



# 2017

## THE STATE OF MONTANA MANUFACTURING



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# INTRODUCTION

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There was an explosion of optimism after the presidential election in November 2016. We saw surges in indices of sentiment in consumer and business surveys, such as the University of Michigan's Survey of Consumer Confidence, and a renewed bull market in stocks, with the S&P 500 Index up about 10 percent right after the election. The actual economic data reports more modest increases with overall growth continuing in the 2 percent range.

Since then, the U.S. economy has returned to full employment, with the current unemployment rate hovering a little less than 5 percent. This suggests that there is not a large pool of unemployed workers who could fill jobs if demand increases - although, the labor force participation rate could rebound and provide some manpower relief. Therefore, the U.S. Federal Reserve will probably continue raising interest rates to keep inflation minimal.

U.S. manufacturing has been a bright spot during the recovery from the trough of the Great Recession. Lower oil prices and an abundance of cheap natural gas have kept costs low and provided opportunities for new products and production facilities. A recovering housing market, particularly in multi-family facilities, is stimulating the demand for building materials, furniture and appliances. But there are uncertainties with manufacturing exports due to the rising value of the dollar, slow worldwide growth and the potential for trade-dampening policies in several countries.

In Montana, low oil prices continue to dampen the economy in the eastern part of the state and a drop in agricultural prices has impacted farms and ranches statewide. Consequently Montana's overall growth rate in 2016 was less than 2015. The energy and agricultural sectors are not projected

to improve markedly in the near future and economic growth in 2017 may be only slightly above that of 2016.

Gallatin County stands out as the fastest growing community in the state, with Flathead County a bit behind. Lewis and Clark and Cascade counties have posted modest growth. Even Missoula and Ravalli counties in the western part of the state have started to turn upward. New and expanded manufacturing establishments are a major factor in the improved conditions in Cascade and Missoula counties.

Table 1 (page 5) presents the manufacturing wage and salary employment for the U.S. and Montana during 2010 (Montana cycle trough) and 2016 (the latest data available). Comparing trends in employment reveals how manufacturing has fared in the U.S. and Montana during the recovery phase of this business cycle.

Montana manufacturing employment has grown much faster than the nation since the Great recession. U.S. manufacturing wage and salary employment rose from 11.5 million workers in 2010 to 12.3 million in 2016, an increase of 7.1 percent. Montana manufacturing employment increased from 16,400 in 2010 to 19,400 in 2016, an increase of 18.3 percent.

The strong growth in Montana manufacturing employment occurred despite permanent closures in several manufacturing industries, such as the Smurfit-Stone paper mill near Missoula, which 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 materials due to diminished harvests on federal and some industrial lands. The paper mill and sawmills have since been dismantled and those jobs will not return.

As shown in Table 1 (page 5), employment in the wood and paper products industries decreased from 3,100 in 2010 to 2,635 in 2016, a decline of 15 percent. Employment in all the other components of Montana manufacturing increased from 13,300 in 2010 to 16,765 in 2015, and increase of 26.1 percent.

In summary, since the start of the recovery Montana manufacturing employment has increased faster than the national rate. This strong performance was in spite of permanent closures in the wood and paper products industries. New and expanded manufacturing establishments were a major contributor to improved growth.

**Table 1.** Manufacturing wage and salary employment, U.S. and Montana, 2010 and 2016. **Source:** U.S. Bureau of Labor Statistics, Bureau of Business and Economic Research, University of Montana.

	2010	2016	Percent Change
U.S. Manufacturing	11,487,000	12,300,000	7.1
Montana Manufacturing	16,400	19,400	18.3
Wood and Paper Products	3,100	2,635	-15.0
All Other manufacturing	13,300	16,765	26.1

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

# WORLD OUTLOOK

## BETTER THAN LAST YEAR, BUT INCREASING UNCERTAINTY

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Global economic growth will be about 2.6 percent in 2017 and Moody's Analytics projects it will accelerate to 2.9 percent in 2018. Led by the U.S., most regions of the world are now growing. Global economic conditions are important for Montana manufacturers, because several prominent firms operate in the worldwide market and their exports depend on economic conditions worldwide.

### Europe and the Eurozone – Recovery Firms

Despite the uncertainty, due to the election in Germany and Britain's exit from the EU, overall indicators are stronger this year than last. Almost all areas are posting positive growth, as compared to declines last year in some of the debt-ridden countries.

Germany remains the growth leader and France lags a bit behind. Countries, such as Italy and Spain, are growing, but still face tight credit conditions. Unemployment remains high in certain countries, but has begun to decline and unemployment rates are still near 20 percent in places such as Greece and Spain, but down from the 25 to 28 percent reported four or five years ago.

The U.K. remains a big unknown. A new recession and rising unemployment that some predicted would immediately follow Brexit has not yet occurred. The pound sterling remains weak, giving some assist to exports and deterring imports and a new election has been scheduled for 2017. A disintegration of the U.K. is possible if there is a Scottish independence vote. Future trade negotiations with the EU may get testy.

Hanging over the entire region is the potential for an energy crisis. The unresolved situation between Russia and Ukraine could result in a sharp drop in energy supplies to Western Europe and a corresponding rise in prices.

### South America – At Least Growth is Projected

The South American economy should show slight growth in 2017 and Moody's Analytics projects an acceleration in 2018. Commodity prices have strengthened a bit and the Brazilian economy will enter positive territory after two years of declines. Venezuela's economy remains a basket case.

Brazil, the largest economy in South America, declined in 2015 and 2016. It has implemented expansionary fiscal and monetary policies, but the effectiveness has been limited by high inflation, the lack of trust in the private sector and a growing political crisis. Argentina is expected to grow after economic reforms take hold and private investment and government spending rebounds. Venezuela continues to be plagued by low oil prices, rampant inflation and political instability.

### Mexico – Unexpected Slowdown

The Mexican economy decelerated because new reforms did not stimulate investment as much as expected. Low oil prices remain a concern and U.S. policies under the new administration may negatively impact future investments from the North.

### India – Tax Reform Uncertainties

A long-awaited nationwide tax reform (a GST-goods and services tax) is scheduled to go into effect in July 2017. Theoretically, this will replace a bewildering array of state taxes and improve the efficiency of the Indian economy. But the proposed GST is itself complex and its implementation may be fraught with difficulties.

### China – Data Uncertainties

Reliable economic data for the Chinese economy remains problematic, but the news is not good. Official statistics show only a moderate deceleration to 7 to 8 percent annual growth rate. Private non-government sources paint a much darker picture, with these estimates showing annual increases in the 2 to 3 percent range. There is some concern that an unstable housing and construction cycle may be underway and a policy mistake may have major repercussions.

### Japan – Less Somber

Japanese consumers are feeling more buoyant as improved employment conditions and a rising stock market boost sentiment. A pickup in global demand and a weak yen continue to support the economy. Exports are expanding at a double-digit rate for the first time in over two years, pushing the trade surplus to levels last seen in 2010. Weaknesses that plagued recent growth have also carried over to this year despite the continuous fall in unemployment.

### Canada – Recovery Gains Strength

The pessimism resulting from the oil price drop is over and there was solid growth in late 2016 and early 2017. The labor market continues strong. Low inflation and a competitive exchange rate have helped exports, but the possibility of a border-adjustment tax looms over the U.S. market. Low inflation and the need for a competitive exchange rate will keep monetary policy accommodative. Export growth to the U.S. is threatened by a border-adjustment tax and increased tariffs.

### Summary – More Downside than Upside Risks

Even though the overall world outlook is more positive than last year, the prominent risks are on the downside:

- The eurozone is facing a crisis with the possibility of euroskeptic leaders winning future elections.
- The impacts of Brexit are still unknown.
- The refugee crisis is far from over.
- The perennial instability in the Middle East is just short of explosive.
- Economic growth in emerging markets is very uneven.

# MEASURING AND 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 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.

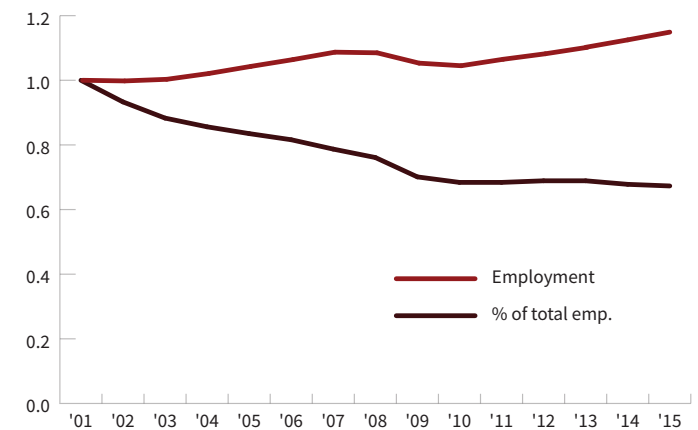
Improvements in productivity and efficiency change the relationships between inputs and outputs. Decreases in employment do not necessarily mean less output is produced or a 10 percent growth in output may not be associated with an equivalent change in some or all of the inputs. In other words, when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

The long-term decline in manufacturing employment is sometimes misinterpreted as an indicator of the poor overall health of the industry. Figure 1 (page 8) 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 definite downward trend from 2001 to 2015. In absolute terms, manufacturing employment decreased from 16.9 million workers in 2001 to 13.1 million in 2015, while its share of total employment dropped from 10.2 percent to 6.9 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 2 (page 9) 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 is manufacturing GDP as a percent of total GDP, both in constant dollars. They have been converted to relatives in order to easily present them side by side.

**Figure 1.** U.S. manufacturing employment (2001 = 1.00).



Source: U.S. Bureau of Economic Analysis.

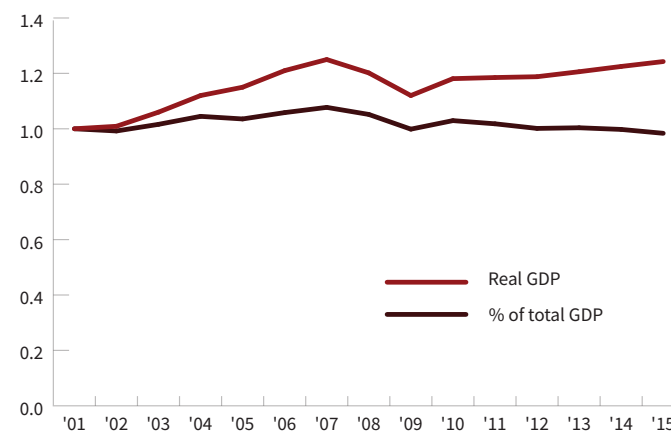


Both measures show general upward trends except for the recession years in 2008 and 2009. Real manufacturing GDP rose from \$1.5 trillion (constant dollars) in 2001 to \$1.9 trillion (constant dollars) in 2015, a rise of 26.8 percent.

Manufacturing represented 12.1 percent of total U.S. GDP in 2001 and 11.9 percent in 2015. In other words, manufacturing output has been rising after adjusting for inflation and the growth in manufacturing has been equal to the economy-wide average, as indicated by its constant share of total real GDP.

The following sections use a variety of data to analyze manufacturing and 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 the most current figures. In each case, the characteristics of the data will be discussed so that they may be interpreted correctly.

**Figure 2.** U.S. manufacturing real GDP (2001=1.00).



**Source:** U.S. Bureau of Economic Analysis.

# MANUFACTURING AND THE MONTANA ECONOMY

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Trends in the Montana economy are primarily determined by the basic 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 the state economy and are responsible for creating further income and jobs.

The role of manufacturing in every state is presented in Table 2 (page 11). Manufacturing's share of each state's economic base as measured by GDP was calculated for 1997 and 2015. The economic base of each state was estimated using a method developed by the U.S. Bureau of Economic Analysis (BEA). There are other methods of identifying the basic industries, which may yield slightly different findings.

The BEA method assigns certain industries to the basic sector in each state. These industries include manufacturing, mining, agriculture, the federal government and rail/truck transportation. Other industries may also be classified in basic sector in certain cases. For example, financial services in New York, insurance in Connecticut and Indiana, and amusement places, such as casinos in Nevada, all serve non-local markets and are part of their state's economic base.

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. By 2015, Oregon vaulted to the second spot and North Carolina dropped to fourth and Wisconsin was out of the top five. 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 25.8 percent of the economic base. Eighteen years later in 2015, Montana rose to 32nd with manufacturing representing about 27.5 percent of the economic base. One of the causes for Montana manufacturing's rise in importance and rank has been oil refining. GDP is a measure of the value of output and the price of refined oil increased significantly between 1997 and 2015.

GDP data is not well-suited to analyze trends in manufacturing from one year to the next. The disadvantage of GDP data is that it is not available prior to 1997 and the most current figures are usually several years old or do not provide detail for specific sub-sectors within manufacturing.

Earnings data is more appropriate for analyzing 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 or overall economic conditions in the agricultural sector. Consequently, the following sections will analyze 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 a volatile component that could mask important trends elsewhere in the economy.

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

**Table 2.** Manufacturing as percent of economic base gross state product for states, 1997 and 2015.

1997			2015			1997			2015		
Rank	State	Percent	Rank	State	Percent	Rank	State	Percent	Rank	State	Percent
1	Indiana	74.88	1	Indiana	74.14	27	Louisiana	44.70	27	Illinois	32.74
2	North Carolina	74.28	2	Oregon	71.33	28	Oklahoma	43.78	28	Nebraska	31.73
3	Wisconsin	70.64	3	South Carolina	67.78	29	Idaho	42.30	29	California	31.22
4	South Carolina	70.00	4	North Carolina	63.30	30	West Virginia	41.68	30	Rhode Island	28.55
5	Oregon	67.97	5	Kentucky	60.91	31	Rhode Island	41.06	31	Washington	27.66
6	Kentucky	66.91	6	West Virginia	58.94	32	Illinois	39.45	32	Montana	27.56
7	Pennsylvania	66.34	7	Louisiana	58.23	33	California	39.15	33	Oklahoma	26.15
8	Ohio	65.36	8	Michigan	57.68	34	Nebraska	36.45	34	South Dakota	24.99
9	Michigan	64.61	9	Alabama	57.05	35	New Jersey	35.03	35	Connecticut	24.45
10	New Hampshire	62.01	10	Kansas	54.75	36	South Dakota	34.26	36	New Jersey	22.92
11	Arkansas	61.80	11	Pennsylvania	51.54	37	Connecticut	31.97	37	Virginia	21.10
12	Iowa	58.76	12	Ohio	50.64	38	Virginia	31.65	38	Massachusetts	20.70
13	Arizona	58.47	13	Iowa	49.95	39	Massachusetts	31.42	39	Florida	18.46
14	Alabama	57.58	14	Arkansas	49.09	40	Delaware	30.49	40	North Dakota	18.03
15	Vermont	56.09	15	Minnesota	45.84	41	Montana	25.82	41	Colorado	17.39
16	Maine	54.07	16	Mississippi	44.58	42	Florida	24.85	42	Delaware	16.57
17	Kansas	53.02	17	Tennessee	44.35	43	Colorado	24.84	43	Nevada	16.25
18	Missouri	51.09	18	Missouri	43.56	44	North Dakota	22.55	44	Maryland	13.92
19	Minnesota	50.89	19	New Hampshire	42.13	45	Maryland	21.02	45	Wisconsin	13.85
20	Tennessee	50.71	20	Texas	41.29	46	New York	16.90	46	Wyoming	13.85
21	Georgia	50.17	21	Georgia	41.25	47	Nevada	15.72	47	New Mexico	12.31
22	Mississippi	49.58	22	Maine	39.09	48	Wyoming	14.42	48	New York	10.74
23	New Mexico	45.71	23	Arizona	38.91	49	Alaska	8.32	49	Alaska	7.29
24	Utah	45.58	24	Vermont	38.12	50	Hawaii	5.57	50	Hawaii	6.27
25	Texas	45.29	25	Idaho	38.07	51	District of Columbia	0.79	51	District of Columbia	0.32
26	Washington	45.27	26	Utah	32.88						

Source: U.S. Bureau of Economic Analysis.

Manufacturing is a basic industry because most of its output and production is shipped out of Montana. As shown later in Table 7 (page 21), about 50 percent of the state's manufacturing earnings are in industries such as wood products, petroleum refining, fabricated metal products and machinery, where almost all of the products immediately leave the state. Even the smaller manufacturing industries, such as transportation equipment and nonmetallic metal products, include 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 3 (page 12).

As shown in Figure 3 (page 12), manufacturing accounts for about 16 percent of total earnings in basic industries and is the third largest basic industry. This percentage differs from that reported in Table 2 (page 11) because GDP is a measure of the value of production or output while the data in Figure 3 are the earnings of workers. Mining accounts for about 18 percent of basic earnings and ranks second. Mining includes the oil and gas extraction 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 a relatively modest 16 percent of the economic base. This importance is illustrated by the data in Figure 4 (page 12), which presents the year-to-year changes in nonfarm basic earnings by industry from 2009 to 2015. The changes in basic earnings are presented for each nonfarm basic industry, starting with the cycle trough in 2009, and each year is discussed below:

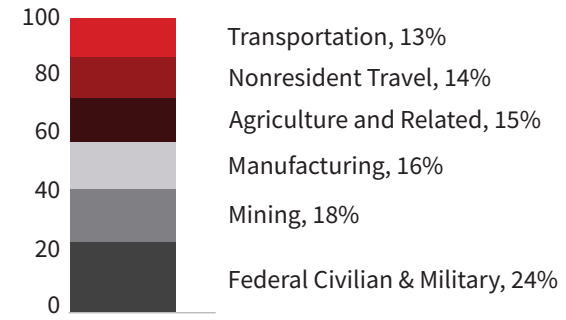
**2009-10:** The economic recovery began. Total nonfarm basic earnings grew \$196 million. The largest increases were in mining (\$113 million) and nonresident travel (\$49 million). Manufacturing declined about \$18 million.

**2010-2011:** Total nonfarm basic earnings grew about \$463 million. The largest increases were in mining (\$359 million) and transportation (\$105 million). The change in manufacturing turned positive (\$18 million) and federal government earnings declined (-\$32 million).

**2011-2012:** Total nonfarm basic earnings increased about \$307 million. The largest increases were in mining (\$154 million) and nonresident travel (\$92 million). Manufacturing grew roughly \$41 million and the federal government continued to decrease (-\$28 million).

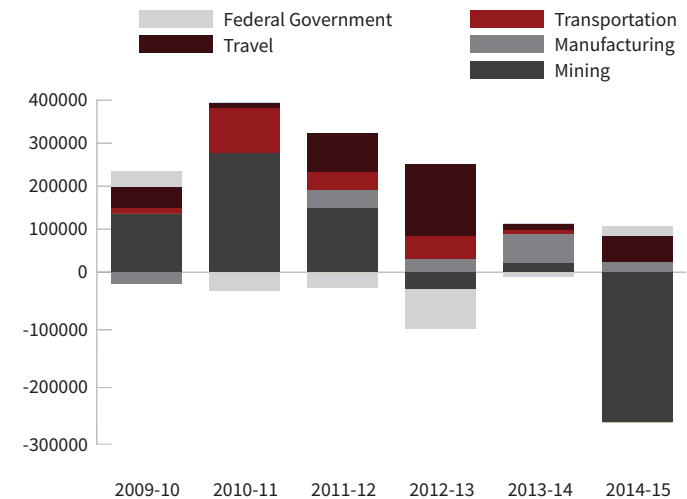
**2012-2013:** Total nonfarm basic earnings rose about \$191 million. The largest increases were in nonresident travel (\$167 million) and transportation (\$74 million). Manufacturing grew about \$33 million, mining declined by \$12 million and the federal government decreased \$72 million.

**Figure 3.** Worker earnings in basic industries, Montana 2013-2015.



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

**Figure 4.** Change in nonfarm basic earnings, Montana.



**Source:** U.S. Bureau of Economic Analysis.

2013-2014: Total nonfarm basic earnings increased \$16 million. Manufacturing experienced the largest growth (\$51 million). Next were transportation (\$37million) and travel \$14 million). Mining declined about \$76 million and federal earnings decreased roughly \$8 million.

2014-2015. Total nonfarm basic earnings decreased \$154 million. Nonresident travel grew the most (\$60 million) while the federal government and manufacturing both rose about \$23 million. Mining declined about \$262 million.

This analysis illustrates a number of important points about the causes of economic growth in Montana. First, overall growth or decline in 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 were consistently the fastest or slowest growing during this period.

Finally, and perhaps most importantly, industries that account for a modest share of the economic base, such as manufacturing, can be major contributors to overall economic growth or decline during specific periods. For example, during 2013-14, the increase in manufacturing earnings was the largest of the state's basic industries. On the minus side, manufacturing was the only declining industry in 2009-10.



## MANUFACTURING ESTABLISHMENTS

There were 3,344 manufacturing establishments in Montana during 2015, as shown in Table 3 (page 14). The largest category was miscellaneous manufacturing (NAICS 339) with 691 establishments. The next largest categories were fabricated metal manufacturing (NAICS 332) with 493 establishments and food products (NAICS 312) with 370 establishments.

**Table 3.** Manufacturing establishments, Montana, 2015.

NAICS Code	Industry	# of Establishments
	Manufacturing	3,364
311	Food Products	370
312	Beverages & Tobacco	100
313	Textile Mills	14
314	Textile Product Mills	66
315	Apparel	146
316	Leather & Allied Products	134
321	Wood Products	345
322	Paper Manufacturing	4
323	Printing & Related	151
324	Petroleum & Coal Products	20
325	Chemicals	82
326	Rubber & Rubber Products	35
327	Nonmetallic Mineral Products	144
331	Primary Metals	45
332	Fabricated Metal Products	493
333	Machinery	125
334	Computer and Elec. Products	65
335	Elec. Equipment and Appliances	22
336	Transportation Equipment	70
337	Furniture and Related	242
339	Miscellaneous	691

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

## EMPLOYMENT SIZE

Montana manufacturers are mostly small businesses. As shown in Table 4 (page 15), there were 645 establishments with one to four workers. They represented 50.5 percent of the 1,276 establishments with employees. There were 878 establishments with less than 10 workers or 68.9 percent of the total. There were no Montana manufacturers with 500 employees or more.

**Table 4.** Manufacturing establishments by employment size, Montana, 2015.

Employment	# of Establishments
Total	1,276
1 to 4	645
5 to 9	233
10 to 19	208
20 to 49	110
50 to 99	42
100 to 249	33
250 to 499	5
500 to 999	0
1,000 or more	0

**Source:** U.S. Bureau of the Census. **Note:** Includes only establishments with employees.



## COMPOSITION OF MANUFACTURING

Montana manufacturing is not identical to U.S. manufacturing. Industries that are important in Montana are not necessarily important nationwide and vice versa.

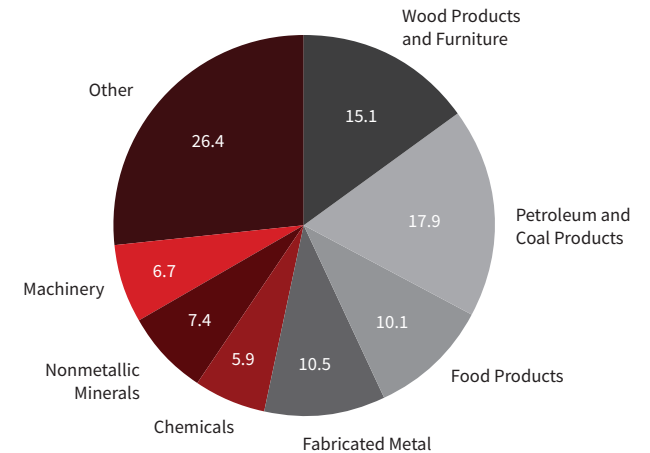
Figures 5 and 6 (page 16) present the composition of manufacturing earnings in Montana and the United States during 2015. The volatility of energy prices have distorted value of output measures for certain industries, such as petroleum refining. Consequently, earnings becomes the best measure of the composition of manufacturing, because it is the amount earned by manufacturing workers in the state.

The largest component of U.S. manufacturing during 2015 was computers and electronics, which accounted for 12.9 percent of total manufacturing earnings. The next four industries were chemical products (10.8 percent), fabricated metals (9.6 percent), food products (8.6 percent) and machinery (9.2 percent).

The two largest Montana manufacturing industries in 2015 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 17.9 percent of total manufacturing earnings in 2015. The next largest industry was wood products and furniture (the paper products industry is now miniscule due to the 2010 shutdown of Smurf-it-Stone) representing 15.1 percent of earnings. The wood products and furniture industry is in first place when measured by employment (see Table 6 on page 19).

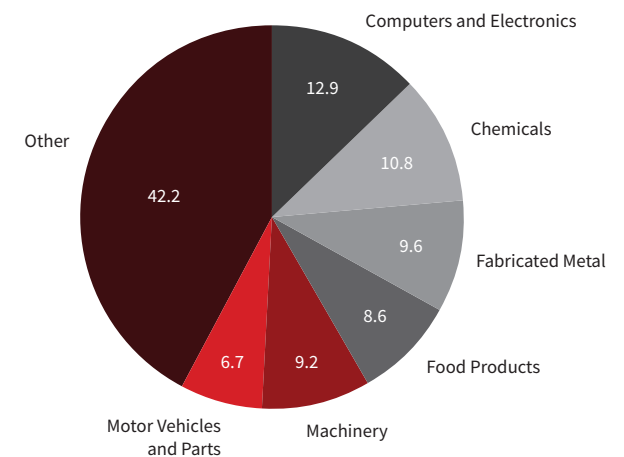
Fabricated metals and food products are the third and fourth largest sectors, accounting for 10.5 percent and 10.1 percent respectively. Earnings in nonmetallic minerals represented 7.4 percent of the total and machinery, which includes Applied Materials (formerly Semitool) accounted for 6.7 percent.

**Figure 5.** Composition of manufacturing, Montana, 2015 (percent of manufacturing earnings).



Source: U.S. Bureau of Economic Analysis.

**Figure 6.** Composition of manufacturing, United States, 2015 (percent of manufacturing earnings).



Source: U.S. Bureau of Economic Analysis.

## MANUFACTURING EMPLOYMENT

The number of manufacturing workers in the U.S. has declined steadily from 2005 to 2015, as shown in Table 5 (page 17). In Montana, manufacturing employment increased between these two endpoints, but experienced a sharp drop at the onset of the Great Recession and then a healthy recovery beginning in 2010.

U.S. manufacturing employment decreased from 14.7 million workers in 2005 to 13.1 million in 2015, a drop of 12.2 percent. Manufacturing's share of total employment declined from 8.5 percent to 6.9 percent during this period.

Montana manufacturing employment increased slightly from about 22,600 workers in 2005 to approximately 23,400 workers in 2015, an increase of roughly 3.5 percent. This increase masks decreases concentrated in a

several industries: wood products, paper products and primary metals refining. These declines occurred during the Great Recession beginning in 2008. As noted earlier, manufacturing employment has risen steadily since the recession's low point. The sectors experiencing the greatest increases will be identified later.

Manufacturing's share of total Montana employment decreased from 3.8 percent in 2005 to 3.5 percent in 2014. Montana's decrease in relative importance was 0.3 percentage points as compared to 1.6 percentage points nationwide.

**Table 5.** Full- and part-time employment, total and manufacturing, Montana and United States.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total, United States	172.6	176.1	179.9	179.7	174.2	173.0	176.3	179.1	182.4	186.2	190.2
(Millions of Workers)											
Manufacturing	14.7	14.7	14.5	14.0	12.5	12.1	12.4	12.6	12.8	12.9	13.1
(Millions of Workers)											
Percent of Total	8.5	8.3	8.1	7.8	7.2	7.0	7.0	7.0	7.0	6.9	6.9
Total, Montana	601.3	617.7	636.6	637.6	621.5	616.8	623.9	633.4	642.2	648.7	661.9
(Thousands of workers)											
Manufacturing	22.6	23.4	24.0	23.4	21.2	19.8	20.7	21.5	22.6	23.0	23.4
(Thousands of Workers)											
Percent of Total	3.8	3.8	3.8	3.7	3.4	3.2	3.3	3.4	3.5	3.5	3.5

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

## MONTANA MANUFACTURING EMPLOYMENT BY INDUSTRY

Detailed manufacturing employment data from 2005 to 2015 is presented in Table 6 (page 19). Total manufacturing employment barely increased by about 700 workers over this 10-year period. The analysis concentrates on the period from 2010 to 2015, which includes the recovery from the Great Recession.

The national business cycle trough was in 2009. Here in Montana, the data in Table 6 (page 19) show that the low point for manufacturing was 2010. Since then, total manufacturing employment has increased by 3,572 workers or almost 18 percent. The largest growth in employment occurred in 2013 when there was an increase of more than 1,100 new jobs. The following paragraphs take a closer look at the 2010 to 2015 period. 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. The Montana Department of Labor and Industry reclassified it in 2012 from the chemicals industry to the nonmetallic mineral products industry. This reclassification accounts for most of the 449 workers increase in nonmetallic minerals and the modest decrease in chemicals between 2010 and 2015. REC Silicon produces raw materials for the international solar and electronic industries. It was formerly named ASIMI.

Fabricated metal products experienced the largest employment increase between 2010 and 2015. The number of workers grew from 1,890 in 2010 to 2,961 in 2015, a rise of 1,071 employees or roughly 56.7 percent. Fabricated metals include a variety of firms producing everything from structural metal buildings to spring and wire products and will be discussed in more detail in a later section.

The 374 employment increase in miscellaneous manufacturing between 2010 and 2015, was the second largest of the categories listed in Table 6 (page 19). As the name implies, this category contains a number of firms producing a wide variety of projects. The two most notable subcategories are sporting goods and equipment, and medical equipment and supplies (including dental labs).

The wood products industry experienced modest growth from 2010 and 2015. This industry added slightly less than 100 workers. This is a relatively modest increase, but it stands in contrast to more than a decade of declines. The Montana wood products industry is but a shell of what it was a decade ago. Employment in 2015 was down roughly 40 percent from the 2005 figure.

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.



**Table 6.** Full- and part-time manufacturing employment, Montana 2005-2015.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Change 2010-15
Manufacturing	22,762	23,407	23,954	23,413	21,220	19,841	20,681	21,540	22,648	23,018	23,413	3,572
Durable goods	14,558	14,945	15,337	14,702	12,712	11,831	12,352	13,237	14,048	14,304	14,561	2,730
Wood products	5,318	5,220	4,955	4,391	3,354	3,064	3,095	3,094	3,269	3,270	3,187	123
Nonmetallic mineral products	1,121	1,109	1,170	1,091	1,003	945	1,016	1,467	1,494	1,426	1,465	520
Primary metals	339	334	482	435	267	149	186	185	202	237	246	97
Fabricated metal products	1,604	1,781	1,986	2,051	1,988	1,890	2,152	2,565	2,723	2,945	2,961	1,071
Machinery manufacturing	1,450	1,589	1,608	1,547	1,205	1,167	1,230	1,309	1,236	1,186	1,177	10
Computer and electronic products	509	579	578	591	447	434	554	564	629	646	685	251
Electrical equipment and appliances	196	216	228	259	237	211	206	182	177	183	203	-8
Motor vehicles and parts	348	408	413	(D)	(D)	301	302	250	287	321	379	78
Other transportation equipment	266	244	239	(D)	(D)	321	293	310	366	347	373	52
Furniture and related	1,356	1,310	1,237	1,260	1,090	973	968	911	1,046	1,065	1,135	162
Miscellaneous	2,051	2,155	2,441	2,372	2,484	2,376	2,350	2,400	2,619	2,678	2,750	374
Nondurable goods	8,204	8,462	8,617	8,711	8,508	8,010	8,329	8,303	8,600	8,714	8,852	842
Food products	2,771	2,892	2,963	2,916	2,875	2,779	2,831	2,928	3,017	2,991	3,001	222
Beverage and tobacco	805	858	779	761	757	766	844	946	1,103	1,159	1,098	332
Textile mills	(D)	(D)	43	34	44	(D)	(D)	38	(D)	47	50	(D)
Textile product mills	198	208	232	235	234	231	240	219	229	213	245	14
Apparel	310	338	(D)	(D)	(D)	(D)	(D)	(D)	263	(D)	(D)	(D)
Leather and allied products	218	217	174	206	213	203	285	297	231	234	214	11
Paper	(D)	(D)	(D)	(D)	(D)	179	(D)	(D)	(D)	(D)	(D)	(D)
Printing and related	1,229	1,295	1,338	1,340	1,176	1,099	1,131	1,148	1,164	1,203	1,223	124
Petroleum and coal	936	966	991	1,078	1,115	1,092	1,157	1,108	1,111	1,180	1,271	179
Chemical	770	747	880	951	963	992	1,117	859	946	985	1,038	46
Plastics and rubber products	370	363	350	392	341	321	364	383	446	414	445	124

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

## MANUFACTURING EARNINGS

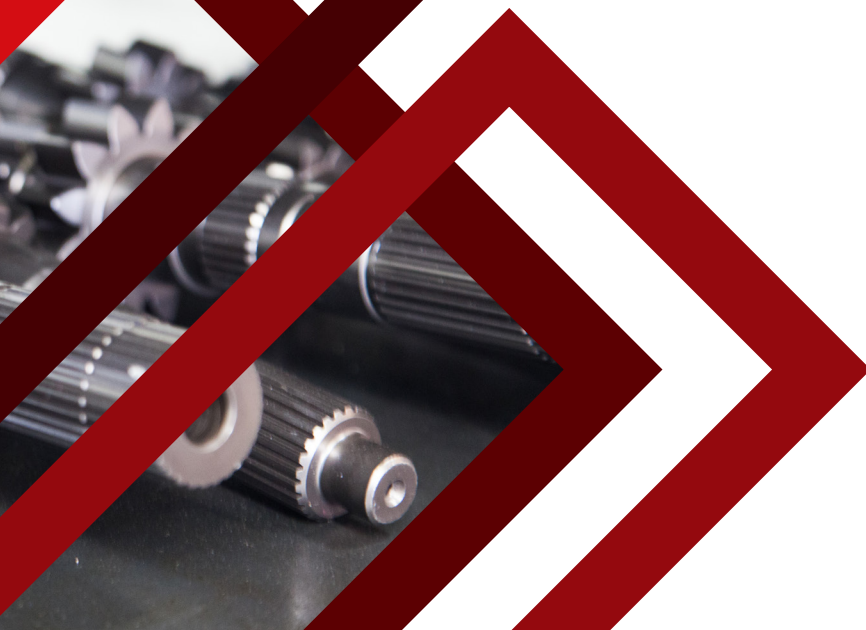
Montana manufacturing earnings from 2005 to 2015 are presented in Table 7 (page 21). Earnings have been corrected for inflation by converting them to 2015 dollars. Earnings are the wages and salaries, plus certain employer paid fringe benefits, such as retirement and health insurance, paid to full- and part- time manufacturing workers.

A comparison of the data in Tables 6 (page 19) and 7 (page 21) reveals 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.

Since the recovery began, manufacturing employment has been increasing faster than earnings. From 2010 to 2015, employment rose 23.3 percent while earnings grew 14.1 percent. This contrasts with the longer run trends where earnings consistently grew faster than employment. Between 2005 and 2015, earnings increased 5 percent while employment grew 2.8 percent.

The reclassification of REC Silicon explains the 103.4 percent increase in nonmetallic mineral products and the 14.7 percent decrease in the chemical industry. The doubling in the relatively small other transportation equipment industry is mostly due to the purchase of a Helena firm by Boeing, its subsequent expansion and the opening of a trailer manufacturer in Missoula.

The small 3.9 percent increase in food products earnings is surprising given the sizable growth in employment from 2010 to 2015. Detailed data is not yet available, so there are no details concerning the 9.9 percent decline in electrical equipment or the 14.9 percent increase in plastics and rubber products, which do not jibe with the smaller changes in employment.



**Table 7.** Manufacturing earnings, Montana (thousands of 2015 dollars).

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	% Change 2010-2015
Manufacturing	1,127,408	1,169,049	1,211,426	1,173,123	1,046,873	1,028,832	1,046,867	1,087,699	1,120,756	1,171,196	1,194,138	14.1
Durable goods	676,416	694,482	729,743	679,360	544,695	529,259	556,492	606,540	642,142	655,390	673,330	21.0
Wood products	265,937	256,157	246,197	211,980	146,977	137,107	140,006	138,928	153,990	151,877	144,998	3.6
Nonmetallic mineral products	56,226	51,927	57,914	54,606	45,516	42,286	43,989	78,421	82,441	81,861	89,476	103.4
Primary metals	18,538	19,107	31,574	29,076	14,316	4,933	6,557	6,248	7,597	8,721	9,308	41.9
Fabricated metal products	65,701	74,257	85,620	87,988	78,770	80,862	93,866	115,480	117,066	128,337	125,604	33.8
Machinery manufacturing	82,587	95,783	90,816	88,701	71,444	76,562	75,188	76,429	79,636	77,391	79,569	5.8
Computer and electronic products	30,923	29,524	32,782	30,933	23,478	23,179	31,217	30,447	32,414	33,979	39,001	24.9
Electrical equipment and appliances	11,337	12,101	12,485	15,311	13,480	12,981	11,691	11,227	8,269	8,921	10,536	-9.9
Motor vehicles and parts	17,181	20,436	21,647	(D)	(D)	15,705	18,705	14,031	17,450	13,465	14,477	-22.6
Other transportation equipment	7,821	8,146	8,264	(D)	(D)	7,991	14,144	18,760	20,288	16,033	14,290	100.3
Furniture and related	44,256	44,779	43,664	43,987	34,064	30,251	29,455	27,551	29,627	32,066	35,079	19.1
Miscellaneous	75,909	82,265	98,780	93,656	97,486	97,404	91,674	89,017	93,365	102,739	110,992	21.1
Nondurable goods	450,991	474,568	481,683	493,763	502,178	499,573	490,375	481,159	478,614	515,806	520,808	6.2
Food Products	108,306	111,612	110,317	111,681	118,128	122,293	116,656	112,318	111,360	120,149	121,168	3.9
Beverages and tobacco	34,001	35,633	32,158	32,859	33,984	38,784	40,438	43,231	45,146	45,306	37,639	-6.9
Textile mills	(D)	(D)	825	643	711	(D)	(D)	713	(D)	628	701	(D)
Textile product mills	5,415	5,592	6,294	5,914	6,218	6,452	6,366	5,950	5,565	5,473	6,368	0.0
Apparel	7,451	8,008	(D)	(D)	(D)	(D)	(D)	(D)	2,709	(D)	(D)	(D)
Leather and allied products	2,824	2,689	2,228	2,403	2,619	2,621	2,583	2,855	3,515	3,318	3,643	41.0
Paper	(D)	(D)	(D)	(D)	(D)	24,133	(D)	(D)	(D)	(D)	(D)	(D)
Printing and related	42,871	46,418	50,555	51,090	42,370	39,769	41,312	43,276	44,879	47,216	46,295	12.1
Petroleum and coal products	128,272	148,388	145,866	157,022	170,355	170,650	174,304	193,090	187,522	208,148	214,651	23.1
Chemicals	58,213	52,414	65,669	67,460	69,276	74,419	82,671	53,480	56,822	65,076	70,524	-14.7
Plastics and rubber products	11,637	12,659	14,028	14,081	13,487	14,668	15,879	16,816	18,350	17,748	18,238	14.9

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

## SPOTLIGHT ON GROWING INDUSTRIES WITHIN MANUFACTURING

Tables 6 (page 19) and 7 (page 21) provide insights concerning 22 categories of manufacturing. But even this level of detail may hide very important trends, because growth in one subcategory may be counterbalanced by declines in another subcategory. Table 8 (page 22) presents wage and salary employment data for five detailed manufacturing industries. Information about the self-employed is not available at this level of detail and the employment data in Table 8 (page 22) is not comparable with that presented in Table 6 (page 19).

Alcoholic beverage manufacturing has increased significantly. There are three subcategories; distilleries, wineries and breweries. Total wage and salaries employment grew from 267 workers in 2011 (2010 data were not available in several categories) to 711 workers in 2015, an increase of 166.3 percent. Although breweries had the most employees, distilleries were the fastest growing. In 2015, there were 575 workers in breweries and 102 in distilleries, but there was a ninefold increase in distilleries employment, compared to a 166.3 percent increase in breweries.

The growth in alcoholic beverages was mostly due to new firms rather than growth in exiting firms. The total number of firm increased from 25 in 2010 to 72 in 2015. Once again, breweries had the largest increase in absolute numbers while distilleries had the greatest growth rate.

Alcoholic beverages are a good example of important trends that can be hidden in aggregate data. Table 6 (page 19) shows sizable growth in the beverage and tobacco industry, which contain the three alcoholic categories, but not the triple digit growth reported in Table 8 (page 22). There was even a decline in beverage and tobacco employment from 2014 to 2015. Further investigation revealed that soft drink and ice manufacturing (another major subcategory) was largely stable from 2010 to 2014 and then declined significantly in 2015.

Table 8 (page 22) also reports the wage and salaries employment for two of the fastest growing subcategories of fabricated metal products. Small arms manufacturing (NAICS 332994) employment increased from 148 workers in 2010 to 381 in 2015, a 157.4 percent increase. These firms are located throughout the state, but many are in the Flathead and Bitterroot valleys.

Employment in structural metals manufacturing rose from 727 in 2010 to 998 in 2015, an increase of 37.3 percent. One example is a new firm located just north of Great Falls, which produces prefabricated buildings.

**Table 8.** Wages and salary employment, Montana, selected industries, 2010 to 2015.

	2010	2011	2012	2013	2014	2015	Percent Change
<b>Alcoholic Beverages</b>							
NAICS 31214 Distilleries	(D)	10	26	66	82	102	920.0 <sup>a</sup>
NAICS 31213 Wineries	(D)	19	22	25	32	34	78.9 <sup>a</sup>
NAICS 31212 Breweries	192	238	309	405	467	575	141.6 <sup>a</sup>
Total	(D)	267	357	496	581	711	166.3 <sup>a</sup>
<b>Fabricated Metal Products</b>							
NAICS 332994 Small arms and ordnance manufacturing	148	277	419	447	457	381	157.4 <sup>b</sup>
NAICS 3323 Architectural and structural metals mfg	727	700	764	806	877	998	37.3 <sup>b</sup>

**Source:** U.S. Bureau of Labor Statistics, QCEW. **Note:** (D) denotes not disclosable. <sup>a</sup>2011 to 2015, <sup>b</sup>2010 to 2015.

## WAGE AND SALARY EMPLOYMENT AND PER WORKER WAGES

This section presents Montana employment, per worker wages and salaries in manufacturing and compares them to other industries in the state and to corresponding nationwide data. Montana 2015 employment, per worker wages and salaries are presented in Table 9 (page 24). These employment and wage figures differ from those reported in Tables 6 (page 19) and 7 (page 21), 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 \$47,227 in 2015, about 17.5 percent higher than the average of \$40,182 for all workers. The highest wages within manufacturing reported in Table 8 (page 22) were the \$113,323 in petroleum and coal products. This industry is dominated by highly skilled workers at oil refineries near Billings and Great Falls.

After petroleum and coal products, the highest per worker wages and salaries were the \$59,771 earned in machinery manufacturing. Next was the \$59,304 earned in other transportation equipment. The lowest paying manufacturing jobs were in textile mills with an average of \$20,905.

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 \$40,182 in 2015, about 75.6 percent of the national average. Montana manufacturing wages per worker were about 72.2 percent of the U.S. figure. Within manufacturing, only the wood products industry had average wages above their respective national average.





**Table 9.** Employment and wages and salaries per worker by industry, Montana, 2015.

	Wage and Salary Employment	Wages and Salaries Per Worker (Current Dollars)	Wages and Salaries Per Worker (% of U.S.)		Wage and Salary Employment	Wages and Salaries Per Worker (Current Dollars)	Wages and Salaries Per Worker (% of U.S.)
Total, all industries	479,586	40,182	75.6	Apparel	(D)	(D)	(D)
Farm	6,868	35,137	109.5	Leather and allied products	83	26,916	59.6
Nonfarm	472,718	40,255	75.6	Paper	(D)	(D)	(D)
Forestry, fishing and other	3,781	33,315	108.7	Printing and related	1,007	36,118	74.3
Mining	7,564	87,606	85.1	Petroleum and coal	1,231	113,323	98.5
Utilities	3,080	87,494	84.5	Chemical	943	55,046	56.6
Construction	27,153	47,823	83.1	Plastics and rubber products	410	34,132	65.7
Manufacturing	19,139	47,227	72.2	Wholesale trade	17,627	54,829	73.7
Durable goods	11,718	45,708	66.5	Retail trade	59,179	27,684	90.7
Wood products	2,762	44,944	103.3	Transportation and warehousing	15,551	51,354	97.3
Nonmetallic minerals	1,313	55,973	99.9	Information	6,365	48,494	50.3
Primary metals	182	39,275	60.1	Finance and insurance	16,180	60,156	59.8
Fabricated metal products	2,432	42,465	77.3	Real estate and rental and leasing	5,706	34,490	62.9
Machinery	1,008	59,771	87.0	Professional and technical services	20,981	59,337	65.5
Computer and electronics	609	49,473	45.0	Management of companies	2,067	75,757	63.9
Electrical equipment and appliances	150	49,700	76.1	Administrative and waste services	17,539	32,092	84.2
Motor vehicles and parts	362	42,028	67.8	Educational services	6,234	22,924	56.1
Other transportation equipment	250	59,304	67.6	Health care and social assistance	65,183	44,362	92.3
Furniture and related	723	35,581	81.6	Arts, entertainment, and recreation	11,606	23,290	59.0
Miscellaneous	1,927	38,383	60.8	Accommodation and food services	51,388	18,985	85.1
Nondurable goods	7,421	49,624	83.1	Other services	20,669	29,237	84.3
Food	2,515	36,452	79.0	Federal, civilian	13,055	65,593	83.7
Beverage and tobacco	991	26,538	47.2	Military	7,857	35,186	75.0
Textile mills	21	20,905	46.6	State and local	74,814	38,825	79.6
Textile product mills	193	25,332	63.3				

Source: U.S. Bureau of Economic Analysis.

## MONTANA'S MANUFACTURING EXPORTS

Montana manufacturers are competitive in international markets. Over the long term, they have expanded internationally to broaden their markets and enhance their sales. But recently, lethargic worldwide economic conditions have stunted growth in Montana manufacturing exports.

Table 10 (page 26) presents data for manufacturing exports by industry during 2002 to 2007, along with value of shipments for many of the industries. These figures provide a historical perspective when world economic conditions were not as unsettled as they are currently. The shipments data was reported in the Census of Manufacturers for 2002 and 2007. Montana manufacturing exports rose from \$290.4 million in 2002 to about \$880.7 million in 2007. Overall, exports rose from 5.8 percent of shipments in 2002 to 8.3 percent of shipments in 2007.

There may be a data error for the transportation equipment industry (NAICS 337). Reported exports exceed the value of shipments. 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 few exceptions, Montana manufacturers increased their exports between 2002 and 2007, both in nominal dollars and as a share of shipments. Chemical industry exports grew more than fourfold in nominal value and their share of shipments doubled from 33.3 percent to 66.7 percent. REC Silicon is classified in the chemical industry in this data and this firm exports much of its production of polysilicon. Machinery industry exports more than doubled their share of shipments from 36.5 percent in 2002 to 58 percent in 2007. Applied Materials (formerly Semitool) is a major component of the machinery industry and sells high-tech products worldwide.

Export data for selected years from 2009 to 2016 are presented in Table 11 (page 27-28). The 2012 value of shipments is reported in the 2012 Census of Manufacturers. The value of shipments for the other years are reported in the Annual Survey of Manufacturers. The Annual Survey is less complete than the Census, which is only available every five years. Data for all intermediate years 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 25.2 percent to roughly \$1.1 billion by 2012. Montana manufacturing exports then stabilized and remained \$1 to \$1.1 billion from 2012 to 2016. Measured against the value of shipments, Montana manufacturing exports were in the 9.5 to 11 percent range during the 2012 to 2015 period. The lack of growth in Montana manufacturing exports reflects the worldwide economic slowdown.

The stability of total exports in the most current data (2015 to 2016) continue to reflect the pattern of earlier years where modest growth in several industries are counterbalanced by declines in other industries. Overall, 13 of the industries posted declines from 2015 to 2016, while eight industries grew. Disappointingly, the industry with the largest increase may be a misnomer. Exports from the beverage and tobacco industry grew about \$56.5 million in 2016. A tobacco packaging/distribution center for cigarettes headed into Canada opened in Shelby, but this establishment should probably be classified in wholesale trade rather than manufacturing.

The industries containing two of Montana's major manufacturing exporters both declined in 2016. Exports of chemicals decreased about \$82.9 million and machinery manufacturing exported about \$16.4 million less in 2016. The \$67.6 million increase in transportation equipment may reflect the new trailer manufacturer and the exports of the Boeing facility near Helena.

Table 12 (page 29) identifies the destination of Montana manufacturing exports. Canada consistently ranks No. 1 as the major destination. China now ranks second after vaulting up from 10th in 2002. Korea ranks third and Taiwan fourth. After Canada, five of the remaining nine export destinations are in Asia. The largest non-Asian destinations are Belgium, Germany and the United Kingdom.

The extent of the worldwide slowdown is also shown in Table 12 (page 29). Eight of Montana's Top 10 destinations had zero or negative growth in 2016. Even China imported less from Montana in 2016 than a year earlier. Only Taiwan had faster growth in 2016, than their average increase for the last 14 years.

**Table 10.** Exports and value of shipments, 2002 and 2007 (thousands of current dollars).

NAICS Code		2002			2007		
		Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments
	Manufacturing, Total	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 product mills	145	(D)		438	(D)	
315	Apparel	628	15,409	4.1	2,174	(D)	
316	Leather and allied products	416	(D)		1,320	(D)	
321	Wood products	20,363	854,352	2.4	36,599	935,340	3.9
322	Paper	29,989	(D)		42,085	(D)	
323	Printing and related	153	(D)		949	106,695	0.9
324	Petroleum and 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	Plastics and 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 manufacturing	71,989	197,393	36.5	172,506	297,310	58.0
334	Computer and electronic products	17,042	(D)		24,287	(D)	
335	Electrical equipment and 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 and 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

**Source:** www.wisertrade.org (accessed April 4, 2011). U.S. Bureau of the Census, Census of Manufacturers 2002 and 2007. **Note:** (D) denotes not shown to avoid disclosure of information.

**Table 11.** Exports and value of shipments, Montana, selected years (thousands of current dollars).

NAICS Code		2009			2012		
		Exports	Shipments	Exports as Percent of Shipments	Exports	Shipments	Exports as Percent of Shipments
	Manufacturing, Total	876,500	8,293,186	10.6	1,096,743	11,535,236	9.5
311	Food products	32,135	772,217	4.2	65,969	879,231	7.5
312	Beverages and tobacco	28	(D)		10,865	170,855	6.4
313	Textile mills	401	(D)		553	(D)	
314	Textile product mills	391	(D)		503	25,601	2.0
315	Apparel	1,793	(D)		2,820	577	
316	Leather and allied products	2,855	(D)		2,720	(D)	
321	Wood products	19,751	580,252	3.4	36,195	616,712	5.9
322	Paper	32,805	(D)		318	(D)	
323	Printing and related	959	(D)		1,591	(D)	
324	Petroleum and coal products	22,800	4,117,780	0.6	148,957	(D)	
325	Chemicals	302,928	(D)		326,452	(D)	
326	Plastics and rubber products	3,716	(D)		11,831	59,369	19.9
327	Nonmetallic mineral products	39,500	244,985	16.1	72,765	(D)	
331	Primary metals	121,453	(D)		28,533	(D)	
332	Fabricated metal products	7,311	277,670	2.6	19,160	331,262	5.8
333	Machinery manufacturing	156,425	195,022	80.2	218,229	326,465	66.8
334	Computer and electronic products	22,293	(D)		34,380	(D)	
335	Electrical equipment and appliances	16,305	(D)		20,386	(D)	
336	Transportation equipment	76,731	(D)		66,484	(D)	
337	Furniture and related	680	(D)		1,422	49,666	2.9
339	Miscellaneous	15,239	205,714	7.4	26,610	246,859	10.8

**Source:** www.wisertrade.org (via Montana Department of Commerce). U.S. Bureau of the Census, Census of Manufacturers 2012 and Annual Surveys of Manufacturers 2009, 2014 and 2015.

**Note:** (D) denotes not shown to avoid disclosure of information. NA denotes not available.

**Table 11 (Continued).** Exports and value of shipments, Montana, selected years (thousands of current dollars).

NAICS Code		2015			2016	
		Exports	Shipments	Exports as Percent of Shipments	Exports	2015-16 Change
	Manufacturing, Total	1,065,311	9,722,103	11.0	1,050,435	-14,876
311	Food products	51,051	1,133,068	4.5	49,030	-2,021
312	Beverages and tobacco	127,701	303,749	42.0	184,234	56,533
313	Textile mills	1,205	(D)	(D)	1,979	774
314	Textile product mills	715	4,696	15.2	378	-337
315	Apparel	3,760	(D)	(D)	3,520	-240
316	Leather and allied products	4,236	(D)	(D)	3,206	-1,030
321	Wood products	36,310	966,533	3.8	40,629	4,319
322	Paper	477	(D)	(D)	288	-189
323	Printing and related	1,860	116,487	1.6	1,952	92
324	Petroleum and coal products	40,410	4,051,836	1.0	31,019	-9,391
325	Chemicals	326,291	(D)	(D)	243,403	-82,888
326	Plastics and rubber products	5,056	63,332	8.0	5,833	777
327	Nonmetallic mineral products	85,363	335,416	25.4	79,794	-5,569
331	Primary metals	45,494	1,141,457	4.0	39,747	-5,747
332	Fabricated metal products	20,141	406,332	5.0	9,739	-10,402
333	Machinery manufacturing	154,537	235,042	65.7	145,224	-9,313
334	Computer and electronic products	47,296	(D)	(D)	30,908	-16,388
335	Electrical equipment and appliances	16,440	31,161	52.8	20,011	3,571
336	Transportation equipment	59,802	186,688	32.0	127,398	67,596
337	Furniture and related	1,783	64,501	2.8	2,218	435
339	Miscellaneous	35,373	316,101	11.2	29,925	-5,448

**Source:** www.wisertrade.org (via Montana Department of Commerce). U.S. Bureau of the Census, Census of Manufacturers 2012 and Annual Surveys of Manufacturers 2009, 2014 and 2015. **Note:** (D) denotes not shown to avoid disclosure of information. NA denotes not available.



**Table 12.** Montana manufacturing exports, by country, selected years (thousands of current dollars).

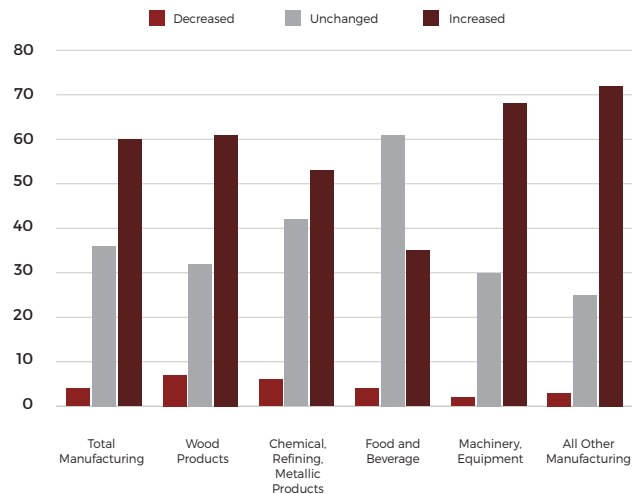
Country	2002		2005		2013		2015		2016		Average Annual Percent Change	
	Exports	Rank	Exports	Rank	Exports	Rank	Exports	Rank	Exports	Rank	2002-2016	2014-2016
Total, all countries	290,417		512,327		1,010,277		1,065,311		1,046,582		18.6	-1.8
Canada	155,787	1	219,182	1	495,362	1	450,326	1	508,799	1	16.2	13.0
China	5,064	10	25,378	5	66,385	2	106,408	2	90,693	2	120.8	-14.8
Korea, Republic of	6,343	8	24,296	6	57,628	4	70,645	3	70,176	3	71.9	-0.7
Taiwan	13,949	4	32,432	4	59,008	3	34,342	7	53,844	4	20.4	56.8
Japan	26,459	2	53,169	2	42,559	6	51,863	4	46,665	5	5.5	-10.0
Mexico	4,232	11	7,461	10	32,579	7	34,522	6	29,666	6	42.9	-14.1
Belgium	3,370	12	1,877	22	46,957	5	36,471	5	27,163	7	50.4	-25.5
Germany	22,784	3	48,957	3	26,343	8	30,416	8	20,533	8	-0.7	-32.5
United Kingdom	6,692	7	22,551	7	20,679	9	23,766	10	18,401	9	12.5	-22.6
France	7,938	6	6,753	11	6,456	16	13,650	13	15,581	10	6.9	14.1

Source: [www.wisertrade.org](http://www.wisertrade.org) (via Montana Department of Commerce).

## MANUFACTURER'S OUTLOOK

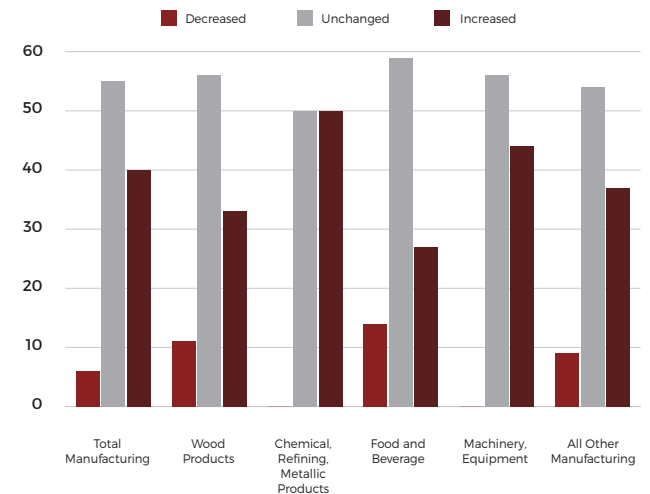
Montana manufacturers are a diverse group of small- to medium-sized firms producing everything from beer to high-tech products exported to the world. With these differences, it is difficult to summarize the outlook with a simple equation or economic forecasting model. Instead, the Bureau of Business and Economic Research surveys about 250 manufacturers each winter and queries them about their outlook for the next year. This section summarizes the responses to the 2016 Manufacturers Survey. The outlooks are summarized for broad manufacturing categories.

**Production (Figure 7).** About 60 percent of manufacturing plants said that their production would increase in 2017 over that of 2016. The least optimistic were food and beverage manufacturers, where only 35 percent were looking for an increase in 2017. About 61 percent thought that production would be unchanged.

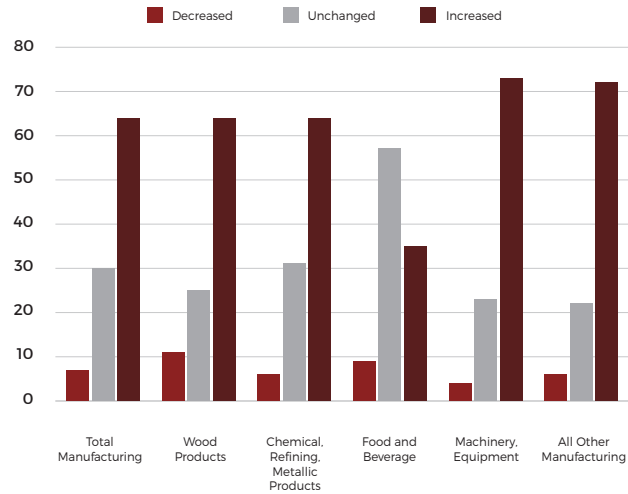


Montana manufacturers are generally optimistic about 2017. Far more of respondents said that 2017 would be better than 2016, than those who thought it would be worse. Optimism was expressed for all economic indicators and was widespread among manufacturing categories. The least optimistic firms were food and beverage manufacturers.

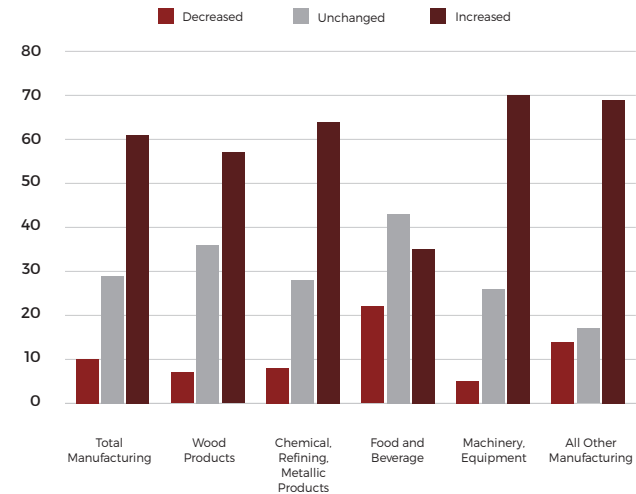
**Production prices (Figure 8).** About 40 percent of respondents said they expected their plant's production prices to increase in 2017. The least optimistic category was wood products, and food and beverage manufactures, where the percentage of respondents expecting declines were in double-digits.



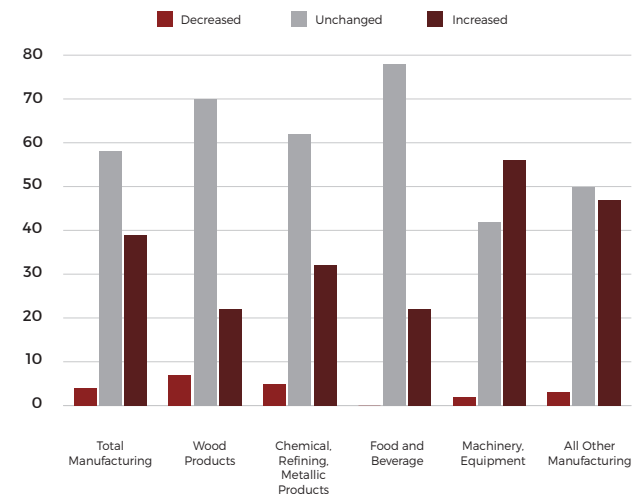
**Gross sales (Figure 9).** Almost two-thirds (64 percent) of respondents said they expected their plant's gross sales to increase in 2017. The least optimistic were food and beverage manufacturers, where 57 percent thought gross sales would remain unchanged.



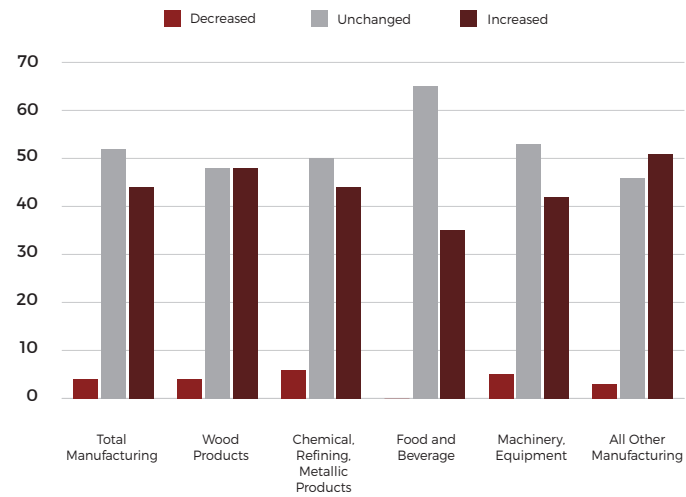
**Profits (Figure 10).** Montana manufacturers are generally optimistic about future profits. About 61 percent said they expect their plants to have increased profits in 2017. The least optimistic were food and beverage manufacturers, where fewer thought there would be increases and more expected decreased profits in 2017. A relative high number firms in the other manufacturing categories were pessimistic, mostly because few respondents said that profits would remain unchanged.



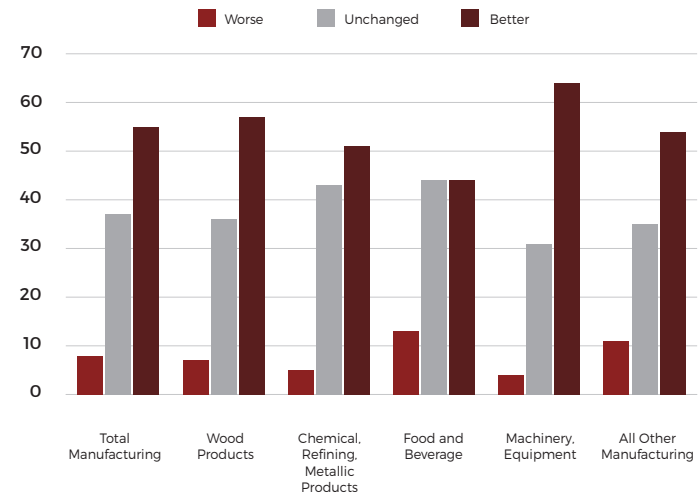
**Employment (Figure 11).** A large majority of manufactures said they believe their employment would increase or remain unchanged. Very few said they expected declines. The most optimistic were machinery/equipment manufacturers with 56 percent expecting employment to increase. The least optimistic were wood products, and food and beverage firms, with 22 percent expecting increased employment.



**Input costs (Figure 12).** Manufacturers said they believed their input costs would remain unchanged or increase in 2017. These responses were approximately the same for four of the five categories. Fewer plants in the food and beverage category said that their input costs would increase, while more said they would remain unchanged.



**Overall outlook (Figure 13).** Montana manufacturers were optimistic about 2017. About 55 percent said they expected 2017 to be better, with only 8 percent saying they expected the outlook to be worse. The most optimistic were machinery/equipment manufacturers, while the least optimistic were food and beverage firms.





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