germany	22,784	3	48,957	5	42,587	6	26,457	8	23,261	8	2.1
United Kingdom	6,692	7	22,551	7	33,547	7	21,127	9	21,072	9	214.9
Netherlands	10,910	5	15,775	10	20,970	10	19,977	11	17,521	10	60.6

Sources: www.wisertrade.org (via Montana Department of Commerce).


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