

The State of Montana Manufacturing

2014 Edition

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INTRODUCTION



The U.S. economy is now in the fifth year of a slow recovery that began from a cyclic trough in the second quarter of 2009. Annual growth in real GDP has averaged between 1.8 percent and 2.8 percent from 2010 to 2013, well below the 3.0 percent increases that were once considered the norm for the U.S. economy. The prolonged recession in Europe and economic slowdowns in China and other developing nations are a major cause of the reduced U.S. growth. Quarterly real GDP growth has a saw-tooth pattern due to bad weather, one-time data movements, and other factors. The U.S. Federal Reserve has indicated that the economy is now sufficiently strong enough that the monetary stimulus will be tapered.

Manufacturing has led the U.S. recovery. Growth in durable goods production accounted for most of the comeback. Consumers now have the income and confidence needed to make the automobile and other major purchases that they had been holding off on during the recession. Similarly, household formation fueled the housing recovery and with it demand for furniture and appliances. Increased business and construction activity have also boosted demand for metals, machinery, and other equipment. To some extent, these recovering industries are those serving long dormant markets or with significant exports to developing countries less impacted by the Great Recession. There will be more about manufacturing exports later in this report, but dependence on developing

Table 1
Manufacturing Employment, U.S. and Montana
2009Q2 and 2013Q3

	2009Q2	2012Q3	Percent Change
U.S. Manufacturing	11,812,000	12,062,000	2.1
Montana Manufacturing	17,500	18,600	6.3
Wood and Paper Products	3,450	2,900	-15.9
All Other Manufacturing	14,100	15,700	11.3

Note: Data does not include the self-employed.

Sources: U.S. Bureau of Labor Statistics. Bureau of Business and Economic Research, University of Montana.

economies could be a two-edged sword if their growth falters.

The Montana economic recovery has also been slow and halting, with a pronounced regional dimension. Between 2010 and 2013, Montana's inflation-adjusted nonfarm earnings increased between 1.4 percent and 3.2 percent per year, with most of the growth figures hovering at about 3.0 percent.

The statewide average hides very different conditions. 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. In contrast, areas in western Montana, such as Missoula and Ravalli counties, have barely budged from their recession lows. In between are Gallatin, Flathead, Lewis and Clark, and Cascade counties which have posted modest growth.

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 2013 (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 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.

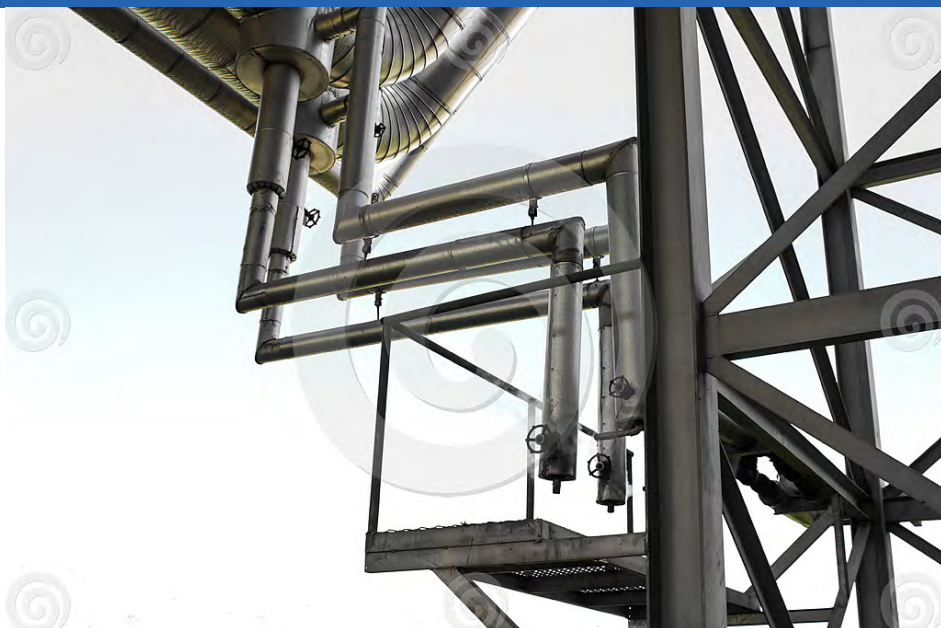
The Columbia Falls Aluminum Company also closed during this period. Employment at this facility has been gradually declining for years as the supply of appropriately priced electricity has become scarcer. The plant could reopen, but it is unlikely given the overall availability of electricity in the Pacific Northwest.

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.

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FUTURE TRENDS AFFECTING MANUFACTURING



Manufacturing and the New American Energy Revolution

The U.S. is in the midst of an energy resurgence. The latest advances in geophysics, nanotechnology, engineering, and production management have led to the shale-energy revolution and a dramatic increase in 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 Montana-North Dakota border, and traditional supply areas such as Texas.

The growing supply of crude oil has greatly decreased the country's dependence on imports. 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 2015. Oil is easily transported and is traded on a global market. The increase in U.S. production is only a small portion of the total and had little noticeable impact on world oil prices.

Natural gas is different. There is some small international traffic in natural gas (after it has been liquefied). For the most part, natural gas markets are limited to North America. The dramatic increase in natural gas supplies has resulted in plummeting prices. The U.S. Energy Information Agency reports the nationwide average was \$11.00 per MCF in 2008. The current price is about \$3.00 and is projected to rise to about \$6.00 per MCF over the next decade.

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The American energy revolution will impact manufacturing in a number of ways:

- The manufacturing firms producing drilling and other specialized equipment will see increases in the demand for their products.
- The decrease in the price of natural gas will reduce energy costs.
- The availability of cheap natural gas will reduce other costs for manufacturers.

Each is described in detail below:

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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.

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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 manufacturers. The U.S. Energy Information Agency reports that about 31 percent of the country's natural gas consumption in 2012 was by the "industrial" sector, which is dominated by manufacturing but includes several other industries.

The U.S. Energy Information Agency identifies a number of energy intensive manufacturing industries. Taken together they account for 38.9 percent of total value of shipments in manufacturing. The five largest manufacturing consumers of natural gas are:

1. Petroleum refining (NAICS 32411)
2. Chemical manufacturing (NAICS 325)
3. Paper manufacturing (NAICS 322)
4. Food manufacturing (NAICS 311)
5. Iron and steel manufacturing (NAICS 3311 AND 3312).

Natural gas is increasingly being used to generate electricity, both because of its decline in price and its reduced emissions relative to coal. In 2012, electricity generation was the largest single use of natural gas, accounting for about 38.9 percent of total gas consumption. Manufacturers purchase large quantities of electricity. The latest Survey of Manufactures reports that the value of electricity purchases by manufacturers was more than 20 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.

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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.

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.

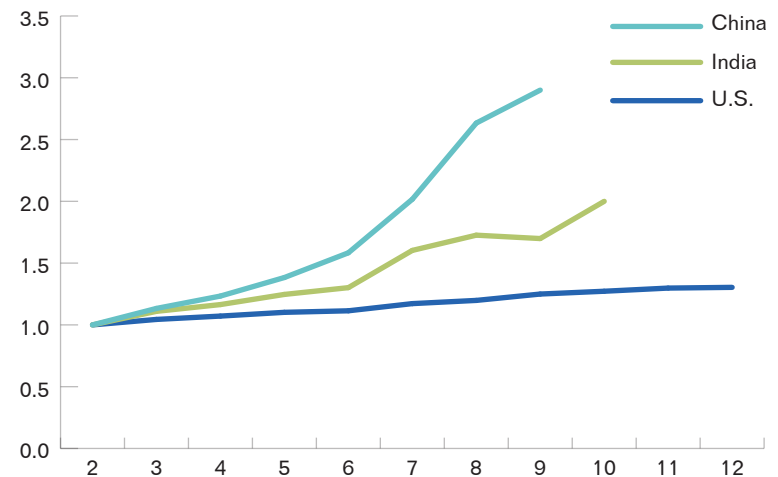
Not only could increased supplies of NGLs reduce manufacturing costs, but the concentration of NGL near the source of the natural gas could lead to new petrochemical processing plants far from the gulf coast. For example, Ohio, West Virginia and Pennsylvania could become a NGL hub like Mont Belvieu, Texas.

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 not levels) of manufacturing wages in the U.S., China, and India. Economic data from underdeveloped nations can be 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.

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



Sources: U.S. Bureau of Labor Statistics.

Table 2
Natural Gas Prices (\$/million Btu)

Country	2007	2012
U.S. (Henry Hub)	6.95	2.76
Japan	7.73	16.75
Germany	8.03	11.03
U.K.	6.01	9.46

Source: BP Statistical Review.

Table 3
2012 Electricity Prices (U.S. cents per Kwh)

Country	Price
U.S.	8.89
Germany	15.15
U.K.	12.45

Source: www. Statista.com.

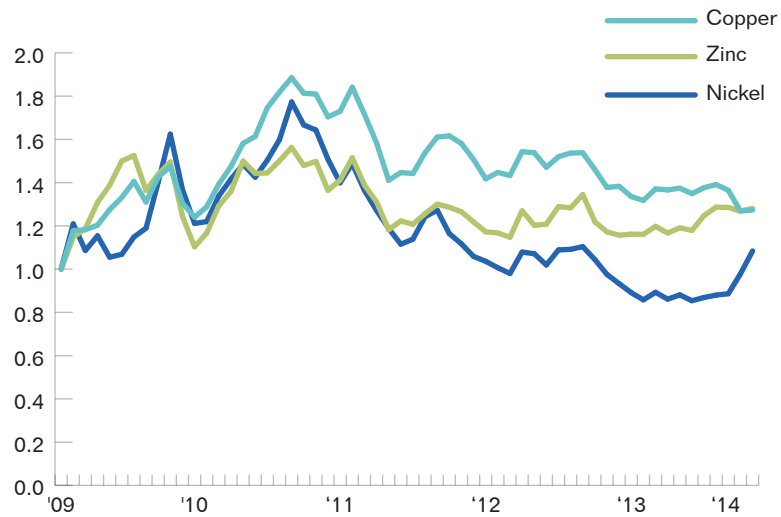
Rising Energy Prices in Other Developed Countries. Emphasis on expensive alternative energy sources, concerns about nuclear power, and reluctance to develop shale resources are leading to much higher energy costs in other developed countries with large manufacturing sectors. This improves the attractiveness 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 2012, the U.S. price dropped to roughly \$3 per million cubic feet while the prices in the other countries rose 30 percent to more than 100 percent. Even allowing for the 2012 U.S. price being artificially low, 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.

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



Source: International Monetary Fund.

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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 countries and a precipitous decline caused 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 2012 and 2013.

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MEASURING AND ANALYZING MANUFACTURING

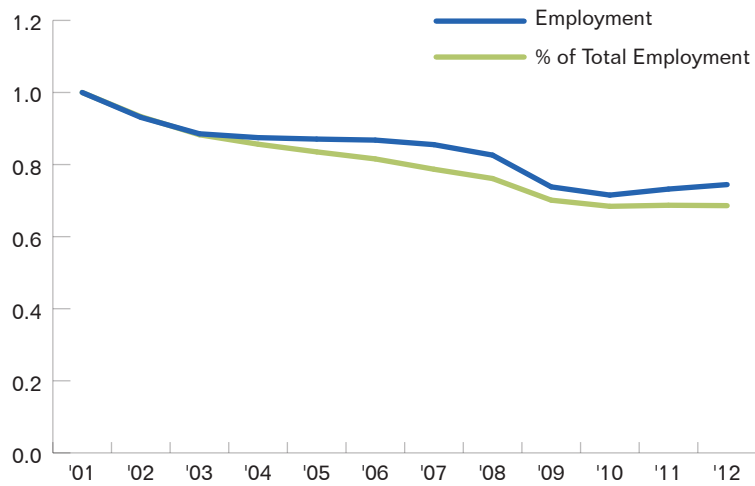


U.S. manufacturing is sometimes pictured as a dinosaur industry, constantly sending jobs overseas in search of lower wages and production costs. The true story is much more subtle and complicated. New investments are particularly important for manufacturers as they constantly improve productivity and 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.

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



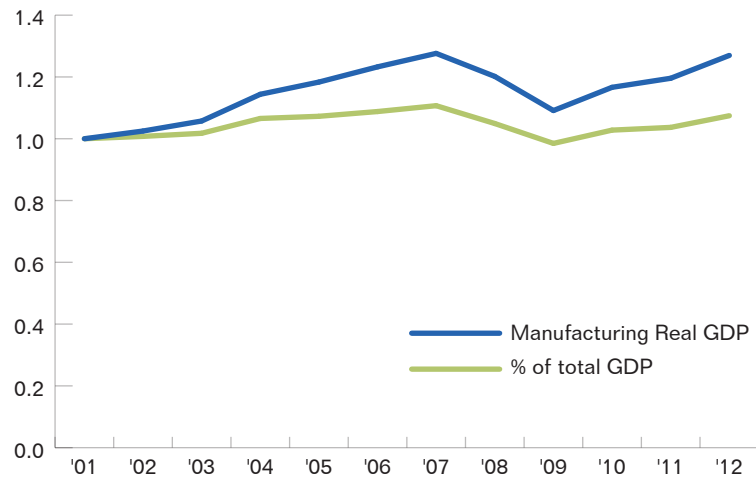
Source: U.S. Bureau of Economic Analysis.

Perhaps one of the most widely cited examples of this mismeasurement is using the decline in manufacturing employment to signal the demise of the manufacturing industry. [Figure 3](#) presents U.S. manufacturing employment. The graph is expressed in relative terms so that both employment and manufacturing employment as a percent of total employment can be presented side by side. Both show a very definite downward trend from 2001 to 2012. In absolute terms, manufacturing employment decreased from 16.9 million workers in 2001 to 12.6 million in 2012 while its share of total employment dropped from 10.2 percent to 7.0 percent during the same period.

But a decline in labor input does not mean decreasing output or a diminishing taste of U.S. consumers for manufactured goods. [Figure 4](#) 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 been converted to relatives in order to easily present them side by side.

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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 \$1.3 trillion (2005\$) in 2001 to \$1.7 trillion (2005\$) in 2012, a rise of 27.0 percent. Manufacturing represented 11.7 percent of total U.S. GDP in 2001 and 12.5 percent in 2012. 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.

04

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 real GDP was calculated for 1997 and 2012. 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.

During 1997, the top five states in terms of manufacturing's share of the economic base were Indiana, North Carolina, Wisconsin, South Carolina, and Michigan. The major difference in the top-tier states between 1997 and 2010 was that Oregon vaulted to the top spot and North Carolina dropped to seventh. The reason for Oregon's rise is the rapid growth of computer and electronics manufacturing in that state.

Montana has traditionally ranked relatively low in terms of its contribution to the economic base. Montana was 42nd in 1997 when manufacturing accounted for 24.4 percent of the economic base. Thirteen years later in 2010, Montana had risen to 38th with about 21.5 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. This is a result of using nominal GDP data and the overall decline in manufacturing's

share of the U.S. economy as measured by these data mentioned earlier.

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](#) (page 27), 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

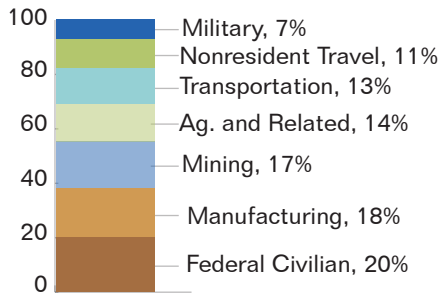
Table 4
Manufacturing as Percent of Economic Base Gross State Product for States, 1997 and 2010

1997			2010			1997, cont.			2010, cont.		
Rank	State	Percent	Rank	State	Percent	Rank	State	Percent	Rank	State	Percent
1	Indiana	74.6	1	Oregon	78.8	27	Louisiana	43.2	27	California	39.2
2	North Carolina	70.4	2	Indiana	70.7	28	Utah	42.3	28	Utah	35.4
3	Wisconsin	70.3	3	Wisconsin	59.3	29	Illinois	41.0	29	Nebraska	33.4
4	South Carolina	68.8	4	South Carolina	58.9	30	West Virginia	40.2	30	Illinois	32.3
5	Michigan	66.7	5	Michigan	55.3	31	Idaho	40.2	31	Oklahoma	32.0
6	Oregon	66.0	6	Louisiana	55.3	32	Oklahoma	40.2	32	West Virginia	26.1
7	Ohio	65.4	7	North Carolina	52.5	33	Nebraska	38.1	33	New Jersey	24.8
8	New Hampshire	65.1	8	New Hampshire	50.1	34	Rhode Island	38.0	34	Connecticut	24.5
9	Kentucky	63.1	9	Iowa	49.8	35	New Jersey	36.4	35	Rhode Island	24.4
10	Arkansas	61.9	10	Arkansas	49.3	36	Connecticut	35.1	36	Virginia	22.8
11	Pennsylvania	59.3	11	Ohio	49.0	37	Virginia	33.6	37	Massachusetts	22.5
12	Iowa	58.6	12	Maine	47.0	38	Massachusetts	30.2	38	Montana	21.5
13	Maine	56.2	13	Kentucky	46.7	39	South Dakota	29.5	39	New Mexico	21.0
14	Vermont	56.2	14	Kansas	46.3	40	Colorado	26.9	40	South Dakota	20.3
15	Arizona	56.2	15	Alabama	45.2	41	Delaware	25.6	41	North Dakota	19.6
16	Alabama	51.4	16	Texas	45.1	42	Montana	24.4	42	Colorado	19.1
17	Kansas	50.7	17	Pennsylvania	44.4	43	Maryland	23.6	43	Florida	18.1
18	Missouri	50.1	18	Vermont	42.3	44	Florida	23.6	44	Maryland	17.1
19	Tennessee	50.1	19	Tennessee	41.5	45	North Dakota	22.9	45	Delaware	15.0
20	Georgia	50.0	20	Mississippi	41.4	46	New York	17.4	46	Nevada	13.8
21	New Mexico	49.1	21	Minnesota	41.2	47	Wyoming	13.4	47	Wyoming	12.7
22	Minnesota	48.9	22	Idaho	41.2	48	Nevada	12.9	48	New York	11.7
23	Mississippi	48.6	23	Washington	41.2	49	Alaska	7.2	49	Alaska	8.5
24	Texas	48.4	24	Georgia	40.2	50	Hawaii	6.2	50	Hawaii	6.1
25	Washington	46.4	25	Missouri	40.0	51	District of Columbia	0.6	51	District of Columbia	0.3
26	California	45.2	26	Arizona	39.9						

Source: U.S. Bureau of Economic Analysis.

04

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.

leave the state. Even the smaller industries within manufacturing, such as fabricated 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 18 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 is the second largest basic industry as measured by earnings, ranking behind the federal civilian government at 20 percent. Nonresident travel accounts for about 11 percent of Montana’s economic base.

Manufacturing is a significant contributor to recent economic trends in Montana despite accounting for only 18 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 2012. 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 \$63 million. The largest increases were in mining (\$137 million) and the federal government (\$37 million). Manufacturing and nonresident travel continue to decline (\$17 and \$110 million respectively).

2009-2011

Total nonfarm basic earnings grew \$372 million. The largest increases were in nonresident travel (\$171 million) and mining (\$130 million). The trend in manufacturing reversed and increased modestly (\$3 million). The federal civilian government continued to decline (\$29 million).

2009-2012

Total nonfarm basic earnings increased \$288 million. The largest increases were in mining (\$144 million) and nonresident travel (\$88 million). The growth in manufacturing accelerated (\$45 million). The decrease in federal civilian government continued (\$31 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.

05

A CLOSER LOOK AT MONTANA MANUFACTURING



Employment Size

Montana manufacturers are mostly small businesses. As shown in [Table 5](#), there were 659 establishments with one to four workers; they represented 53.1 percent of the 1,240 establishments with employees. There were 898 establishments with less than 10 workers, or 72.4 percent of the total. There were no Montana manufacturers with 500 employees or more.

Manufacturing Establishments

There were 3,348 manufacturing establishments in Montana during 2012, as shown in [Table 6](#) (page 20). The largest category is miscellaneous manufacturing (NAICS 339) with 713 establishments. The next largest categories were fabricated metal manufacturing (NAICS 332) with 443 establishments and wood products (NAICS 321) with 376 establishments.

Table 5
Manufacturing Establishments
by Employment Size,
Montana, 2011

Employment	Number of Establishments
Total	1,240
1 to 4	659
5 to 9	239
10 to 19	166
20 to 49	104
50 to 99	37
100 to 249	31
250 to 499	4
500 to 999	0
1,000 or more	0

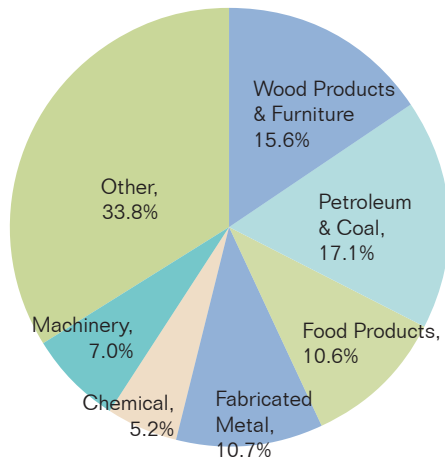
Source: U.S. Bureau of the Census.
Note: Includes establishments with no employees.

05

Composition of Manufacturing

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 2012. 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, 2012
(Percent of Manufacturing Labor Income)



Source: U.S. Bureau of Economic Analysis.

Figure 8
Composition of Manufacturing, United States, 2012
(Percent of Manufacturing Labor Income)

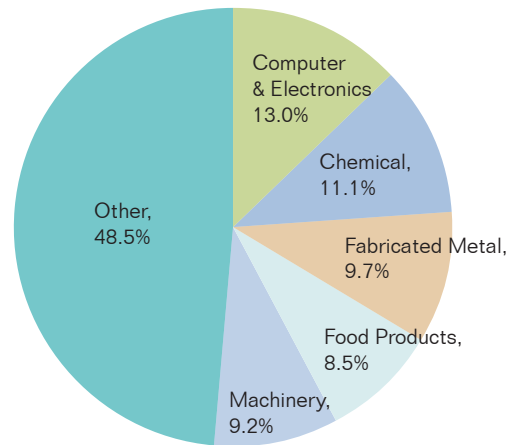


Table 6
Manufacturing Establishments,
Montana, 2012

NAICS Code	Industry	Number of Establishments
	Manufacturing	3,348
311	Food Products	376
312	Beverages & Tobacco	63
313	Textile Mills	19
314	Textile Product Mills	67
315	Apparel	138
316	Leather & Allied Products	132
321	Wood Products	371
322	Paper Manufacturing	6
323	Printing & Related	175
324	Petroleum & Coal Products	28
325	Chemicals	73
326	Rubber & Rubber Products	34
327	Nonmetallic Mineral Products	155
331	Primary Metals	42
332	Fabricated Metal Products	443
333	Machinery	115
334	Computer and Elec. Products	51
335	Elec. Equipment and Appliances	24
336	Transportation Equipment	57
337	Furniture and Related	266
339	Miscellaneous	713

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

The largest component of U.S. manufacturing during 2012 was computers and electronics, which accounted for 13.0 percent of total manufacturing earnings. The next four industries were chemical products (11.1 percent), fabricated metals (9.7 percent), machinery (9.2 percent), and food products (8.5 percent).

The two largest Montana manufacturing industries in 2012 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 17.1 percent of total manufacturing earnings in 2012. The next largest industry was wood products and furniture (the paper products industry no longer exists since the 2010 shutdown of Smurfit-Stone), representing 15.6 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 10.7 percent and 10.6 percent, respectively. Earnings in chemical products represented 5.2 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 2002 to 2012, as shown in [Table 7](#) (page 22). In Montana, manufacturing employment also declined during this period, but the rate of decrease was much less than in the U.S. and there were even short periods of modest growth.

U.S. manufacturing employment decreased from 15.8 million workers in 2002 to 12.6 million in 2012, a drop of 20.3 percent. Manufacturing's share of total employment declined from 9.6 percent to 7.0 percent during this period.

Montana manufacturing employment declined from about 23,200 workers in 2002 to approximately 21,400 workers in 2012, a decrease of roughly 7.8 percent. Most of this decrease was concentrated in a few industries: wood products, paper products, and primary metals refining. Despite this overall decrease from 2002 to 2012, Montana manufacturing employment did experience a few small increases between 2002 and the onset of the Great Recession in 2008 and then again during the recovery phase of 2010 to 2012. The sectors experiencing the greatest increases will be identified later.

Manufacturing's share of total statewide employment decreased from 4.1 percent in 2002 to 3.4 percent in 2012. Montana's decrease in relative importance was 0.7 percentage points as compared to 2.6 percentage points nationwide.

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total, United States (Millions of Workers)	165.2	166.0	169.0	172.6	176.1	179.7	179.6	174.2	173.0	176.3	179.6
Manufacturing (Millions of Workers)	15.8	15.0	14.8	14.7	14.7	14.5	14.0	12.5	12.1	12.4	12.6
Percent of Total	9.6	9.0	8.8	8.5	8.3	8.1	7.8	7.2	7.0	7.0	7.0
Total, Montana (Thousands of workers)	564.0	570.5	583.9	598.0	615.4	634.3	635.0	618.0	613.2	619.8	631.2
Manufacturing (Thousands of workers)	23.2	22.0	22.3	22.6	23.4	24.0	23.4	21.1	19.8	20.6	21.4
Percent of Total	4.1	3.9	3.8	3.8	3.8	3.8	3.7	3.4	3.2	3.3	3.4

Note: Includes the self-employed.

Source: U.S. Bureau of Economic Analysis.

Montana Manufacturing Employment by Industry

Detailed manufacturing employment from 2002 to 2012 is presented in [Table 8](#) (page 25). Total manufacturing employment declined about 1,500 workers over this 10-year period. The following paragraphs concentrate on trends from 2010 to 2012. 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 1,566 workers or almost 8 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 issue must be discussed. 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 accounts for much of the 498 worker increase in nonmetallic mineral and the 102 worker decrease in chemicals between 2010 and 2012. REC Silicon produces raw materials for the international solar and electronic industries. It was formerly called ASiMi.

Fabricated metal products had the largest employment increase between 2010 and 2012. The number of workers grew from 1,890 in 2010 to 2,582 in 2012, a rise of 692 employees or 36.6 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.

The second largest growth in manufacturing was in the beverage and tobacco industry, which increased 169 workers or 24.0 percent between 2010 and 2012. Almost all of this increase 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.

Machinery manufacturing increased 166 workers, or 10.6 percent, between 2010 and 2012. This increase mostly represents the cyclic recovery of a high-tech manufacturer in Kalispell, which experienced significant declines during the recession.

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 138 and 167 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 was relatively stable between 2010 and 2012. 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. This suggests that inputs will not be available as U.S. demand bounces back. Therefore many of the mill closures are permanent shutdowns.

In addition, the Hostess Company closed its Sweetheart bakery in Billings during late 2012 with the loss of about 350 jobs. The food products industry is likely to experience a sizable decline in the near future.

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Table 8
Full and Part-Time Manufacturing Employment, Montana 2002 to 2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2010-2012
Manufacturing	23,162	22,009	22,273	22,596	23,372	23,962	23,360	21,157	19,802	20,627	21,368	1,566
Durable goods	15,174	14,165	14,084	14,413	14,901	15,311	14,638	12,648	11,792	12,320	13,131	1,339
Wood products	5,794	5,324	5,292	5,288	5,219	4,956	4,390	3,354	3,065	3,094	3,057	-8
Nonmetallic mineral products	1,015	1,138	1,109	1,114	1,096	1,169	1,088	997	938	1,016	1,436	498
Primary metals	561	445	332	341	338	487	439	278	173	200	188	15
Fabricated metal products	1,507	1,521	1,549	1,595	1,784	1,986	2,051	1,988	1,890	2,152	2,582	692
Machinery manufacturing	1,493	1,303	1,288	1,432	1,580	1,608	1,548	1,206	1,168	1,231	1,334	166
Computer and electronic products	612	482	479	502	582	583	593	452	435	560	573	138
Electrical equipment and appliances	131	129	194	200	216	228	259	234	206	200	184	-22
Motor vehicles and parts	(D)	(D)	(D)	342	402	409	(D)	(D)	286	292	246	-40
Other transportation equipment	(D)	(D)	(D)	237	222	208	(D)	(D)	281	253	241	-40
Furniture and related	1,296	1,310	1,348	1,331	1,305	1,233	1,251	1,085	971	968	947	-24
Miscellaneous	2,207	1,993	1,952	2,031	2,157	2,444	2,374	2,487	2,379	2,354	2,343	-36
Nondurable goods	7,988	7,844	8,189	8,183	8,471	8,651	8,722	8,509	8,010	8,307	8,237	227
Food products	2,588	2,485	2,740	2,757	2,892	2,962	2,914	2,874	2,779	2,830	2,859	80
Beverage and tobacco	820	823	826	792	850	769	761	754	766	842	935	169
Textile mills	(D)	(D)	(D)	(D)	(D)	47	37	47	(D)	(D)	64	(D)
Textile product mills	235	230	223	201	209	238	238	238	226	219	216	-10
Apparel	292	272	298	314	338	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Leather and allied products	214	196	201	213	220	176	209	210	203	285	370	167
Paper	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	180	(D)	(D)	(D)
Printing and related	1,171	1,173	1,205	1,216	1,296	1,338	1,339	1,177	1,099	1,130	1,137	38
Petroleum and coal	954	938	903	939	962	988	1,076	1,113	1,088	1,140	1,085	-3
Chemical	711	766	800	773	754	885	954	969	997	1,122	895	-102
Plastics and rubber products	357	333	365	376	365	374	395	336	317	364	370	53

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

Manufacturing Earnings

Montana manufacturing earnings from 2002 to 2012 are presented in [Table 9](#) (page 27). The earnings figures have been corrected for inflation by converting them to constant 2012 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.

It takes only a quick comparison of the data in [Tables 8](#) and [9](#) to determine that the earnings data paint a different picture of manufacturing trends than employment. The overall growth rates from 2010 to 2012 for employment and earnings are similar (7.9 percent for employment 5.3 percent for earnings), and some of the major industry findings are the same. Many of the other industries have very different employment and

earnings trends. The similarities include the reclassification of REC Silicon, leading to the decrease in chemical earnings and the large rise in nonmetallic mineral products growth earnings, and the sizable growth in fabricated metal products. On the other hand, beverages and tobacco had a healthy rise in employment but only a small increase in earnings, and for furniture and related employment declined while the corresponding figure for earnings increased.

The divergent trends between manufacturing employment and earnings are mostly due to the fact that the former incorporate improvements in labor productivity and the effects of structural change. Trends in earnings more closely mirror those of production and value of output rather than just labor input. In some cases there are

other explanations. For example, the sizable growth in beverages and tobacco employment accompanied by a much smaller increase in earnings is probably related to the fact that many brewery employees work in the tasting rooms and their wages are more similar to the food service industry than manufacturing.

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**Table 9
Manufacturing Earnings, Montana (Thousands of 2012 Dollars)**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Percent Change 2010-11
Manufacturing	1,106,376	1,084,940	1,078,351	1,107,392	1,148,498	1,184,645	1,152,243	1,019,604	1,000,428	1,013,665	1,054,098	5.4
Durable goods	689,474	647,202	637,121	661,006	676,559	704,659	659,954	530,652	515,292	532,050	589,868	14.5
Wood product	282,413	262,046	263,207	261,673	251,481	239,552	207,017	144,448	133,776	135,910	137,097	2.5
Nonmetallic minerals	48,046	56,256	53,499	54,777	50,888	56,668	53,340	44,418	41,522	43,199	77,092	85.7
Primary metals	35,110	26,575	17,639	17,493	18,144	30,209	27,648	13,714	4,901	6,928	6,760	37.9
Fabricated metals	61,971	62,002	61,105	63,863	72,607	83,442	87,111	78,362	79,095	89,029	113,279	43.2
Machinery manufacturing	80,334	68,825	69,876	78,112	89,901	83,929	82,970	67,752	73,764	72,079	73,699	-0.1
Computer and electronics	29,412	24,652	23,478	29,601	28,171	30,919	29,616	21,990	21,944	27,746	24,919	13.6
Electrical equipment and appliances	7,738	8,110	10,144	10,694	11,546	12,231	14,608	12,957	12,957	11,461	10,860	-16.2
Motor vehicles and parts	(D)	(D)	(D)	17,694	20,606	21,605	(D)	(D)	16,604	17,290	13,467	-18.9
Other transportation equipment	(D)	(D)	(D)	9,767	9,522	9,124	(D)	(D)	10,297	13,517	13,665	32.7
Furniture and related	40,512	40,070	40,000	40,134	40,389	39,459	39,526	30,310	27,130	27,020	29,364	8.2
Miscellaneous	78,307	73,442	71,162	77,198	83,304	97,521	91,855	93,958	93,300	87,871	89,666	-3.9
Nondurable goods	416,902	437,738	441,230	446,386	471,938	479,986	492,288	488,952	485,136	481,616	464,230	-4.3
Food	101,251	99,786	107,470	106,903	111,664	112,971	113,643	113,508	114,659	111,249	111,520	-2.7
Beverages and tobacco	34,120	34,735	35,381	33,997	35,257	31,516	31,759	31,682	34,985	37,196	39,948	14.2
Textile mills	(D)	(D)	(D)	(D)	(D)	777	624	688	(D)	(D)	642	(D)
Textile product mills	5,656	5,604	5,660	5,263	5,552	6,268	6,461	6,146	6,310	6,233	5,759	-8.7
Apparel	5,276	7,777	10,050	9,561	10,327	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Leather and allied products	5,608	9,904	5,660	3,149	3,522	2,684	2,666	2,812	2,852	2,792	3,031	6.3
Paper manufacturing	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Printing and related	40,327	40,673	40,721	41,484	45,086	48,970	49,707	41,342	38,552	40,586	42,053	9.1
Petroleum and coal	115,591	125,485	118,179	126,361	146,200	143,963	155,008	166,038	169,183	174,879	181,020	7.0
Chemical manufacturing	46,479	52,132	55,189	57,999	52,308	64,957	67,293	68,529	74,133	82,846	54,425	-26.6
Plastics and rubber products	10,324	9,624	10,682	11,414	12,492	14,079	14,013	13,198	14,476	15,672	16,393	13.2

Note: Includes the income of the self-employed. (T) and (D) denote 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 2012 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 \$43,411 in 2012, about 17.2 percent higher than the average of \$37,033 for all

workers. The highest wages within manufacturing reported in [Table 10](#) were the \$109,925 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 \$52,205 earned in electrical equipment and appliances. Next was the \$50,926 earned in machinery manufacturing. The lowest paying manufacturing jobs were in leather and allied products (\$22,636) and textile product mills (\$23,196), 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 \$37,033 in 2012,

about 74.6 percent of the national average. Montana manufacturing wages per worker were about 70.5 percent of the U.S. figure. Within manufacturing, only wood products and petroleum and coal workers had average wages at or near their respective national average. The lowest was for computer and electronics workers, who earned only 43.0 percent of their national counterparts.

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Table 10
Employment and Wages and Salaries per Worker, By Industry, Montana, 2012

	Wage and Salary Employment	Wages and Salaries Per Worker (Current Dollars)	Wages and Salaries Per Worker (Percent of U.S.)		Wage and Salary Employment	Wages and Salaries Per Worker (Current Dollars)	Wages and Salaries Per Worker (Percent of U.S.)
Total, All Industries	460,085	37,033	74.6	Leather and allied products	66	22,636	57.2
Farm	5,593	27,422	117.3	Paper	(D)	(D)	(D)
Nonfarm	454,492	37,151	74.0	Printing and related	920	35,468	77.0
Forestry, fishing, and Other	2,808	30,654	110.7	Petroleum and coal	1,070	109,925	102.1
Mining	8,730	81,885	84.4	Chemical	784	47,242	53.7
Utilities	3,196	76,683	80.2	Plastics and rubber products	354	35,508	72.5
Construction	23,892	43,891	82.9	Wholesale trade	16,334	49,846	72.0
Manufacturing	17,537	43,411	70.5	Retail trade	55,826	25,340	89.0
Durable goods	10,578	41,673	63.9	Transportation and warehousing	14,531	47,750	96.6
Wood products	2,616	40,644	103.6	Information	6,949	43,011	51.7
Nonmetallic minerals	1,221	49,944	96.2	Finance and insurance	15,707	53,670	58.4
Primary metals	143	32,930	52.5	Real estate and rental and leasing	5,262	30,567	62.2
Fabricated metal products	2,139	38,854	73.8	Professional and technical services	19,706	57,590	68.3
Machinery	1,128	50,926	77.9	Management of companies	2,057	68,618	62.3
Computer and electronics	522	43,391	43.0	Administrative and waste services	19,727	29,301	81.9
Electrical equipment and appliances	151	52,205	83.8	Educational services	5,672	21,358	56.1
Motor vehicles and parts	244	40,971	68.6	Health care and social assistance	62,185	39,929	86.8
Other transportation equipment	200	51,525	62.9	Arts, entertainment, and recreation	10,885	20,289	55.3
Furniture and related	583	33,870	83.8	Accommodation and food services	47,467	16,726	82.3
Miscellaneous	1,631	35,360	60.9	Other services	20,473	26,173	83.0
Nondurable goods	6,959	46,053	83.0	Government	95,548	39,717	81.2
Food	2,515	32,328	75.2	Federal, civilian	13,563	62,013	84.0
Beverage and tobacco	871	29,677	54.3	Military	8,315	35,513	74.6
Textile mills	26	18,154	43.9	State and local	73,670	36,087	79.6
Textile product mills	184	23,196	63.6				
Apparel	(D)	(D)	(D)				

Note: (T) and (D) denote not shown to avoid disclosure of confidential information.
Source: U.S. Bureau of Economic Analysis.

Montana's Manufacturing Exports

Montana's manufacturers have been expanding internationally to broaden their markets and enhance their sales. [Table 11](#) (page 31) presents manufacturing exports by industry for 2002 and 2007 along with the value of shipments for many of the same industries. The shipment data are reported in the Census of Manufacturers and are the most complete data available. The 2012 Census of Manufacturing data should become available in late 2014 or early 2015.

[Table 12](#) presents more current export data for 2009 to 2013, but the value of shipments data are either not available or are the far more limited figures published in the Survey of Manufacturers.

As shown in [Table 11](#), 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 its 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 manufacturers are also classified in chemicals, and they have traditionally served certain Canadian markets. Machinery exported about 36.5 percent of its 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

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

	Industry	- 2002 -			- 2007 -		
		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	164,560	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	Nonmetallic 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.

Materials) more than doubled, and their share of shipments rose from 36.5 percent in 2002 to 58.0 percent in 2007.

More recent data for Montana manufacturing exports from 2009 to 2013 are presented in [Table 12](#) (page 33). The sequestration and federal government shutdown in 2013 has seriously delayed the release of the 2012 Census of Manufacturing. The export data for 2012 and 2013 are presented without the corresponding shipment data for industries.

Total manufacturing exports were at their recession low in 2009 and then increased 27.2 percent in 2010. Exports maintained their levels in 2011 and 2012 but then declined slightly in 2013. Exports increased from 10.6 percent of shipments in 2009 to 11.6 percent in 2010 and then declined slightly to 9.9 percent

in 2011. As discussed earlier, there are no values of shipments data for 2012 and 2013. The lack of overall growth of manufacturing exports from 2010 to 2012 and the decline in 2013 may be a reflection of the economic turmoil in Europe and deceleration of growth in Asia and other developing countries.

A closer look at the exports for individual manufacturing industries reveals a mixture of trends. First of all, the reclassification of REC Silicon is clearly seen in the data for the chemicals and nonmetallic mineral products industries. The largest increases between 2009 and 2013 were in petroleum and coal products and machinery manufacturing, but both experienced declines between 2012 and 2013. Paper products and primary metals experienced the greatest decrease. Both of these industries experienced plant closures during this period.

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 but 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. These data confirm the general upward trend

in Montana manufacturing exports and the increase from the cycle trough between 2009 and 2011. Information for 2012 and 2013 may provide more information about the leveling of exports shown earlier in [Table 12](#).

[Table 14](#) identifies the destination of Montana manufacturing exports. Canada consistently ranks number 1 as the major destination. Despite a decrease in 2013, China remains in second place as the destination of exports with an almost 14-fold increase in value of exports between 2002 and 2013. Taiwan ranks third and Korea is fourth. Four of the top five export destinations for Montana manufacturing are Asian countries. The largest non-Asian destinations are Germany and the United Kingdom, which rank 8th and 9th.

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

NA-ICS Code	Industry	- 2009 -			-2010-			-2011-		-2012*-		-2013*-
		Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments	Exports	Exports
n/a	Manufacturing	876,500	8,293,186	10.6	1,115,672	9,586,897	11.6	1,162,912	11,705,624	9.9	1,132,600	1,047,011
311	Food Products	32,135	772,217	4.2	32,647	787,051	4.1	41,759	872,879	4.8	65,396	66,326
312	Beverages and Tobacco	28	(D)		7,765	(D)		8,798	NA	NA	10,876	42,499
313	Textile Mills	401	(D)		619	(D)		334	NA	NA	497	1,271
314	Textile and Fabrics	391	(D)		530	(D)		533	NA	NA	500	717
315	Apparel	1,793	(D)		1,952	(D)		2,923	NA	NA	2,887	3,658
316	Leather & Allied Products	2,855	(D)		2,027	(D)		2,807	NA	NA	2,713	3,843
321	Wood Products	19,751	580,252	3.4	25,720	591,703	4.3	26,457	614,337	4.3	36,105	33,291
322	Paper Manufacturing	32,805	(D)		1,419	(D)		550	NA	NA	455	379
323	Printing & Related	959	(D)		1,040	(D)		1,148	NA	NA	1,591	1,108
324	Petroleum & Coal Products	22,800	4,117,780	0.6	54,404	5,325,367	1.0	160,221	6,567,756	2.4	148,973	91,643
325	Chemicals	302,928	(D)		369,301	(D)		349,595	NA	NA	326,674	278,815
326	Plastic & Rubber Products	3,716	(D)		3,011	(D)		6,443	NA	NA	11,620	21,320
327	Nonmetallic Mineral Products	39,500	244,985	16.1	59,437	(D)		58,307	NA	NA	72,715	70,592
331	Primary Metals	121,453	(D)		124,071	(D)		64,211	NA	NA	28,371	50,235
332	Fabricated Metal Products	7,311	277,670	2.6	11,319	258,933	4.4	14,281	316,775	4.5	18,765	38,558
333	Machinery	156,425	195,022	80.2	220,649	(D)		204,992	395,876	51.8	219,288	163,292
334	Computer & Elec. Products	22,293	(D)		22,904	(D)		29,556	NA	NA	37,826	34,863
335	Electrical Equipment & Appliances	16,305	(D)		17,705	(D)		17,009	NA	NA	14,702	16,058
336	Transportation Equipment	76,731	(D)		137,889	(D)		149,480	NA	NA	104,663	103,883
337	Furniture & Related	680	(D)		1,152	(D)		1,051	NA	NA	1,426	1,369
339	Miscellaneous	15,239	205,714	7.4	20,108	199,870	10.1	22,454	NA	NA	26,557	23,291

* 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 Manufactures 2009 and 2010.

The orientation of Montana manufacturing exports has changed from Europe to Asia. As recently as 2002, Germany ranked third and the United Kingdom sixth. This reorientation has both pluses and minuses. On the plus side, the current European economic malaise may be having less of an impact on Montana. On the other hand, Montana manufacturers will certainly feel the effects of moderating economic growth in Asia.

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

Country	-2002-		-2005-		-2011-		-2013-		Percent Change 2002-2013
	Exports	Rank	Exports	Rank	Exports	Rank	Exports	Rank	
Total, All Countries	290,417	–	512,327	–	1,162,911	–	1,047,009	–	260.5
Canada	155,787	1	219,182	1	500,362	1	512,657	1	229.1
Japan	26,459	2	53,169	2	61,993	5	42,559	6	60.8
Taiwan	13,949	4	32,432	4	65,752	4	59,025	3	323.1
China	5,064	8	25,378	6	110,654	2	74,610	2	1,373.3
Korea	6,343	7	24,296	5	90,205	3	57,628	4	808.5
Belgium	3,370	24	1,877	25	30,681	8	47,015	5	1,295.1
Germany	22,784	3	48,957	3	42,587	6	26,457	8	16.1
United Kingdom	6,692	6	22,551	7	33,547	7	21,127	9	215.7
Mexico	4,232	18	7,461	9	20,048	9	33,084	7	681.8
Netherlands	10,911	5	17,775	8	18,248	10	18,786	10	268.6

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

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

	2006	2009	2011
Export-Related Shipments (Millions)			\$2,457
Percent of Manufacturing Shipments	8.2	16.0	21.0
Export-Related Employment			3,100
Percent of Manufacturing Employment	10.6	15.6	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 May 28, 2014).

