



2024 MONTANA MANUFACTURING REPORT

Prepared by
The Bureau of Business and Economic Research
University of Montana



Table of Contents

Executive Summary	1
Introduction	4
The State of the Overall Economy	5
1.1 Global Regional Overview	6
Europe and the European Union	7
Asia and Pacific	7
Latin America and Canada	8
1.2 The United States Economy.....	8
Headwinds	9
1.3 National Manufacturing Overview	12
Overview of National Manufacturing.....	12
Trends in Manufacturing.....	16
1.4 The Montana Economy	20
Base Industries	22
Manufacturing in Montana	24
Challenges Facing Montana’s Manufacturing Sector	26
2.1 Regional Economic Analysis	27
Summary of the Six Manufacturing Regions	28
Northwestern Region	30
Western Region	32
Continental Divide Region	34
Southwestern Region	35
Missouri River Region	37
Yellowstone River Region	39
Conclusion	40
2.2 Montana’s Manufacturing Exports	41
Montana Manufacturers Survey	43
3.1 Year in Review	43
Capital Investment and Product Development.....	43
Employment.....	44
Ongoing Challenges	45
3.2 How will 2024 turn out?.....	46
Capital Investment and Supply Chain	46
Employment.....	47
The Montana Manufacturing Extension Center	49
4.1 Overall Satisfaction	50
Client Comments	51
4.2 Why Choose MMEC	53
4.3 Future Challenges	54
4.4 Quantitative Estimates of MMEC Visit Outcomes.....	55
4.5 Economic Impacts of MMEC Visits and Services	56
4.6 Return on Investment and Fees.....	57
ROI for the State of Montana	57
ROI for MMEC Clients.....	57

List of Figures

Figure 2.1 CBOE Volatility Index and Sahm Rule Recession Indicator.....	5
Figure 2.2 Projected Economic Growth, Year-over-Year	6
Figure 2.3 Global Supply Chain Pressure and Producer Price Index.....	10
Figure 2.4 Openings-to-Hires Ratio in Goods-Producing Sectors	11
Figure 2.5 Household Consumption Behavior.....	12
Figure 2.6 Manufacturing Output, Hours Worked, Unit Labor Cost, and Productivity, United States	13
Figure 2.7 Manufacturing Employment and Average Workweek, United States.....	13
Figure 2.8 Net Percentage of Domestic Banks Tightening Standards for C&I Loans	14
Figure 2.9 Manufacturing Business Outlook Survey	15
Figure 2.10 Comparative Trends in Manufacturing and Total Employment for Montana and the U.S.....	15
Figure 2.11 Recent Trends in Employment by Manufacturing Subsector, United States.....	16
Figure 2.12 Projected Manufacturing Employment Change by Occupation Education, United States.....	17
Figure 2.13 Trends in Registered Apprenticeships by Industry Category, United States.....	17
Figure 2.14 Technological Adoption Rates, Manufacturing vs. Nonmanufacturing.....	18
Figure 2.15 Montana Output (Real GDP \$ Millions) and Unemployment Rate	20
Figure 2.16 Montana Employment and Housing Price Index	21
Figure 2.17 Knowledge and Technology Intensive (KTI) Industry Employment, Index 2013 = 100	22
Figure 2.18 Share of base earnings, million \$ in Montana, 2023	23
Figure 3.1 Manufacturing Real GDP (millions of \$) by Industry Category, 1997 to 2023	24
Figure 3.2 Composition of Montana's Real GDP (millions of \$), Manufacturing in 2023	25
Figure 3.3 Trends in U.S. and Montana Manufacturing Output, Real GDP	26
Figure 3.4 Montana's Manufacturing Regions	28
Figure 3.5 Count of Manufacturers by Region, 2008 to 2024.....	29
Figure 3.6 Manufacturing Establishments by Industry, Northwestern Region, Montana, 2023.....	30
Figure 3.7 Manufacturing Employees by Industry, Northwestern Region, Montana, 2023	30
Figure 3.8 Manufacturing Total Wages by Industry, Northwestern Region, Montana, 2023	31
Figure 3.9 Manufacturing Establishments by Industry, Western Region, Montana, 2023.....	32
Figure 3.10 Manufacturing Employees by Industry, Western Region, Montana, 2023.....	32
Figure 3.11 Manufacturing Total Wages by Industry, Western Region, Montana, 2023.....	33
Figure 3.12 Manufacturing Establishments by Industry, Continental Divide Region, Montana, 2023	34
Figure 3.13 Manufacturing Employees by Industry, Continental Divide Region, Montana, 2023	34
Figure 3.14 Manufacturing Total Wages by Industry, Continental Divide Region, Montana, 2023.....	35
Figure 3.15 Manufacturing Establishments by Industry, Southwestern Region, Montana, 2023.....	35
Figure 3.16 Manufacturing Employees by Industry, Southwestern Region, Montana, 2023.....	36
Figure 3.17 Manufacturing Total Wages by Industry, Southwestern Region, Montana, 2023	36
Figure 3.18 Manufacturing Establishments by Industry, Missouri River Region, Montana, 2023	37
Figure 3.19 Manufacturing Employees by Industry, Missouri River Region, Montana, 2023	38
Figure 3.20 Manufacturing Total Wages by Industry, Missouri River Region, Montana, 2023.....	38
Figure 3.21 Manufacturing Establishments by Industry, Yellowstone River Region, Montana, 2023.....	39
Figure 3.22 Manufacturing Employees by Industry, Yellowstone River Region, Montana, 2023	39
Figure 3.23 Manufacturing Total Wages by Industry, Yellowstone River Region, Montana, 2023	40

List of Tables

Table 3.1 Manufacturing exports by sector ranked, 2023, (millions of 2023\$).....	41
Table 3.2 Top 20 export markets, 2022, millions of 2023\$s	42
Table 4.1 For calendar year 2023, did your plant's ...?	43
Table 4.2 In calendar year 2023, did your plant ...?	44
Table 4.3 Over calendar year 2023...?	44
Table 4.4 Major issues that affected individual manufacturing plants: % responding yes	45
Table 4.5 In 2024 do you anticipate ...?	46
Table 4.6 Do you anticipate the need to ... your plant's supply chain in 2024?	47
Table 4.7 In 2024, do you anticipate...?	47
Table 4.8 What is the primary challenge you face in recruiting or retaining employees for your plant?	48
Table 5.1 Economic Impacts, 2000 to 2024.	49

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About the Bureau of Business and Economic Research

The Bureau of Business and Economic Research (BBER) was founded in 1948 as the research arm of the University of Montana's School of Business Administration. The Bureau's mission statement states,

"The purpose of the Bureau is to serve the general public, as well as people in business, labor, and government, by providing an understanding of the environment in which Montanans live and work."

BBER has since developed to become one of the most sought-after sources of information and analysis on the Montana economy. The Bureau has published the Montana Business Quarterly, an award-winning business periodical, since 1962, and has conducted the annual Montana Economic Outlook Seminar, a half-day program on the economic outlook presented in nine cities statewide since 1976.

Executive Summary

This report examines the state of manufacturing in Montana and was conducted for the Montana Manufacturing Extension Center (MMEC) by the Bureau of Business and Economic Research (BBER) at the University of Montana. This marks the 28th consecutive year of collaboration between BBER and MMEC to analyze Montana's manufacturing climate. The report focuses on three main areas: the economic context of manufacturing at both state and national levels, a survey of Montana manufacturers regarding the state of manufacturing in Montana, and an impact survey of firms that utilized MMEC's consulting services. The economic analysis and survey cover the year 2023 and the expectations of the immediate future, while the MMEC impact survey was carried out from April 2023 to February 2024.

The State of the Overall Economy

The global economy in 2024 faces a complex mix of challenges shaped by geopolitical tensions, shifting monetary policies, and the lingering effects of the COVID-19 pandemic. Global economic growth has been modest but steady, with advanced economies like the U.S. navigating inflationary pressures and labor market constraints, while Europe struggles with sluggish growth and energy challenges. Emerging markets, particularly in Asia, continue to drive a significant portion of global expansion, though China's slowing consumption and real estate concerns raise risks for broader economic stability.

Key insights into the global and U.S. economies in 2024 include:

- Global GDP growth was projected to be 3.0% in 2024, below the pre-pandemic average of 3.4%.
- U.S. growth remained resilient in 2023 at 2.5%, supported by strong consumer spending, while Europe's growth lags due to inflation and energy costs.
- Labor markets across advanced economies are tight, with job openings significantly outpacing hires in key sectors like manufacturing, healthcare, and hospitality.
- Workforce challenges are driving increased investment in employee training, apprenticeships, and skills development, particularly in advanced manufacturing and technical roles.
- Technological adoption, including automation, artificial intelligence (AI), and advanced energy systems, is transforming industries, with manufacturers accelerating investments to address labor shortages and improve productivity.

In the U.S., the adoption of advanced technologies is reshaping workforce demands, with a growing emphasis on upskilling employees to manage and maintain AI-driven systems and automation. While this technological shift offers solutions to persistent labor shortages, it also highlights gaps in workforce readiness, pushing industries to expand training programs and apprenticeships. At the same time, global supply chains are stabilizing, but geopolitical risks and inflationary pressures remain significant, shaping economic conditions into the coming year. These dynamics underscore the critical need for innovative strategies in workforce development and technological advancement to maintain economic momentum.

Manufacturing in Montana

Montana's manufacturing sector faces unique challenges compared to the national landscape due to its distinct composition, which is primarily concentrated in nondurable goods — items with an average lifespan of less than three years. The largest manufacturing sectors in Montana are petroleum and coal products, and food, beverage, and tobacco products, which are not among the top seven sectors nationally, highlighting the state's distinctive manufacturing profile.

Key statistics for Montana manufacturing in 2023 include:

- Over 5,099 manufacturing firms are in operation in Montana, including sole proprietors.
- Manufacturing accounts for 17% of Montana's base industry earnings totaling about \$12.3 billion.
- Manufacturing jobs paid about \$65,000 in wages, compared to the state average of just under \$57,000.
- The industry accounts for 5.5% of total private state labor earnings, equaling \$1.95 billion.
- Manufacturing employs 4.4% of Montana's nonfarm workforce, with about 22,700 employees.
- Manufacturers produced 6.4% of Montana's inflation-adjusted Gross Domestic Product, with a value of \$2.9 billion; and
- Montana manufacturing employment and output growth was almost double the national average in 2023.

Montana's manufacturing sector has largely rebounded from past economic disruptions, with many industries returning to or exceeding pre-pandemic levels of activity. While traditional natural resource-based industries, such as timber, agriculture, and mining, remain foundational, the sector is evolving, with significant contrasts between regions

dominated by resource-based manufacturing and those fostering technology-driven industries. Areas centered around agricultural and natural resource manufacturing benefit from proximity to raw materials, enabling cost-effective production in sectors like food processing, wood products, and energy. However, these industries often face challenges tied to global commodity price fluctuations and labor availability in rural areas.

In contrast, regions with access to universities and skilled workforces are driving growth in advanced manufacturing sectors, including medical and pharmaceutical products, electronics, and aerospace components. These industries are less dependent on raw materials and instead thrive on innovation and connectivity to global markets. This diversification into technology-driven production underscores Montana's broader shift toward complex and specialized manufacturing, highlighting its resilience and adaptability in meeting evolving economic demands while balancing the distinct strengths and challenges across its regions.

Montana Manufacturers Survey

This section of the report presents the findings of the 2024 Montana Manufacturers Survey, conducted by the Bureau of Business and Economic Research, to assess manufacturers' economic performance in 2023 and their expectations for 2024. Montana's manufacturing industry remains predominantly composed of small businesses, with over 80% employing fewer than 10 individuals and only 25 firms statewide with 100 or more workers. The survey collected 143 responses, primarily from durable manufacturing firms.

Highlights of the 2024 manufacturing survey:

- Sales and production in 2023 showed steady or improved performance for most manufacturers, with 46% reporting increased sales. However, profitability declined, with 35% of firms, particularly in nondurable manufacturing, experiencing losses due to tight margins and high input costs.
- Major capital expenditures were made by 55% of respondents in 2023, exceeding expectations from the prior year's survey and highlighting increased investments in equipment. Durable manufacturers led the surge in modernization efforts, while nondurable manufacturers focused on product innovation, with 35% introducing new product lines.
- Workforce stability improved, with 23% of manufacturers reporting employment growth in 2023, up from 16% in 2022. Significant worker shortages declined, with 32% of firms citing them compared to 44% the previous year. However, recruiting challenges remain a top concern, particularly in the nondurable sector.
- For 2024, 41% of manufacturers anticipate making major capital investments, with durable manufacturers showing increased optimism about long-term returns in automation and advanced manufacturing.
- Input costs remain a significant concern, with 53% of respondents expecting prices to rise further.
- Supply chain strategies continue to evolve. While 48% of manufacturers expect no major changes, others plan to de-risk by diversifying suppliers, and 10% aim to onshore or localize supply chains, particularly in the durable sector.

Montana's manufacturers face a blend of opportunities and challenges as they navigate evolving market conditions. Persistent concerns about workforce availability, input costs, and supply chain complexities remain top issues. However, the sector has demonstrated resilience, with firms leveraging federal and state initiatives to modernize operations and address labor shortages. As manufacturers look to 2024, their cautious optimism reflects a commitment to balancing growth opportunities with economic pressures.

Evaluation of Montana Manufacturing Extension Center

The Montana Manufacturing Extension Center (MMEC) is a vital resource for Montana's manufacturing sector, dedicated to fostering economic growth by helping firms create and retain jobs, innovate, reduce costs, and improve profitability. MMEC's experienced staff provide onsite consultations to identify challenges, develop tailored solutions, and assist with implementation. As part of the National Institute of Standards and Technology's (NIST) Manufacturing Extension Partnership (MEP), MMEC's performance is rigorously evaluated through independent surveys of client outcomes.

Key Findings from the 2023 NIST Surveys include:

- 96% of Montana manufacturers were highly likely to recommend MMEC to others, highlighting the organization's exceptional client relationships and impactful services.
- 62% of Montana manufacturers relied solely on MMEC for business support services, reflecting the center's unique value to small- and medium-sized firms.

- Staff expertise remains the most important factor for firms using MMEC services (72.1%), while the organization's reputation for delivering measurable results continues to attract new clients. Firms citing reputation as a key factor rose from 18% in 2019 to 28% in 2023.
- Manufacturers identified workforce recruitment and retention, cost-reduction strategies, and identifying growth opportunities as top challenges. The rising emphasis on growth opportunities underscores the sector's evolving needs.
- MMEC helped create or retain 487 manufacturing jobs in 2023, generating approximately \$23.9 million in wages and \$1.18 million in Montana income tax revenue. With a 3.07 employment multiplier, MMEC-supported jobs created an additional 994 jobs statewide, contributing \$58.1 million in total wages.
- Return on Investment:
 - MMEC delivered a \$5.99 return for every dollar the state invested.
 - MMEC delivered a \$20.32 return for every dollar paid for MMEC services.

Introduction

This report examines the state of manufacturing in Montana and was conducted for the Montana Manufacturing Extension Center (MMEC) by the Bureau of Business and Economic Research (BBER) at the University of Montana. This marks the 28th consecutive year of collaboration between BBER and MMEC to analyze Montana's manufacturing climate. The report focuses on three main areas: the economic context of manufacturing at the national, state, and within state regions; a survey of Montana manufacturers regarding the state of manufacturing in Montana; and an impact survey of firms that utilized MMEC's consulting services. The economic analysis and survey cover the year 2023, or the most recently available data, and the MMEC impact surveys were carried out throughout 2024.

Section 1: The State of the Overall Economy

This section provides an overview of the global, national, and Montana economies, discussing current conditions and potential headwinds that may present challenges in the near future. It highlights how workforce challenges and the adoption of technologies such as automation and artificial intelligence will shape both current and future manufacturing practices. Additionally, it covers the national state of manufacturing and offers a brief overview of Montana's economic landscape.

Section 2: Manufacturing in Montana

This section provides an overview of how Montana's manufacturing industry has evolved from traditional resource-based manufacturing to one increasingly driven by technology and specialized skills. It examines trends in manufacturing establishments, employment, and wages across the state's regions, highlighting the diversification of the industry. The analysis explores how different regions are adapting to changes in workforce needs, industry demands, and global market influences, while also addressing the opportunities and challenges that come with Montana's unique geography and demographics. The section concludes with a look at the opportunities and constraints facing Montana's manufacturing future.

Section 3: Montana Manufacturers Survey

This section delves into the findings of the Montana Manufacturers Survey, conducted by the Bureau of Business and Economic Research (BBER) in the second quarter of 2024. The survey provides valuable insights into the sentiments and experiences of Montana's manufacturing sector. Results highlight the challenges faced by both durable and nondurable manufacturers in the aftermath of the pandemic, including uneven economic recovery and heightened geopolitical tensions. Key findings emphasize workforce shortages, capital availability constraints, and energy and supply chain disruptions experienced over the past year, along with manufacturers' expectations for the immediate future.

Section 4: The Montana Manufacturing Extension Center

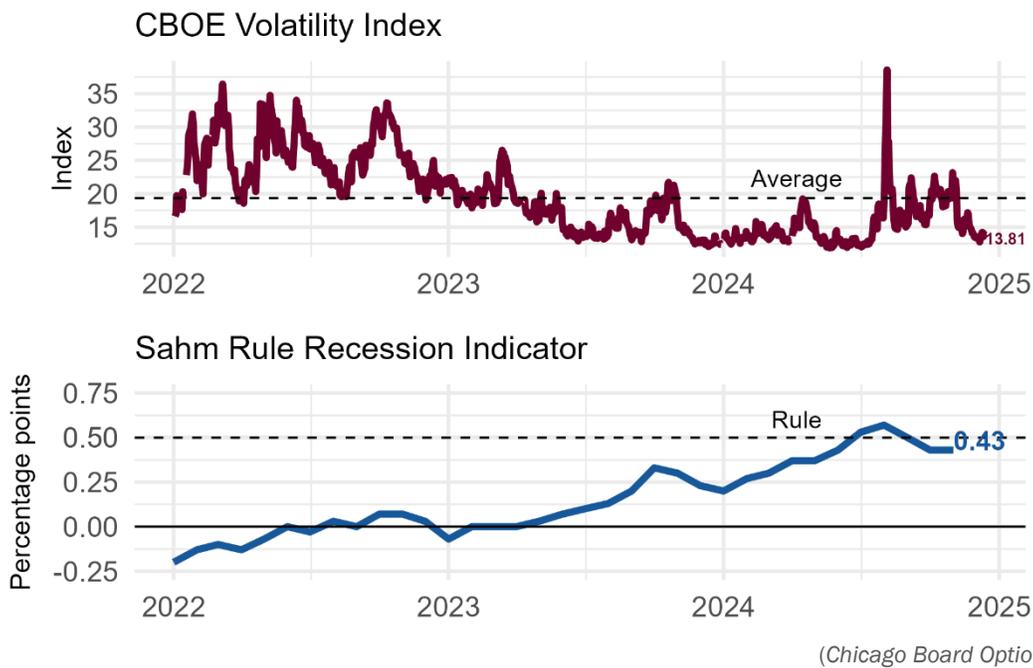
The concluding section contains the results of the client impact survey conducted by an independent third party following a project completed by the MMEC. The survey is used to evaluate the effectiveness of MMEC and for calculations of the center's return on investment (ROI) and economic impact.

The State of the Overall Economy

Markets often serve as a barometer for the broader economy, so the CBOE Volatility Index (VIX) is a key measure of market volatility and investor sentiment. Markets frequently react quickly – though not always precisely – to changes in global conditions. A rapid spike in the VIX offers some insights into perceived economic risks and future trends. For example, the spike in the VIX in August 2024 highlighted widespread investor anxiety, as shown in Figure 2.1. This was driven by a perfect storm of factors, including a weaker-than-expected U.S. jobs report, which revealed only 114,000 jobs were added in July and amplified fears of a slowing economy. Additionally, tech sector volatility and a surprise rate hike by the Bank of Japan added to investor concerns. These events, unfolding alongside shifting investor expectations around interest rates and Treasury yields, led investors to closely monitor and react to the U.S. jobs report, highlighting how seemingly distant or unrelated events can quickly unsettle markets.

The Volatility Index had been decreasing since its 2022 peak, and as of mid-December 2024, the VIX was at 13.81 representing about four months of average or below average volatility. However, throughout July and into the first week of August, the VIX increased rapidly, reaching over 27, suggesting a resurgence in market volatility. The measure at the time of this writing sits below average and it remains to be seen if this expectation of stability will persist over the coming year.

Figure 0.1 CBOE Volatility Index and Sahm Rule Recession Indicator



(Chicago Board Options Exchange)

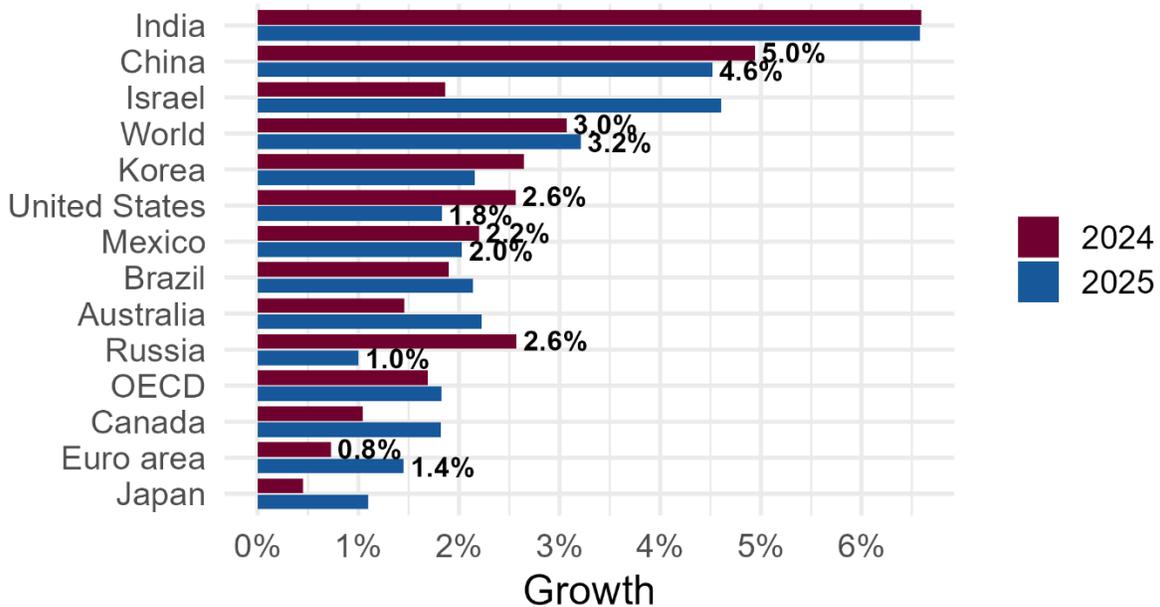
The discussion surrounding a potential U.S. recession over the next 18 months remains relevant, particularly as certain economic indicators point toward a “soft landing” and others toward a recession. The Sahm Rule, a recession indicator based on the unemployment rate, rose to 0.57 percentage points in August 2024, up from 0.43 percentage points in June. This by itself suggests a growing possibility of a recession, as the rule typically signals a downturn when the three-month moving average of the unemployment rate increases by 0.50 percentage points or more compared to its low over the previous 12 months. However, given the uniqueness of today’s labor market and participation rates did not appear to signal a recession and have now returned to 0.43 percentage points.

Meanwhile, several economic indicators already suggest that Europe may be heading into, or is already experiencing, a recession. Should the U.S. also enter a recession, it would have significant global economic implications, likely impacting trade, global financial markets, and supply chains, further straining economies already struggling with inflation and volatility.

As of July 2024, both the global and U.S. economies are navigating a complex landscape marked by moderate growth and notable challenges. Global GDP growth exceeded 3% in 2023 and is projected to rise at a similar pace, with forecasts of 3.0% for 2024 and 3.2% for 2025. While this growth is modest, remaining below the 2013-2019 average of 3.4%, it persists despite ongoing geopolitical risks in regions such as the Middle East and Ukraine.

Following the COVID-19 pandemic and rising geopolitical tensions, the global economic recovery remains uneven across regions. While the U.S. economy has displayed relatively strong growth, many European economies are lagging. In 2023, the U.S. grew by about 2.5%, defying earlier expectations of a slowdown, driven by robust consumer spending and job-market resilience. However, Europe continues to struggle with sluggish growth, partly due to persistent inflation and energy challenges exacerbated by the war in Ukraine.

Figure 0.2 Projected Economic Growth, Year-over-Year



(OECD, Economic Outlook, May 2024)

Monetary policy responses vary across the globe. Central banks in advanced economies, like the U.S. Federal Reserve and the European Central Bank (ECB), have focused on curbing inflation by raising interest rates. In the U.S., inflation has cooled, prompting the Fed to ease rates as of the second half of 2024. Meanwhile, Europe continues to face higher inflationary pressures, causing its central banks to maintain a more restrictive stance. Tighter monetary conditions globally are affecting housing and credit markets, with higher borrowing costs dampening economic activity, particularly in Europe.

As of late 2024, inflation is gradually easing in many advanced economies, particularly in the U.S. and parts of Europe, as central banks' aggressive monetary tightening over the past years begins to take effect. Labor markets remain robust, with unemployment rates at or near record lows across many countries. However, labor shortages in key sectors, such as health care, manufacturing, and hospitality, persist, driving wages higher. These wage increases, while necessary to attract talent, risk reigniting inflationary pressures as businesses may pass higher labor costs onto consumers. This delicate balance between taming inflation and maintaining economic momentum remains a central challenge for policymakers.

The broader global economy also faces heightened geopolitical risks, particularly due to armed conflicts in Ukraine and the Middle East, as well as a heightened trade war between the U.S. and China. These conflicts have disrupted energy markets and supply chains, adding to the volatility in global commodity prices and manufacturing. Should these tensions escalate further, the global economy could face slower growth, rising energy costs, and increased uncertainty in the financial markets.

1.1 Global Regional Overview

As of November 2024, the global economic landscape presents a nuanced picture characterized by easing inflation, divergent monetary policies, and persistent geopolitical tensions.

Monetary Policy and Inflation Trends

In the United States, the Federal Reserve has initiated a series of interest rate cuts in response to cooling inflation and a resilient labor market. The most recent reduction brought the federal funds rate to a range of 4.5% to 4.75%. Fed Chair Jerome Powell emphasized a cautious approach to further cuts, citing persistent inflationary pressures.

Conversely, the European Central Bank is expected to implement substantial rate cuts due to slow growth and below-target inflation, with projections indicating Eurozone inflation could drop below the ECB's 2% target as early as February 2025.

Labor Markets and Workforce Dynamics

Labor markets in advanced economies remain robust, with unemployment rates at or near record lows. However, labor shortages persist in key sectors such as health care, manufacturing, and hospitality, driving wages higher. These wage increases, while necessary to attract talent, risk reigniting inflationary pressures as businesses may pass higher labor costs onto consumers.

Technological Adoption and Employee Training

The acceleration of technological adoption continues to reshape industries, necessitating significant investments in employee training and upskilling. Companies are increasingly focusing on digital transformation to enhance productivity and competitiveness, highlighting the critical need for a workforce adept in emerging technologies.

Geopolitical Risks and Global Trade

Geopolitical tensions, particularly ongoing conflicts in Ukraine and the Middle East, along with heightened trade disputes between the U.S. and China, continue to disrupt energy markets and supply chains. These conflicts have added volatility to global commodity prices and manufacturing, posing risks to economic stability.

Economic Growth Projections

The International Monetary Fund (IMF) projects global growth to remain at 3.0% in 2024 and strengthen modestly in 2025, with inflation returning to target in most countries by the end of 2025. However, the IMF also warns that retaliatory tariffs could undermine growth, particularly in Asia, by impacting supply chains and raising costs.

In summary, while there are signs of economic stabilization, the global economy continues to navigate a complex environment marked by divergent monetary policies, labor market challenges, technological advancements, and geopolitical uncertainties.

Europe and the European Union

In 2024, Europe continues to face substantial economic challenges, primarily due to the Russian-Ukrainian conflict, which has disrupted energy markets and led to elevated energy prices. This has placed a significant burden on European industries, particularly manufacturing, which has been hit hard by rising input costs. Germany, Europe's largest economy, has been especially affected, entering a technical recession earlier in the year as its manufacturing sector — a key contributor to employment — stumbled under the pressure of high costs and weakened global demand.

Inflation remains a persistent issue across the region, especially in the services sector, where labor shortages and rising wages are driving prices up. In response, the European Central Bank has maintained high interest rates to combat inflation. However, these restrictive monetary policies have strained investment and slowed broader economic growth. Despite some success in reducing headline inflation remains sticky (which excludes volatile components like food and energy). This has raised concerns that the ECB may struggle to avoid a scenario of high inflation combined with slow economic growth. Such a situation could lead to rising unemployment and reduced consumer spending, which would further hamper growth, creating a significant challenge for policymakers.

In response to these economic pressures, European leaders are focusing on longer-term strategies to improve energy security and labor market flexibility. For instance, Germany has reformed its immigration policies to attract more workers, addressing both labor shortages and an aging workforce. At the same time, there is a growing emphasis on the green energy transition, with efforts aimed at reducing dependence on Russian energy supplies and lowering the costs of renewable energy. However, these policies will take time to deliver results, and in the short term, Europe is likely to experience slow growth and continued uncertainty for the foreseeable future.

Asia and Pacific

The economic outlook for the Asia-Pacific region remains a key driver of global growth in 2024, with China and India accounting for nearly half of the world's economic expansion. However, China's domestic consumption is showing signs of weakening. Despite initial post-COVID momentum, recent data indicates that consumer demand is slowing due to rising unemployment, particularly among younger workers, and stagnating income growth. These issues are compounded by a looming housing market crisis, where key real estate developers face mounting debts and property

sales have sharply declined. Since the real estate industry is a significant part of China's economy, these factors create a risk of economic instability, even as the government implements fiscal measures to address these challenges.

Meanwhile, India continues to experience strong growth, with projections of over 6% for 2024. India's economic expansion is supported by robust domestic demand and an expanding technology and manufacturing sector. However, the country is facing its own set of challenges, including the typical inflationary pressures but also a need for structural reforms to maintain its growth trajectory. Elsewhere in the Asia-Pacific region, countries like Vietnam and Indonesia are benefiting from shifting global supply chains, as companies diversify production away from China due to cheaper labor and growing trade tensions.

Japan is also an important player in the region but faces a different set of challenges. Demographics have for a time been the leading issue largely due to an aging population and a coinciding labor shortage, but now the declining export demand is also playing a role. Additionally, deflationary pressures have been a concern for years, but the government and Bank of Japan, until recently, showed a preference for economic growth over addressing deflation directly. Japan's growth is projected to remain modest, but its recent monetary policy response and potential stimulus measures may prevent a major downturn. However, Japan's long-term demographic challenges and reliance on exports remain longer term concerns.

Latin America and Canada

The economic outlook for Latin America in 2024 presents a mixed picture. The International Monetary Fund (IMF) has revised its growth forecast for the region to 2.1%, up from earlier projections, indicating a modest improvement. However, this growth remains subdued compared to global averages. Inflation has shown signs of easing, yet underlying price pressures persist, particularly in services and food sectors. Countries like Brazil have experienced robust private consumption and investment, bolstered by a strong labor market and government transfers, leading to an upgraded growth forecast of 1.9% for 2024. Conversely, Mexico's growth forecast has been adjusted downward to 1.5%, influenced by weakening domestic demand. The region continues to face challenges such as high public debt, structural inefficiencies, and vulnerability to external shocks, which may impede more robust economic recovery.

Canada's economic outlook for 2024 is marked by cautious optimism as the Bank of Canada reduces its policy rate to 4.25%, aiming to counter slowing growth. Inflation has moderated near the 2% target, providing room for further rate cuts if necessary. However, the housing market remains under pressure from high borrowing costs, with affordability challenges persisting in urban areas despite some price stabilization. Labor market conditions have softened, with unemployment rising to 6.6% amid slower growth in construction and manufacturing. Nonetheless, strength in energy exports and investments in renewable energy infrastructure are partially offsetting these challenges, leaving the economy reliant on effective monetary policies and global market stability for recovery.

1.2 The United States Economy

As of late 2024, the likelihood of the U.S. entering a recession within the next 18 months remains a pressing concern, with markets exhibiting heightened sensitivity to adverse news. Economic indicators, corporate earnings reports, and geopolitical developments continue to drive swift reactions from investors and traders. The Federal Reserve, after maintaining elevated policy rates longer than anticipated, began easing monetary policy in September, cutting rates to 4.75%-5% as inflation moderated. Despite this shift, the Fed is expected to proceed cautiously with further adjustments, balancing the need to support economic stability against the risk of reigniting inflationary pressures.

The likely drivers for the economy over the next year include:

Monetary Policy: The Federal Reserve has already taken steps to ease monetary policy, with a 50-basis-point cut in September 2024, lowering rates to 4.75 -5%. This shift came after a period of higher rates aimed at controlling inflation. While inflation has moderated, the Fed signaled further cuts might be necessary depending on economic data, and markets are anticipating continued easing as the economy shows mixed signals of growth.

Inflation Trends: While inflation has moderated from its peak, persistent inflation in core sectors — like services and housing — continue to strain consumer spending and business investment. Inflation trends will be heavily influenced by monetary policy and businesses and households' ability to adjust to higher prices. Inflation remaining significantly over 2% will erode purchasing power, further dampening consumer confidence and business activity.

Housing and Debt Service Burdens: The housing market is a major driver of economic conditions. Rising interest rates have made housing less affordable, leading to a cooling market and declining home prices in some areas. However, supply shortages in regions like Montana keep prices elevated. This, combined with reduced household wealth and

lower personal savings, could suppress consumption and further slow economic growth. Additionally, rising rental prices due to limited housing supply burdens mid- to low-income households, reducing disposable income.

Rising debt-service costs due to higher interest rates and the rollover of low-yielding debt could strain both public and private sector finances. The end of pandemic-era support has been supplanted in part by rising household debt. While this has helped maintain aggregate demand, the high cost of debt due to higher interest rates could reduce future spending and increase delinquency rates.

Geopolitical Risks: High geopolitical tensions, especially in regions like the Middle East and East Asia, pose risks to global trade and energy markets. Disruptions in these regions could lead to supply shocks, higher energy prices, and increased market volatility, potentially curbing global and U.S. growth. The ongoing conflict in Ukraine and tensions between the U.S. and China over trade and technology are critical areas of concern.

Supply Chains: Supply chain disruptions remain a concern, especially with ongoing trade tensions between the U.S. and China. Companies have started diversifying their supply sources to mitigate risk, but any further disruptions—due to natural disasters, geopolitical conflicts, or even another pandemic—could limit production and raise costs, affecting business operations and prices for consumers.

Investment: High borrowing costs make it more expensive for firms to invest in physical capital. This trend is particularly impactful in regions like Montana, where small businesses are highly sensitive to these changes. Although lending standards have eased slightly, they remain much tighter than in the pre-pandemic period, limiting access to credit and stifling small business growth. On the financing side, the percentage of U.S. banks tightening standards for small business loans peaked at 49% in Q3 of 2023 but has since eased to a still elevated 19.7% as of Q2 2024. For comparison, the rate of tightening standards from 2010 to 2019 hovered around -3.8%, indicating significantly tighter conditions now than in the pre-pandemic period.

Housing and Financial Markets: As housing and financial markets cool down, personal consumption expenditures are likely to slow as household wealth decreases. This could be exacerbated by falling personal savings and continued high inflation rates, which would further suppress individual consumption. Conversely, while housing price growth is beginning to slow nationally, certain areas, such as parts of Montana, continue to face supply shortages, keeping housing prices relatively high. These higher prices for residential real estate affect all parts of the economy from household consumption to global investment.

Economic Policy: National budget politics have returned to pre-pandemic norms, causing increased policy and regulatory uncertainty. The passage of a debt ceiling package in May 2023 eased concerns over debt repayment, a government shutdown, and the cessation of social program spending. This reduced the likelihood of financial markets responding with higher interest rates if the federal government reneged on its debt commitments.

Technology and Automation: Adoption of new technologies like AI, robotics, and automation is transforming sectors like manufacturing and logistics, boosting productivity and enabling reshoring of jobs. However, the full benefits of these technological advancements will take time to materialize. Industrial policy will be crucial in supporting high-tech manufacturing and determining how the U.S. competes globally in these capital-intensive sectors. While the U.S. economy shows signs of resilience, it faces significant challenges from inflation, monetary policy responses, and geopolitical uncertainties. The effectiveness of ongoing economic policies will be crucial in shaping future economic outcomes.

Headwinds

This section synthesizes the primary headwinds impacting the state and national economies, providing a framework for understanding how these challenges—ranging from monetary policy and geopolitical risks to labor market dynamics—may influence economic growth and stability in the years ahead.

Economic Policy and Monetary Conditions: Key drivers over the next year include inflation control, interest rate policy, and the impact of tighter monetary policy. The Fed's ongoing attempts to curb inflation through keeping interest rates higher will continue to influence borrowing costs for both consumers and businesses. Higher interest rates have cooled demand in housing markets and could suppress personal consumption as household wealth decreases. Furthermore, national budget politics and fiscal uncertainty remain challenges, though the passage of a debt ceiling deal in 2023 reduced the likelihood of a government default.

Another factor shaping economic policy is the ongoing use of tariffs as a trade tool. Tariffs on Chinese goods that remain in place as part of the ongoing trade dispute aim to address ongoing issues related to technology transfer, intellectual property, and innovation practices by China. Tariffs will continue to affect both global supply chains and domestic prices, and have led to elevated costs for U.S. manufacturers and consumers. The tradeoffs between the

longer-term aim of the tariffs and their downstream impacts remain a point of debate in U.S. economic policy. The Biden administration while providing some exclusions for machinery used in domestic manufacturing has yet to make significant changes to the tariffs in place.

Investments and Debt: Investment in physical capital is expected to decline as long as interest rates remain high, impacting business expansion and real estate development, particularly in regions like Montana where firms are more sensitive to interest rate fluctuations. Tighter lending standards for small businesses, while improving slightly from their peak in 2023, continue to restrain growth, especially in sectors reliant on borrowed capital. Meanwhile, household debt is rising due to higher borrowing costs, which may strain future spending as debt service burdens increase. This elevated debt could slow consumption, particularly if delinquency rates begin to rise, further dampening economic growth.

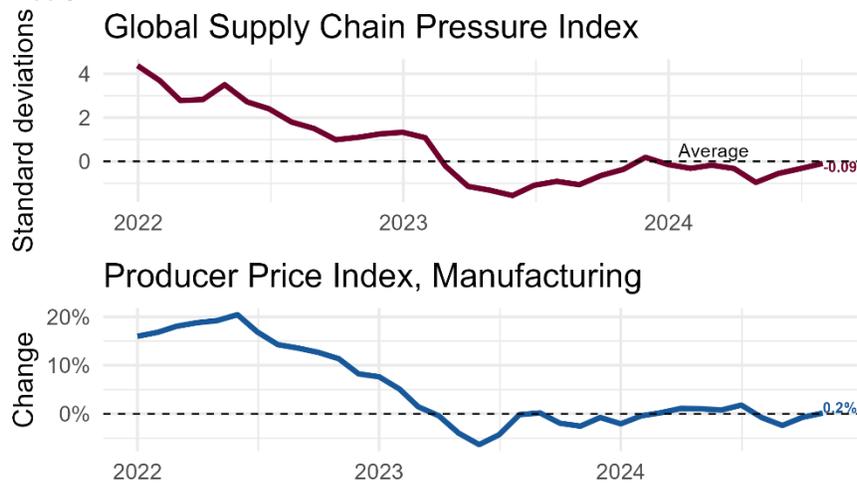
Geopolitical Risks: Geopolitical tensions continue to pose significant risks to the global economy. The Russian-Ukrainian war remains a central concern, as it has led to significant disruptions in global energy markets, particularly in Europe, where high energy prices and supply shortages have had long-lasting economic impacts. The conflict has also strained global food supply chains, especially given the importance of Ukraine as a key exporter of grain. Rising energy costs and disrupted supply lines have exacerbated inflationary pressures across many regions, leading to concerns about prolonged economic stagnation, especially in Europe.

Additionally, heightened tensions in the Middle East could further destabilize global energy markets, adding more volatility to oil prices and broader commodity markets. At the same time, U.S.-China trade tensions continue to encourage companies to diversify their supplier bases, reinforcing the need for resilient supply chains. These tensions, combined with potential disruptions in global trade, highlight the importance of mitigating risks through robust trade policies.

Supply Chains and inflation: Supply chain pressures have eased considerably, reducing some inflationary pressures. The disruptions that had caused commodity price shocks, contributing significantly to inflation in previous years, have subsided. This is reflected in falling import prices and lower production costs across industries. Improvements in global supply chain logistics have helped alleviate delays, reduce transportation costs, and stabilize the flow of goods.

However, these gains have been partially offset by rising energy prices driven by ongoing geopolitical tensions, particularly in the Middle East, where conflicts threaten critical shipping routes. This has led to renewed concerns about supply chain vulnerabilities, especially in energy and commodity markets, and has kept inflationary pressures elevated in key sectors dependent on stable energy and commodity prices.

Figure 0.3 Global Supply Chain Pressure and Producer Price Index



(FRB of New York, Bureau of Labor Statistics, & Bureau of Economic Analysis)

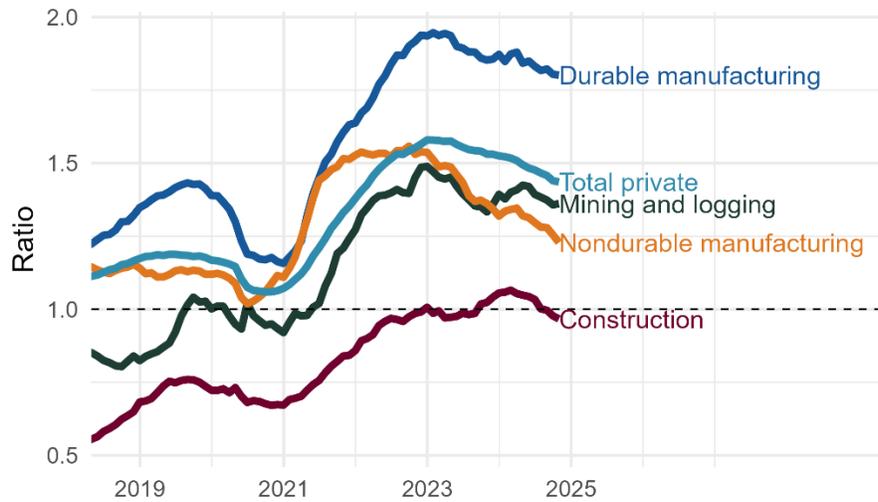
Labor Markets: Labor markets remain strained due to ongoing labor shortages and strong demand for workers, particularly in sectors like durable manufacturing. However, there are signs of gradual improvement as some industries are starting to fill positions more effectively. The openings-to-hires ratio, a key indicator of labor market tightness, measures the number of job openings relative to hires. A higher ratio indicates more job openings than hires, signaling difficulty in finding qualified workers, while a lower ratio suggests positions are being filled more easily.

Figure 2.4 illustrates that in the goods-producing industries broadly, job openings are still significantly higher than pre-pandemic levels. However, conditions have stabilized, and since 2022, there has been slow but steady

improvement. As of October 2024, the 12-month moving average of the openings-to-hires ratio in durable manufacturing remains elevated at 1.8 openings per hire, up from 1.3 in 2018, reflecting ongoing challenges in filling positions. However, this ratio has begun to stabilize and slightly decline, suggesting that some pressure on labor markets is easing as employers adapt to current conditions.

In nondurable manufacturing, where skill requirements are generally lower, the ratio has risen from 1.1 in 2018 to 1.2 in 2024, indicating a less severe but still tight labor market. This shows that while conditions remain tight, gradual improvements are happening across many industries.

Figure 0.4 Openings-to-Hires Ratio in Goods-Producing Sectors



(Bureau of Labor Statistics, Job Openings and Labor Turnover Survey (JOLTS), BBER Analysis)

The average openings-to-hires ratio in October remains high, particularly in durable manufacturing, with about 1.8 openings per hire, up from 1.3 observed in October of 2018.

Collectively, these headwinds are expected to slow economic growth and affect various sectors differently. The effectiveness of ongoing policies and the ability to adapt to these challenges will be crucial for future economic stability.

Wildcards: The following is a partial list of wildcard events that could significantly impact the economy, introducing both opportunities and challenges depending on how they unfold:

- The Trump administration could result in significant policy shifts, with mixed outcomes. Changes in taxation, trade, regulation, and international relations could both create opportunities and introduce uncertainties for businesses and the broader economy.
- Shifts in U.S.-China relations remain a critical area of concern. Trade disputes, geopolitical tensions, or breakthroughs in diplomacy could have significant implications for global trade, supply chains, and economic stability.
- Geopolitical tensions in the Middle East and Ukraine continue to pose risks. Further escalation in these regions could lead to disruptions in energy markets, higher commodity prices, and increased volatility in global financial markets.
- Unexpected technological breakthroughs or disruptions could reshape industries. Innovations in AI, clean energy, or manufacturing processes may drive productivity and growth, while failures or security breaches in emerging technologies could have widespread consequences.
- Climate-related disasters could impact supply chains, infrastructure, and production. Wildfires, hurricanes, or floods could disrupt key industries, particularly agriculture, energy, and transportation, with localized and global repercussions.

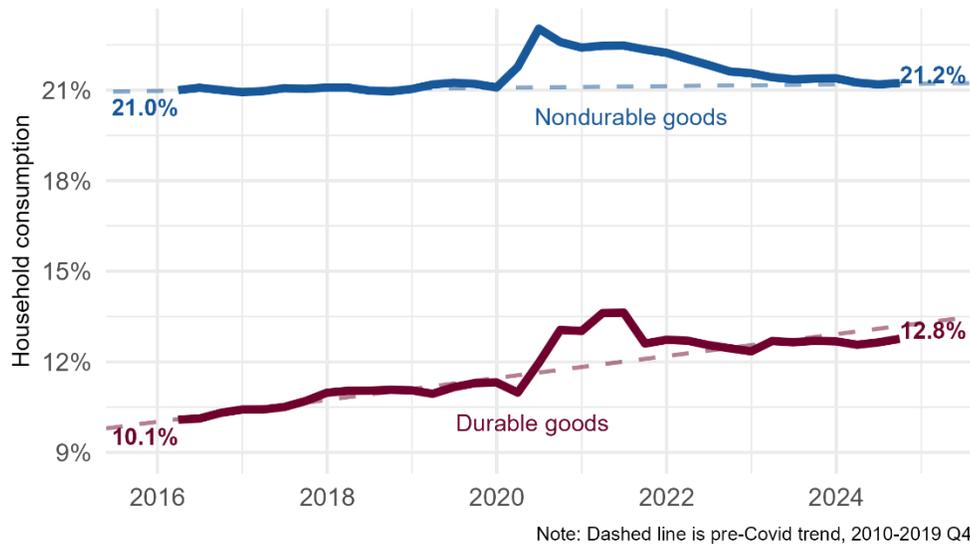
1.3 National Manufacturing Overview

Overview of National Manufacturing

Over the past few years, manufacturers have faced a "perfect storm" of challenges, from a spike in demand for goods to global supply chain disruptions and higher interest rates that have strained firms' ability to invest in capital. The pandemic caused a dramatic shift in household consumption patterns, as consumers spent increasingly more on goods than on services, adding pressure to an already-strained system. Labor shortages have further complicated the recovery, pushing firms to accelerate automation and invest in higher-skilled labor. Meanwhile, concerns about tax policy, the business climate, and inflationary pressures continue to weigh on manufacturers. Despite these obstacles, the sector has shown resilience, with supply chain issues easing and firms adapting to the new economic landscape by localizing production and leveraging new technologies.

To set the stage, it is essential to begin with an examination of household consumption behavior – demand for manufactured goods. During the pandemic, household spending shifted significantly toward goods consumption as service industries were impacted by restrictions. Figure 2.5 illustrates this surge in demand, where goods saw an outsized share of household income. Although spending is now gradually returning to pre-pandemic trends, both durable and nondurable goods continue to command a larger portion of household budgets, reflecting the shift and the persistent inflationary pressures in the service sector.

Figure 0.5 Household Consumption Behavior

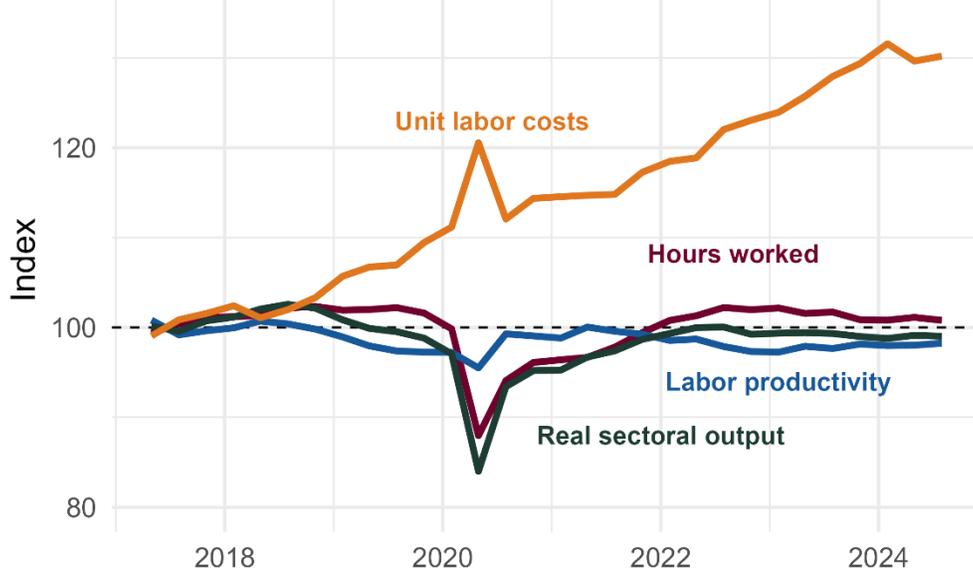


(U.S. Bureau of Economic Analysis, Real personal consumption expenditures)

The economic shocks of recent years have continued to disrupt the industry but have also served to accelerate long-term trends in manufacturing. Automation, which was already gaining momentum, has become increasingly essential as companies face rising demand and persistent labor shortages. Nationally, 67% of manufacturers cited labor shortages as their primary challenge as of the most recent *Manufacturers Outlook Survey*. The second top challenge, rising health care costs, is also workforce related.

This observation is made clearer by considering the manufacturing output indices shown in Figure 2.6, which illustrate changes to weekly hours worked and output – measures of economic activity – and labor productivity and unit labor costs (dashed lines), which reflect labor effectiveness and costs. Output has returned to pre-COVID levels; however, labor productivity and hours worked have remained largely unchanged since mid-2020. This stagnation in productivity is particularly concerning, as manufacturers must produce more with the same or fewer workers in a tight labor market. If labor markets continue to tighten or skill gaps persist, manufacturers will increasingly need to rely on technology, such as AI and machine learning, to maintain and enhance production efficiency.

Figure 0.6 Manufacturing Output, Hours Worked, Unit Labor Cost, and Productivity, United States

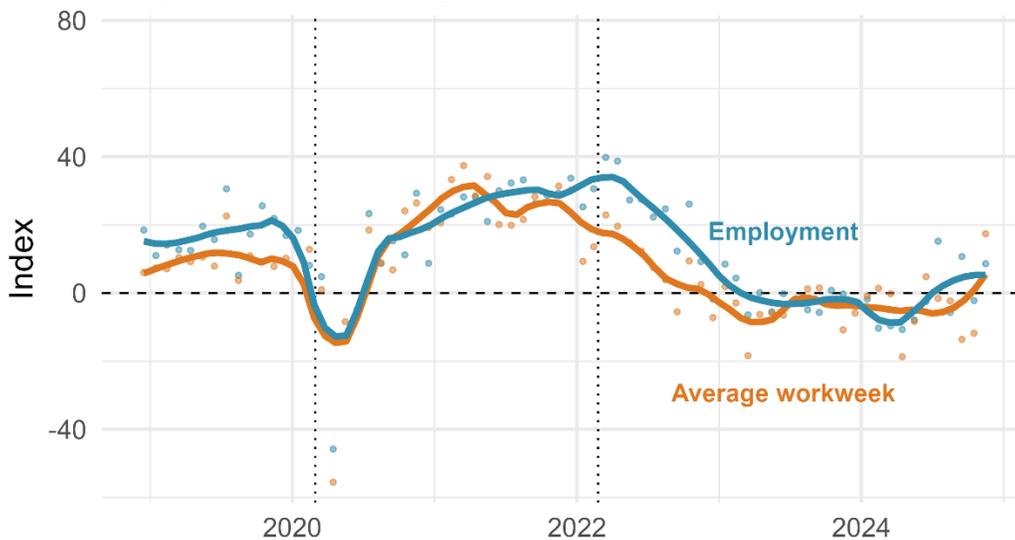


(Bureau of Labor Statistics, Labor Productivity and Costs)

Similarly, Figure 2.7 indicates a deceleration in both employment and work hours, echoing the concerns expressed earlier about labor shortages among manufacturers. The trend lines reveal a concerning trend: both employment and average workweek metrics are experiencing a slowdown, reflecting the challenges manufacturers face in recruiting and retaining workers amid rising labor costs.

Manufacturing is the 7th-fastest growing sector, with 5% overall employment growth since 2018.

Figure 0.7 Manufacturing Employment and Average Workweek, United States



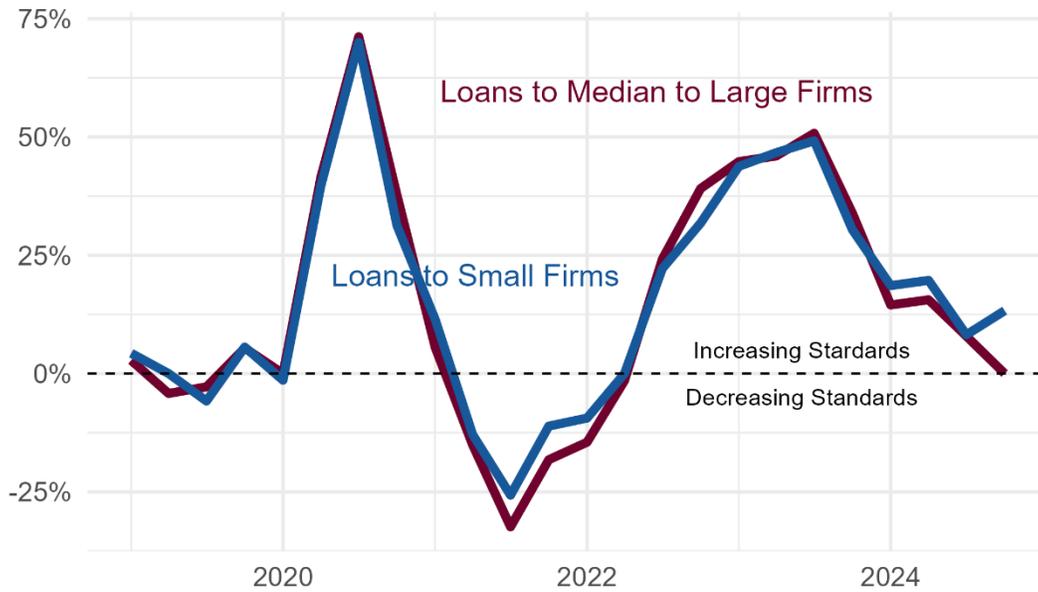
Note: LOESS smoothing applied with a 12-month window

(Federal Reserve Bank of Philadelphia)

To meet these challenges, many manufacturers would need to make significant capital investments in advanced technologies and automation, such as AI, robotics, and other digital tools. Capital expenditures on automation and productivity-enhancing equipment not only reduce reliance on labor but also increase efficiency in production processes. However, this is a particularly challenging time for smaller manufacturers to secure funding for such investments.

The Federal Reserve's Senior Loan Officer Opinion Survey shows a rising percentage of banks increasing their credit standards for small businesses over recent quarters. This trend reflects tightening financial conditions in response to higher interest rates and growing economic uncertainty. As shown in Figure 2.8 the share of banks tightening credit standards has steadily increased since the start of 2023, adding to the financial pressure on smaller manufacturers that already face challenges securing capital for critical investments in automation and technology.

Figure 0.8 Net Percentage of Domestic Banks Tightening Standards for C&I Loans



(Federal Reserve's Senior Loan Officer Opinion Survey)

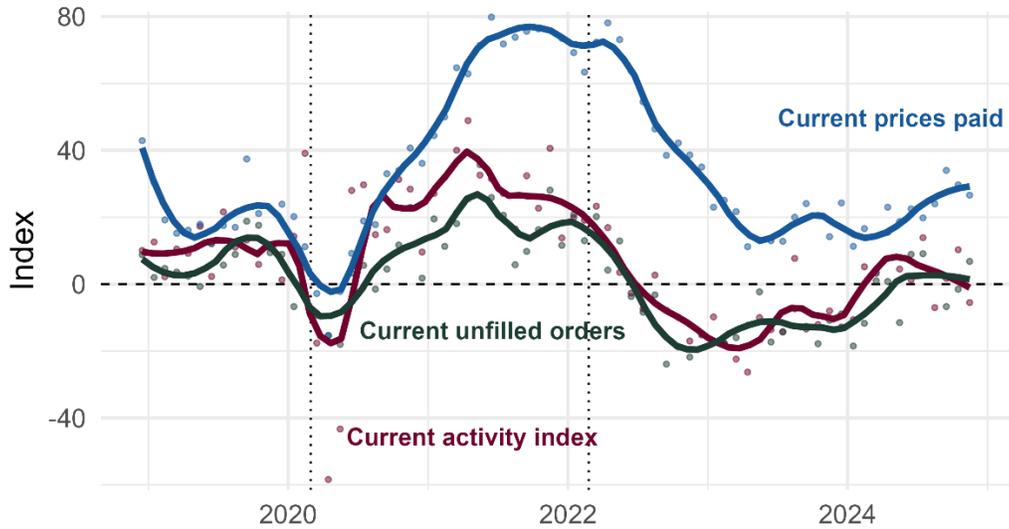
Another key issue shaping the business landscape is the business climate and policy concerns manufacturers face. Uncertainty surrounding tax policy looms large, with 94% of manufacturers calling for Congress to prevent scheduled tax increases before the end of 2025. This includes the expiration of provisions such as the immediate expensing of R&D and full expensing for capital purchases, both of which are critical to maintaining investment momentum in the sector. Additionally, the 20% pass-through deduction is set to expire, further adding to manufacturers' anxieties about their ability to remain competitive in an increasingly volatile global market.

Spurred by a challenging domestic and global economy, U.S. policies — such as tariffs on imported goods like electric vehicles and recent support for domestic microchip production — have further incentivized U.S. manufacturers to innovate and localize production. These efforts aim to strengthen domestic supply chains and reduce reliance on foreign producers, positioning manufacturers to capitalize on the growing demand for advanced products.

While these policies are shaping the landscape, the good news is that supply chain concerns have eased significantly. Only 25.8% of manufacturers now cite supply chain disruptions as a primary challenge, a substantial improvement from the past two years. This reduction in concern signals that manufacturers are beginning to overcome the bottlenecks that have plagued production since the pandemic's onset.

Turning to manufacturing activity, we see mixed signals across key metrics. Figure 2.9 shows the immediate effects of both COVID and the Russia-Ukraine war, and that current activity and unfulfilled orders returned to normal at the start of 2024, the dashed line in the figure. However, overall prices paid to manufacturers remain slightly elevated, reflecting in part the cost of inputs. Although a semblance of normality is apparent, all three metrics appear to be experiencing an uptick following a year of decline.

Figure 0.9 Manufacturing Business Outlook Survey

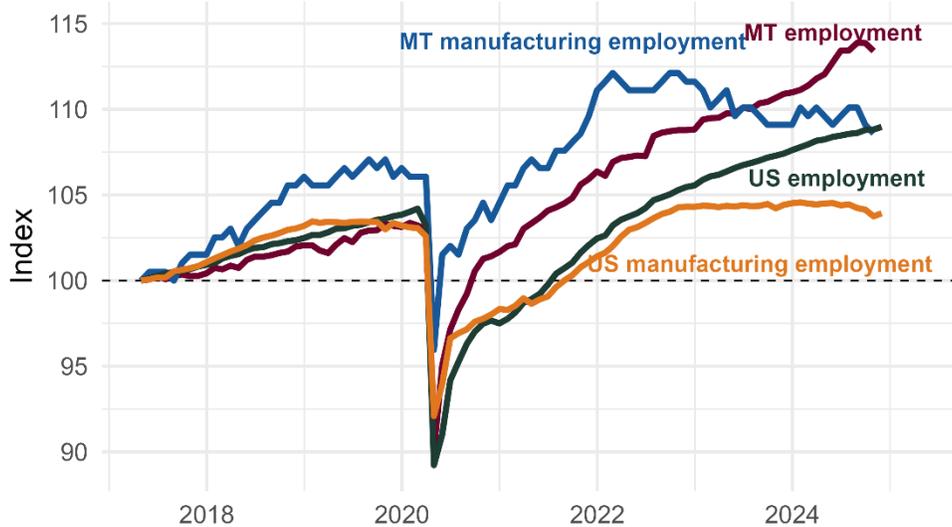


Note: LOESS smoothing applied with a 12-month window

(Federal Reserve Bank of Philadelphia)

Figure 2.10 illustrates broader labor trends in manufacturing, highlighting the divergence and convergence between national and state-level employment growth. The figure shows that Montana's employment recovery from the COVID-19 recession was faster and more robust than the nation's. Notably, since April 2017, the growth in Montana's manufacturing employment was strong relative to the nation's trajectory, with a quicker rebound and sustained rapid growth over the past seven years. However, since 2023, a gradual convergence has occurred, indicating that Montana's manufacturing employment is aligning more closely with national trends. In the last year and a half, growth in Montana's manufacturing sector has slowed, now trailing behind the overall private sector employment within the state. This slowdown reflects the divergence that existed at the national level just before the onset of the recession.

Figure 0.10 Comparative Trends in Manufacturing and Total Employment for Montana and the U.S.



Note: Index April 2017 = 100

(Bureau of Labor Statistics, Current Employment Statistics)

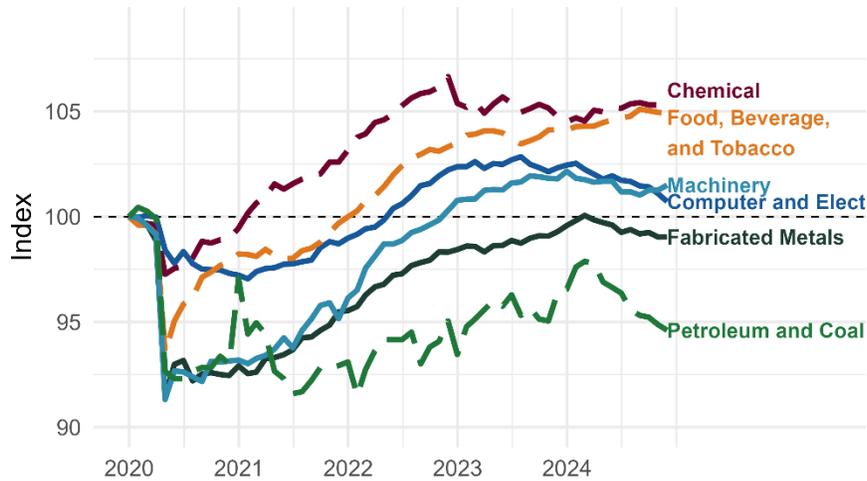
Despite ongoing challenges at all levels, U.S. manufacturers remain optimistic. The national *Manufacturers Outlook Survey* found that 71.9% of manufacturers are optimistic about their firm's outlook. Although medium and small firms reported slightly lower optimism at 69.8% and 69.9%, respectively, this still marks a slight improvement from the previous year. This cautious optimism sets the stage for examining key trends in manufacturing, including shifts in employment and human capital investments, advancements in artificial intelligence and automation, the easing of supply chain disruptions, the growing focus on environmental sustainability, such as product recycling, and the rise of decentralized manufacturing.

Trends in Manufacturing

Several key trends in manufacturing have gained significant traction in recent years, shaping the future of the industry. The two primary interrelated trends discussed here are workforce and technological adoption. These trends are driving fundamental changes in jobs in manufacturing, as the skills gap widens, and technology transforms industry.

According to the National Manufacturers Association Survey (2024 Q2), finding qualified workers remains the top concern for U.S. manufacturers, though this concern has eased in the short term. Figure 2.11 shows the post-COVID-19 recovery in manufacturing employment, with national employment returning to or exceeding pre-pandemic levels. However, some subsectors, like fabricated metals and petroleum and coal products, are still recovering, while others, such as food, beverage, and tobacco Products, have experienced robust growth.

Figure 0.11 Recent Trends in Employment by Manufacturing Subsector, United States



Note: Dashed lines are nondurable goods, Index Jan 2020 = 100

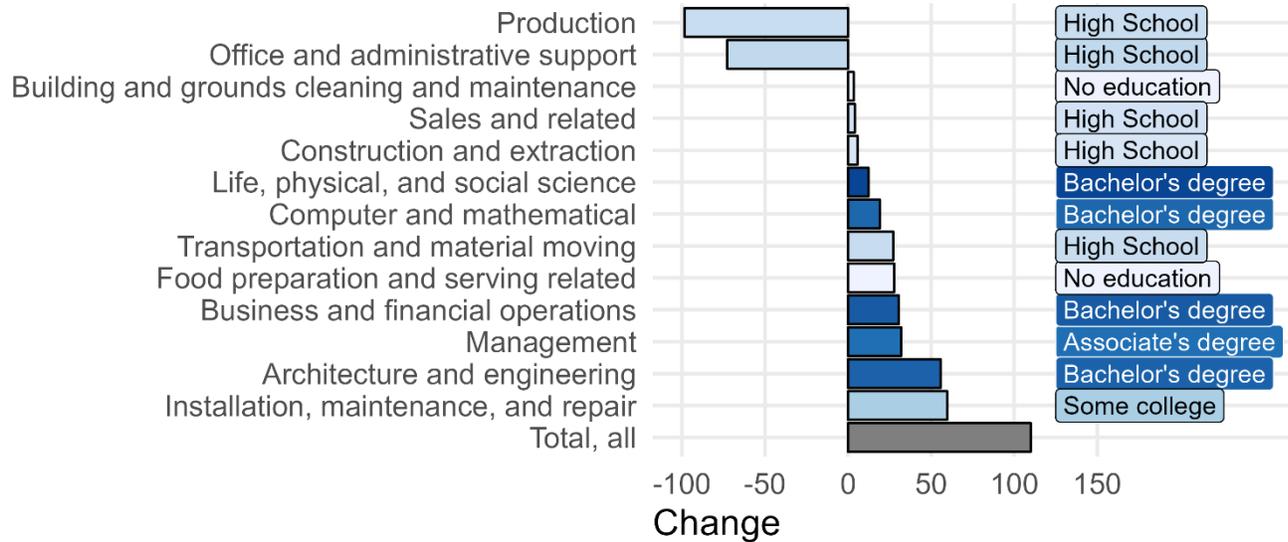
(Bureau of Labor Statistics, QCEW)

Despite the return to employment growth for some manufactured goods, the longer-term outlook suggests moderate growth accompanied by a changing occupational mix in the industry. The Bureau of Labor Statistics (2023) projects that manufacturing employment will grow by 110,000 workers by 2033, driven by the need for higher-skilled workers as technological adoption accelerates. A study by the National Association of Manufacturers (NAM) and Deloitte projects a higher figure, estimating the creation of 1 million jobs due to industry growth and federal initiatives, while also noting that 2.8 million additional workers will be needed to fill vacancies caused by retirements.

For a forward-looking view, the Bureau of Labor Statistics projects the employment outlook over the next decade by industry and occupation. As shown in the last row of Figure 2.12, U.S. manufacturing employment is expected to grow overall due to industry expansion. However, the net change in jobs reveals a shift away from lower-skilled roles in production and administrative support toward higher-skilled jobs in installation and maintenance, as well as architecture and engineering.

Figure 2.12 combines the employment projections with the current typical entry level educational requirements of those occupations, indicating that new manufacturing employment would typically require at least some college education. This shift underscores the evolving landscape of the manufacturing workforce, with a growing emphasis on more advanced skills and training.

Figure 0.12 Projected Manufacturing Employment Change by Occupation Education, United States



(U.S. Bureau of Labor Statistics- Employment Projections (EP), BBER Analysis)

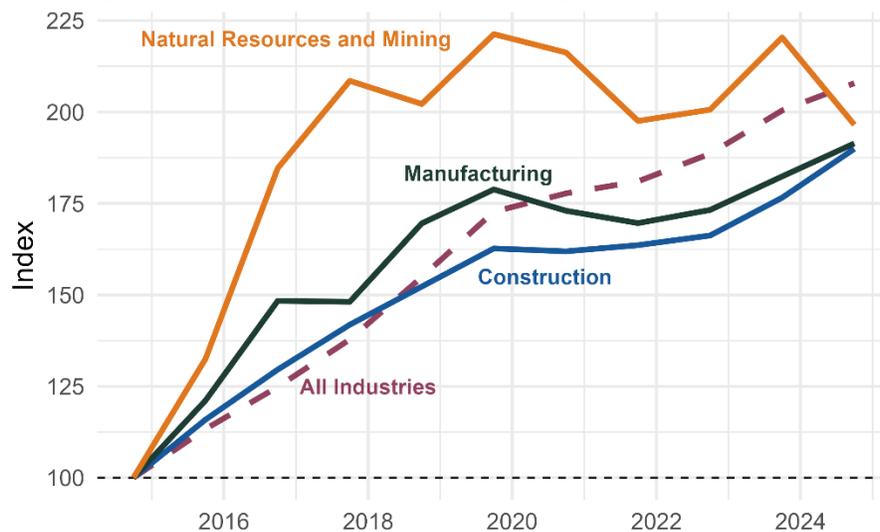
Although colleges and universities will play a role in narrowing the current talent gap, manufacturers are increasingly turning to alternative methods of upskilling the workforce to meet the needs of advanced manufacturing. The following section focuses on recent trends in human capital investments, specifically apprenticeships by U.S. manufacturers.

Employment & human capital investment

Changing workforce dynamics are reshaping how the labor market functions. On the supply side, workers have emerged from the pandemic with new perspectives on work-life balance, as technology has enabled flexible working modes such as telecommuting across a wider range of industries. In manufacturing, technology has reduced the need for workers to perform repetitive tasks but has also increased the demand for skilled and creative workers who can design, build, and operate advanced technologies.

One strategy for upskilling the workforce and addressing the skills gap is through apprenticeships. Figure 2.13 compares the overall growth in registered apprenticeships across all sectors of the economy. Manufacturing saw a significant rise in apprenticeships during the first half of the last decade. However, both manufacturing and construction sectors experienced a slowdown in apprenticeship growth in the second half of the decade, with service industries now driving much of the apprenticeship growth through fiscal year 2024.

Figure 0.13 Trends in Registered Apprenticeships by Industry Category, United States



(U.S. Department of Labor, Registered Apprenticeship Partners Information Database System (RAPIDS))

While apprenticeships have played a role in addressing the skills gap, the recent decline in apprenticeship growth, coupled with ongoing workforce recovery challenges, suggests that manufacturers will need to explore additional strategies to meet their workforce needs over the next decade. In the meantime, technological progress continues to

reshape industry. Manufacturers that successfully leverage technology to increase worker productivity will be better positioned to navigate these challenges. This shift toward integrating more advanced technologies, such as AI, and automation is already reducing the demand for assembly occupations but soon will also reduce the demand for office and administrative roles. All trends point toward a need for a more skilled workforce that more effectively uses modern technology.

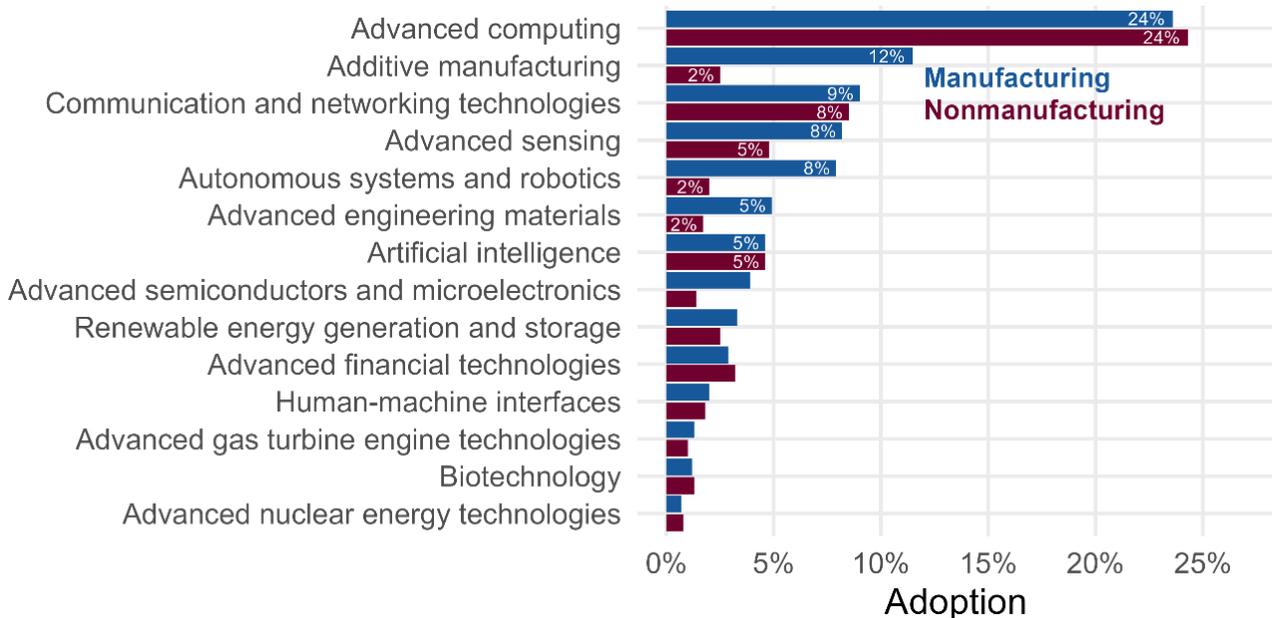
Automation, artificial intelligence, and technological adoption

The manufacturing sector is undergoing a profound transformation as advancements in automation and artificial intelligence (AI) reshape traditional roles and processes. Historically, automation has shifted the demand away from manual production jobs toward more specialized roles, such as machine troubleshooting, repair, and maintenance. Now, the rapid integration of AI is expanding the capabilities of machines even further, enabling them to perform increasingly complex tasks that were once the domain of skilled human workers. According to Figure 2.14, based on the 2021 Annual Business Survey, the adoption of advanced technologies such as advanced computing, communication and networking technologies, advanced sensing, and autonomous systems and robotics was reported by at least 8% of manufacturers.

While artificial intelligence ranked seventh in adoption in 2021, it's important to note that this survey was conducted before AI became a widely debated topic beyond computer science circles. Public interest surged following the release of large language models like ChatGPT, which brought AI into mainstream discourse. However, even in 2021, the technologies mentioned earlier — advanced computing, sensing, and robotics — laid the groundwork for collecting and analyzing real-world data. This data, currently processed by human workers, will increasingly be the foundation that AI systems rely on to make decisions in the future.

For example, autonomous systems equipped with advanced sensing technologies can gather vast amounts of real-time data from their environment. This data is then processed by AI, enabling precise adjustments to production processes without the need for human intervention. The integration of AI with other technologies, such as digital twins and the Industrial Internet of Things (IIoT), allows manufacturing systems to take a holistic view of operations while also collecting data, performing complex calculations, and learning from their interactions in both simulated and real-world environments. Given the pace of technological advancement, these systems could, in theory, identify patterns and optimize processes faster and more cost-effectively than on-the-ground research and development teams alone. This capability allows manufacturers to leverage data to make more informed and efficient production decisions.

Figure 0.14 Technological Adoption Rates, Manufacturing vs. Nonmanufacturing



(National Center for Science and Engineering Statistics and Census Bureau, 2022 Annual Business Survey)

In addition to improving efficiency, automation and AI technologies may help manufacturers address one of their most pressing challenges: workforce shortages. As manufacturers struggle to find enough production workers, these technologies fill the roles of the most repetitive, manual tasks traditionally performed by humans. However, while these innovations help ease the burden of labor shortages in production roles, they simultaneously increase the demand for more skilled employees who can manage, maintain, and troubleshoot the advanced systems used on the factory floor.

Beyond workforce challenges, manufacturers are also focusing on increasing efficiency across other inputs into the production process, such as raw materials and energy. This focus on efficiency is evident in the 12% adoption of additive manufacturing. Additive manufacturing, or 3D printing, allows products to be built layer by layer from raw materials, reducing waste by using only the necessary material rather than starting from a raw material and cutting away excess. While recycling remains a key trend in manufacturing, additive manufacturing minimizes the raw material required, reducing the need for recycling in the first place.

Additionally, the growing adoption of advanced energy technologies, including renewable energy, advanced gas turbines, and nuclear energy – highlights the industry's focus on reducing energy inputs and costs. Although adoption is currently small, these technologies offer manufacturers opportunities to diversify their energy sources, decrease reliance on foreign fuels, and minimize environmental impacts, particularly carbon emissions from energy-intensive production processes.

Overall, while the manufacturing industry leads in adopting production-focused technologies, non-manufacturing sectors are increasingly integrating advanced technologies into service-oriented, financial, and scientific applications. This contrast reflects how each sector's unique needs shape their approach to technology. As AI and automation continue to evolve, both sectors are set to transform not only their operations but also their workforces.

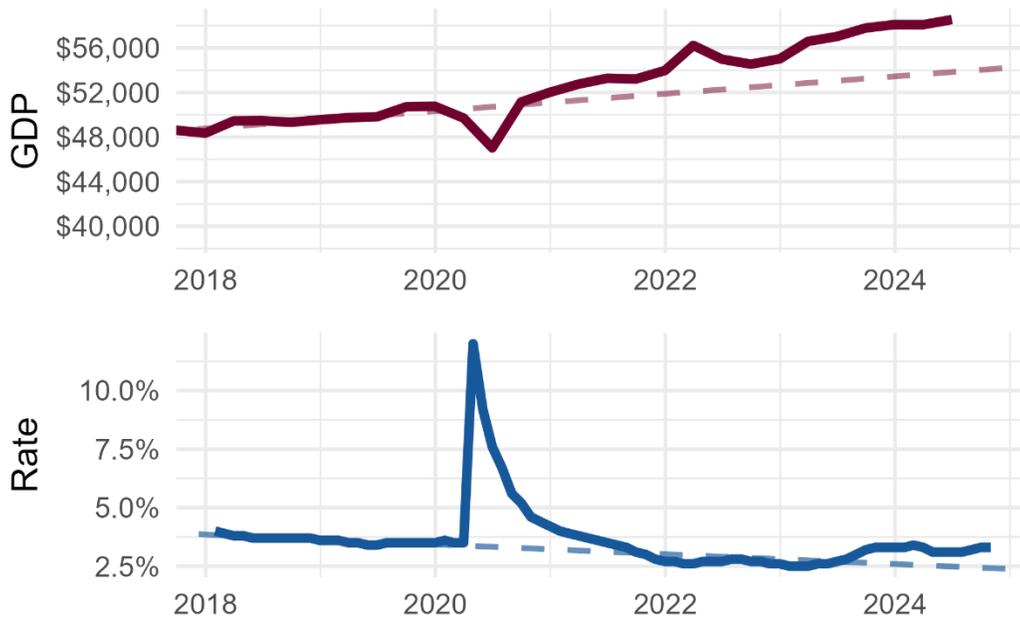
In a global market where the U.S. cannot compete on labor costs, its strength lies in technological innovation, advanced manufacturing, and the production of high-quality and high-tech goods. By reshoring manufacturing where possible and focusing on critical sectors that require secure domestic access to natural resources, food, and energy, the U.S. can better insulate its economy from global market fluctuations. Continued leadership in research and development, intellectual property protection, and a commitment to fair worker compensation and environmental stewardship will enable the U.S. to safeguard its future against global competition and disruptions.

1.4 The Montana Economy

Montana's economy has seen significant growth since emerging from the pandemic, with a notable spike in 2022. Figure 2.15 highlights this sharp rise, driven by surging commodity prices in oil, gas, and agriculture, alongside the "revenge tourism" many areas experienced as visitors flocked back after COVID-19 restrictions eased. Federal infrastructure investments and a tight labor market further bolstered the state's economic output. Montana's real GDP grew by 2.9% during the most recent year and has remained above pre-pandemic trends.

While still low, Montana's unemployment rate of 3.1% in 2024 reflects a slightly weakening labor market compared to 2023, when the rate got as low as 2.5%. This shift, shown suggests that some of the labor market tightness experienced post-pandemic may be easing. The most substantial contributing factors include higher interest rates, which the Federal Reserve has thus far kept elevated to control inflation. As long as interest rates remain high, they will continue to exert more pressure on economic growth. However, signs of rising unemployment represent one factor the Fed would like to continue seeing before considering another rate cut, as a softening labor market may signal the economy is cooling enough to ease monetary policy without reigniting inflation.

Figure 0.15 Montana Output (Real GDP \$ Millions) and Unemployment Rate



(Bureau of Economic Analysis, Bureau of Labor Statistics)

As Montana's labor market shows signs of softening, the state's key industries continue to play a critical role in sustaining economic growth. Sectors like tourism, energy, mining, agriculture and forestry remain the backbone of Montana's economy, with each contributing significantly to employment and GDP. However, Montana's economy has undergone notable shifts over the past decade, with service industries increasingly becoming the dominant employers especially in the professional and business services, education and health services, and leisure and hospitality sectors.

Tourism bounced back strongly post-pandemic, and its influence remains substantial across the state's communities. In 2023, Glacier National Park saw another good year, attracting nearly 3 million visitors, significantly boosting the local economy, and tourism-related expenditures near the park reached \$3.72 million, supporting 5,725 jobs in the regional economy (National Park Service 2023). This sector, along with others like natural resources and manufacturing, highlights the diverse drivers of Montana's economic landscape.

The energy and mining sectors have experienced even more volatility than normal, particularly in oil and gas and metal mining due to fluctuating global prices and evolving regulations. While oil and gas remain important, it constitutes a smaller portion of Montana's overall energy production. Recently, the state has seen a small shift toward biofuels, natural gas, as well as renewable energy projects like wind and solar, reflecting broader trends in energy diversification.

Metal mining remains a cornerstone of Montana's economy, producing key metals such as copper, gold, palladium, and platinum. However, in 2024, prices for palladium and platinum dropped due to increased production from Russia,

straining Montana’s mining operations. Despite these challenges, domestic demand for metals is expected to rise due to their use in green energy and advanced computing technologies.

Montana’s agriculture and forestry sectors have faced their own challenges with price volatility, trade uncertainties, and climate impacts such as flash flooding and drought. While traditional products like wheat, barley, cattle, and hay remain significant, there is increasing focus on diversifying crops and improving resource management. Forestry has been particularly hard-hit, with increased competition from Canada and the Southern U.S. leading to the closure of some related wood products manufacturing facilities.

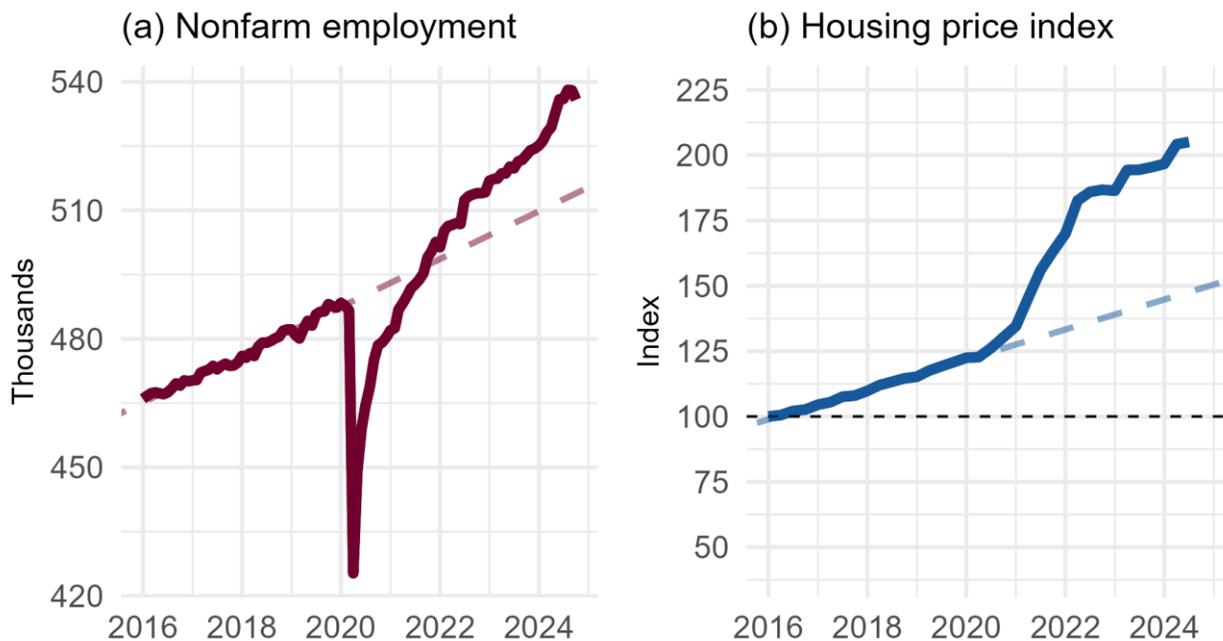
The Manufacturing sector has demonstrated steady growth, with particularly strong performance in transportation equipment, nonmetallic minerals, and both primary and fabricated metal products. Transportation equipment, for instance, has grown at an impressive annual rate of 8.9%, fueled by robust domestic demand and expanding export opportunities. Although the sector’s contribution to Montana’s GDP declined from \$3.2 billion in 2018 to \$2.5 billion in 2023, its widespread presence across the state underscores its critical role in driving economic diversification. Manufacturing ranks as the 7th-fastest-growing sector out of Montana’s 10 growing industries, with an average annual growth rate of 1%. Since 2018, the sector has added approximately 1,300 jobs, reflecting its ongoing importance to the state’s economic growth.

The two fastest-growing sectors since 2018 are Construction and Professional and Technical Services, with 10,300 employees added in Construction, and about 10,000 in Professional and Technical Services. Construction employment growth has been driven by increased net migration and business investment in Montana, and in turn, will continue to drive further economic expansion. This cycle of growth serves as both a signal of the state’s development and a catalyst for sustained business activity and population inflows.

However, Montana’s population growth and demographic changes have also impacted its economy in other ways. The state has seen a steady increase in population, driven primarily from an influx of new residents. Demographic challenges such as an aging population and the need for a more diversified workforce remain pressing issues. Efforts to address these challenges include initiatives to attract younger and more skilled workers, improve educational opportunities, and enhance health care services, ensuring that Montana can support its growing and changing population while maintaining its growth.

Montana’s positive net migration has led to increased pressure on housing and infrastructure, with rising demand driving up home prices and straining local resources. Despite these concerns, migration has introduced some skilled labor, contributing to productivity growth and attracting new businesses. However, labor shortages remain in key industries like construction, health care, and hospitality, as new residents do not necessarily align with the sectors facing the highest demand.

Figure 0.16 Montana Employment and Housing Price Index



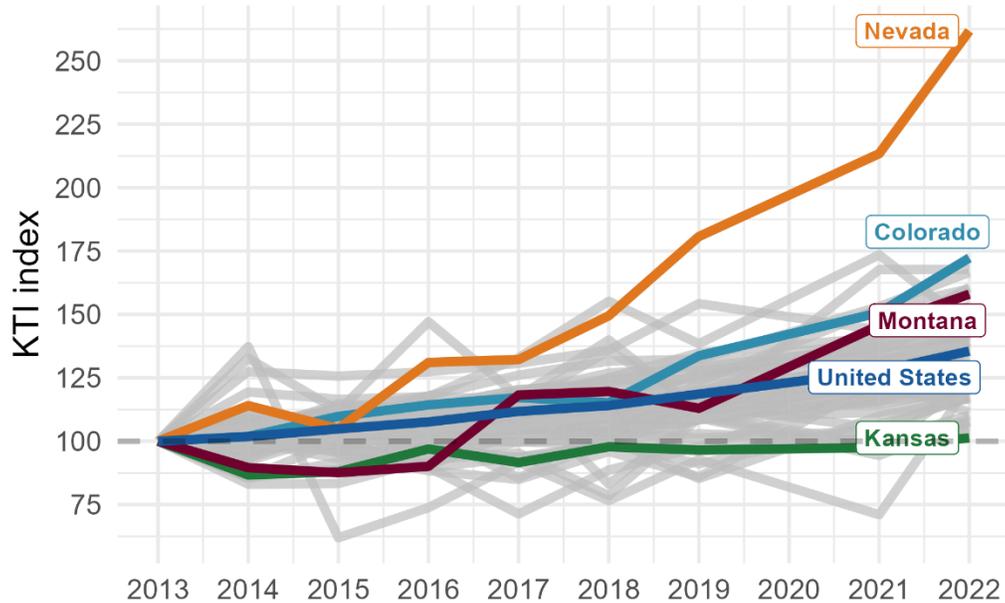
Note: Dashed line is pre-Covid trend, Index 2016Q1 = 100,

(Bureau of Labor Statistics and U.S. Federal Housing Finance Agency)

As shown in Figure 2.16, comparing nonfarm employment growth, Montana’s economy has expanded significantly following the COVID-19 recovery. However, this has contributed to home prices more than doubling since 2016, worsening an already acute housing crisis. Rising housing costs have limited accessibility for many residents and further exacerbated labor shortages in sectors essential to the state's continued success. The existing jobs to skills mismatch will continue to complicate Montana’s transition from a goods-based economy to one increasingly reliant on services, despite the long-term potential for diversification.

Montana’s economic transition is also evident in the growth of Knowledge and Technology Intensive (KTI) employment. Since 2013, Montana has seen a 57% increase in KTI industry employees, ranking eighth overall in total KTI growth. This trend is part of a broader regional shift, with Mountain West states leading the nation in KTI employment expansion. Nevada and Colorado have experienced the most significant increases over the past decade, as shown in Figure 2.17, followed closely by Wyoming, Utah, and Idaho, all ranking within the top five.

Figure 0.17 Knowledge and Technology Intensive (KTI) Industry Employment, Index 2013 = 100



(National Science Board, National Science Foundation)

Montana's economy is experiencing a dynamic transformation, marked by growth in both established sectors like construction as well as rapid growth in industries requiring skilled labor and technology. Net migration and rising business investment have been key drivers of this growth, yet challenges remain, including housing shortages, labor mismatches, and an aging population. The increase in KTI employment underscores the state's potential for economic diversification, placing it among the top performers in the Mountain West. As Montana navigates these challenges, efforts to attract skilled workers and address infrastructure needs will be critical to maintaining its recent economic success.

Base Industries

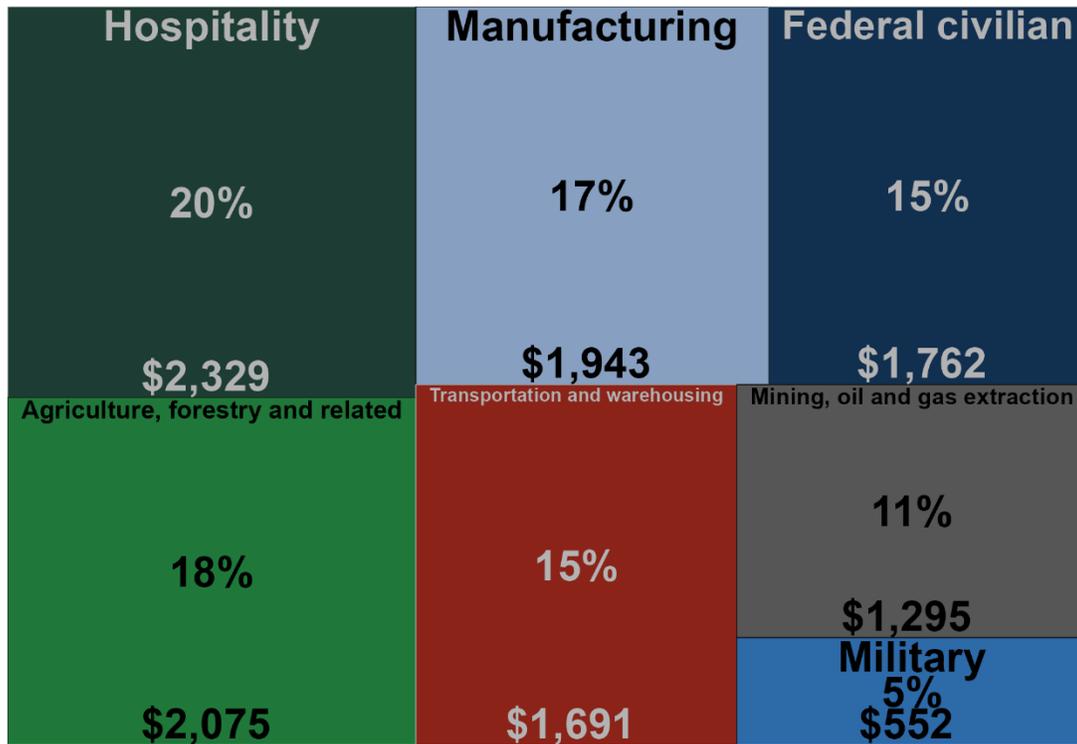
Trends in Montana's economy are primarily shaped by its base industries, which are industries that generate revenue by selling goods and services outside the state or are significantly influenced by factors beyond Montana’s borders. These base industries are crucial to Montana's economic development because they inject new funds into the local economy, creating income, jobs, and additional demand for local services. Manufacturing, as one of these key base industries, plays a pivotal role in driving both state and regional economic growth.

To accurately quantify the impact of these base industries, we turn to labor earnings data, which provides a stable and insightful measure of each sector’s economic contribution over time. Unlike other indicators such as employment numbers, which may fluctuate due to seasonal trends or business cycles, labor earnings data captures the enduring economic footprint of base industries. This stability makes labor earnings an ideal metric for assessing long-term trends in Montana's economic structure. By analyzing labor earnings, we can better understand the evolution of base industries like manufacturing and their ongoing significance to Montana’s economy.

Since the end of the Great Recession, the composition of Montana’s base industries has undergone several shifts. Historically, agriculture and hospitality have been leading sectors in terms of base earnings. However, since 2016, the hospitality industry has consistently expanded its share of base earnings, becoming the largest base sector in the

state by 2023. Manufacturing, although behind hospitality and agriculture in terms of total base earnings, remains a vital contributor to Montana’s economy, ranking as the 3rd-largest base sector in 2023, shown in Figure 2.18.

Figure 0.18 Share of base earnings, million \$ in Montana, 2023



(Bureau of Economic Analysis, BBER Analysis)

Manufacturing has long been a fundamental driver of Montana’s economic vitality, contributing significantly to both job creation and income generation. As a key base industry, manufacturing plays a unique role in the state’s economy by producing goods that reach beyond Montana’s borders, including petroleum and coal products, lumber, medical products, processed foods, and increasingly advanced manufacturing products. These goods not only serve local needs but also meet national and international demand, bringing vital external income into the state.

This external income is critical, as it fuels local economic growth. When manufacturing products are sold outside of Montana, the revenue flows back into the state, where it supports wages, investments, and additional business opportunities. These benefits ripple throughout the economy, creating demand in other sectors such as transportation, hospitality, and professional services. The interconnectedness of manufacturing with the broader economic landscape is vital to sustaining both urban and rural communities across Montana, supporting everything from large-scale industrial operations to small local businesses.

In recent years, Montana’s manufacturing sector has demonstrated resilience and adaptability in the face of global supply chain disruptions, technological changes, and shifting trade policies. At the same time, the industry has capitalized on new opportunities, such as advancements in automation, renewable energy, and the rise of niche, high-quality products that appeal to both national and international markets.

Despite the evolving global landscape, the manufacturing industry remains a cornerstone of Montana’s economy, deeply embedded within its local communities. However, Montana’s manufacturing landscape is not uniform across the state. Each region – from the Missouri River agricultural-based sectors to the advanced manufacturing hubs in the Southwestern region – offers unique contributions, challenges, and growth opportunities. Understanding the role of manufacturing across these different regions, its major products, and the opportunities and challenges they face is crucial to appreciating the full scope of everything made in Montana.

Manufacturing in Montana

Montana's manufacturing sector has long been shaped by its natural resources, which have historically driven the state's economy. Early manufacturing in Montana centered around industries that processed raw materials: timber, agriculture, and mining. The state's forests made timber one of the earliest and most significant contributors to manufacturing, with sawmills and paper mills transforming logs into wood products, furniture, and paper.

Similarly, Montana's large agricultural base fostered the growth of agricultural processing, particularly in grain milling, food processing, and livestock industries, which continue to support food and beverage manufacturing today. Metal, nonmetallic mineral, and petroleum and coal product production were other foundational industries, with the extraction and processing of minerals like copper, coal, and palladium playing a central role. Mining operations spurred the development of fabricated metal manufacturing and associated refining industries, turning raw minerals or recycled metals into valuable products.

Figure 3.1 highlights the continued dominance of natural resource-based manufacturing in Montana, despite only tracing back to 1997. The figure illustrates how industries dependent on natural resources, such as wood, agriculture, minerals, and energy, have consistently contributed the largest share of the state's manufacturing GDP. The Petroleum and Coal Products sectors, while volatile due to fluctuating energy and commodity prices, continue to represent a significant portion of manufacturing output for the state.

Figure 0.1 Manufacturing Real GDP (millions of \$) by Industry Category, 1997 to 2023

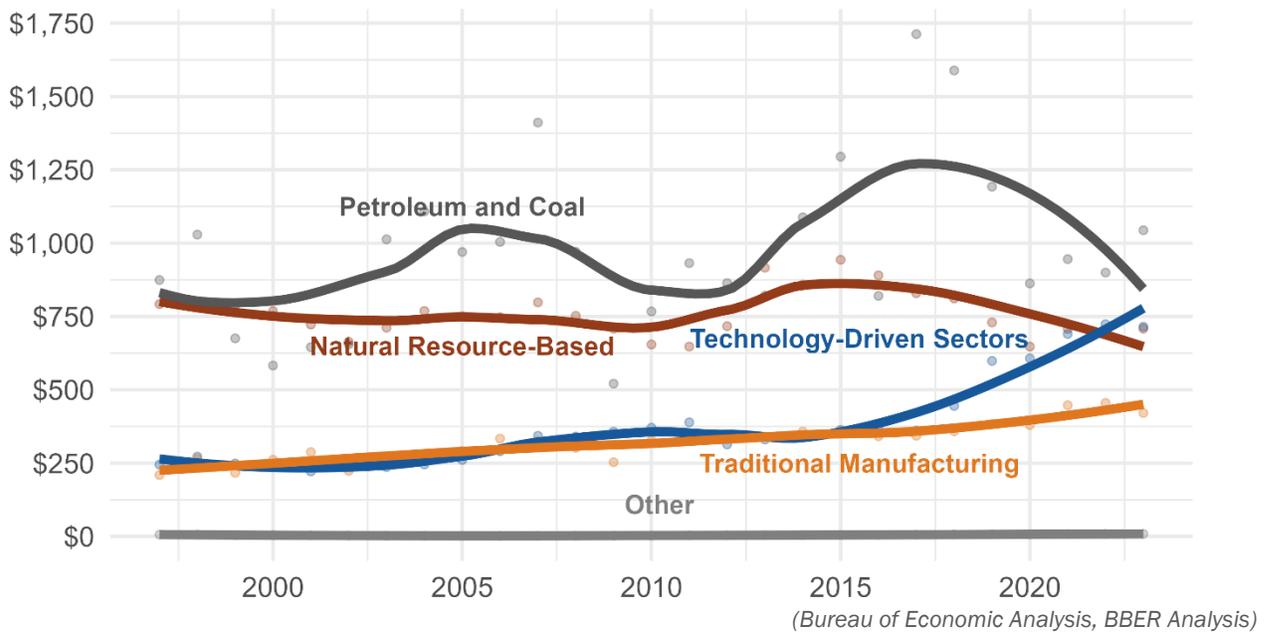


Figure 3.1 also shows that while Montana's manufacturing base is still primarily based on natural resource processing, it has gradually diversified into more stable manufacturing sectors. Traditional manufacturing, like primary metal processing and machinery, has shown steady growth and produces more consistent output year after year, as evidenced by the fitted orange line closely tracking observed production, points in the figure.

Over the past decade, Montana has experienced a shift toward more complex manufacturing and technology-driven products. For the two most recent observations, these sectors now exceed natural resource-based industries, excluding petroleum and coal. The overall growth in manufacturing output is increasingly being driven by emerging firms in more specialized advanced technology sectors.

Montana's manufacturing output is about 35% larger than it was in 2010, compared with 18% in the US.

Among the most prominent technology-driven manufacturing sectors is miscellaneous manufacturing, which encompasses a range of small-scale or niche industries, such as sporting goods, toys, and medical products. This

category also includes handmade items, reflecting the growth of “Maker” and “Made in Montana” products, ranging from dishware to jewelry sold in local businesses and craft fairs across the state.

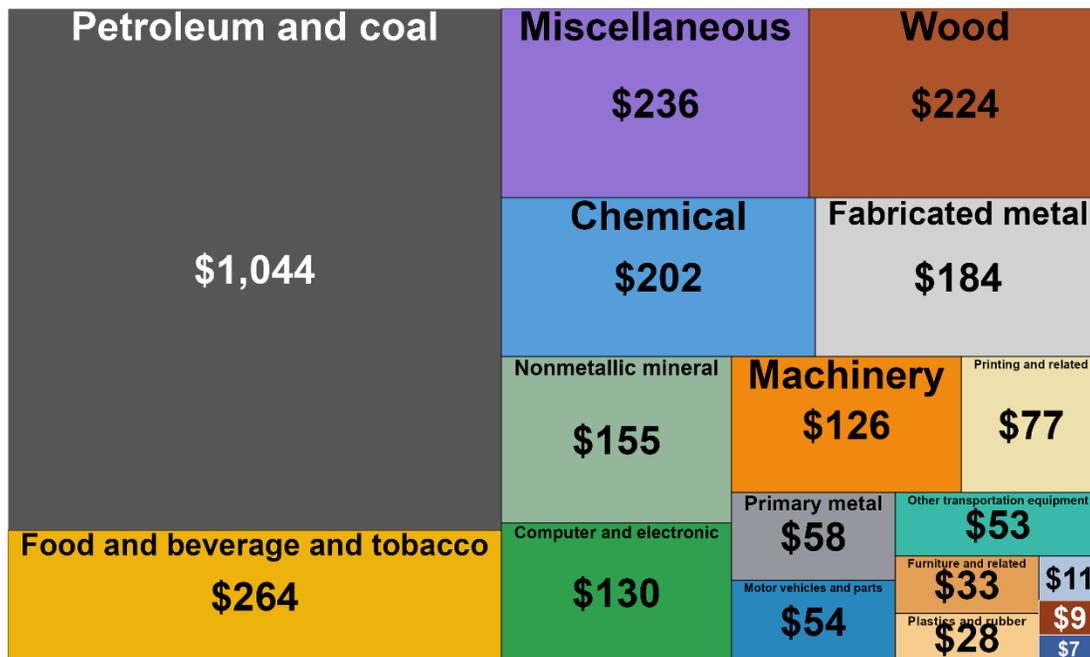
Sporting goods manufacturing has also emerged as a small but growing sector, likely fueled by Montana’s strong tourism and recreation industries. Like natural resource-based manufacturing, this sector is geographically tied to natural amenities and fills the demand for recreational products enjoyed by both residents and visitors.

However, the largest growth areas within the technology-driven sector over the past decade are medical and pharmaceutical manufacturing, nested within the miscellaneous and chemical manufacturing subsectors. These industries are closely tied to the broader medical and biotechnology sectors, which continue to gain prominence, but concentrate in more urbanized centers such as Missoula, Hamilton, Kalispell, Bozeman, and Billings. Another growing sector is computer and electronic products, which experienced substantial growth over the same period.

The most recent addition to Montana’s technology-driven manufacturing landscape is the transportation sector, which includes motor vehicles and parts as well as aerospace components manufacturing. While possibly still in its early development, these industries have entered the top 5 in Montana’s international export sectors, particularly the manufacture of aerospace components, a major U.S. export, highlighting a growing connection between Montana’s manufacturing sector and the demands of the global economy.

Figure 3.2 provides a snapshot of the composition of Montana’s manufacturing GDP by subsector in 2023, showing the dominant role of petroleum, coal, food, beverage, wood, metals, and minerals while also illustrating the diversity and scale of various products manufactured in the state.

Figure 0.2 Composition of Montana’s Real GDP (millions of \$), Manufacturing in 2023

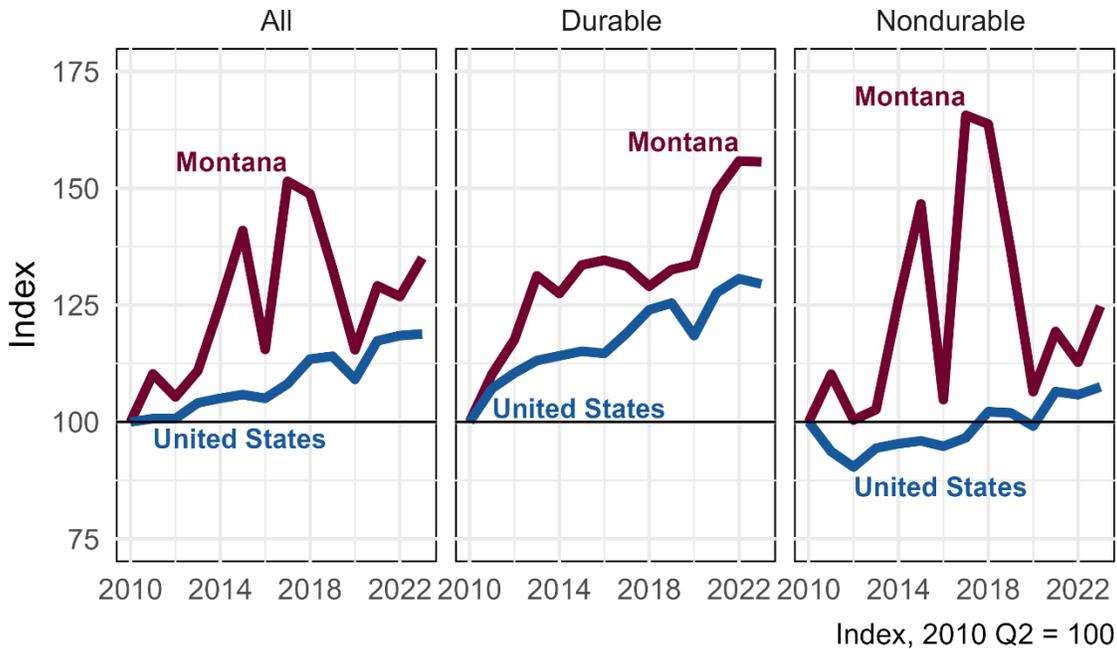


(Bureau of Economic Analysis)

Montana's manufacturing sector has experienced notable growth relative to national trends. Figure 3.3 illustrates an index of manufacturing production in Montana compared to the U.S. from 2010 onward. Between 2010 and 2013, Montana’s manufacturing output closely followed the national average. However, after 2013, Montana’s output accelerated, particularly in its durable goods sector, which includes both traditional industries like metal fabrication and machinery, as well as emerging technology-driven sectors such as electronics and advanced machinery. Additionally, Montana’s nondurable manufacturing sector, including industries such as food and beverage and chemical production, demonstrated growth even as the national nondurable sector stagnated or contracted between 2010 and 2020.

While some of Montana's rapid growth and stability could be attributed to the state's smaller manufacturing base catching up with national trends, Figure 3.3 highlights that Montana’s unique mix of industries has consistently demonstrated both stability and expansion. The state’s ability to sustain growth during periods of national contraction reflects the diversification within its manufacturing sector, which continues to benefit from a combination of resource-based industries and advanced manufacturing capabilities.

Figure 0.3 Trends in U.S. and Montana Manufacturing Output, Real GDP



(Bureau of Economic Analysis)

Challenges Facing Montana's Manufacturing Sector

Montana's manufacturing sector faces a unique set of challenges that vary between its durable and nondurable manufacturing sectors. These challenges, while overlapping in some areas, affect each sector differently based on the specific demands of their production processes and market conditions.

Supply chain disruptions have impacted both durable and nondurable manufacturing, but the challenges differ in scope and scale. For durable manufacturing, disruptions in global supply chains, especially for electronic components and specialized materials, can severely impact production timelines and costs. The reliance on imported goods for advanced manufacturing processes makes these sectors particularly vulnerable to international supply chain volatility. Nondurable manufacturers, such as those in the food and beverage industry, have also faced challenges, primarily in sourcing packaging materials and ensuring the steady supply of agricultural inputs. However, their reliance on local agricultural production helps mitigate some of the global supply chain issues that affect more technologically advanced sectors.

Labor shortages continue to be a critical issue across the state, especially for the durable manufacturing sector, which includes both traditional and advanced products. These sectors demand a highly skilled and technically proficient workforce, yet the available labor pool in Montana often lacks the skills needed for these industries. The state's rural geography and relatively smaller workforce exacerbate this issue, making it difficult for manufacturers to attract and retain workers with the necessary expertise. Nondurable manufacturing sectors, such as food processing and beverage production, face less stringent technical requirements but still experience labor shortages, particularly in more rural regions of the state where the relatively older population increasingly limits the availability of active or able workers.

Geographic isolation poses a significant challenge for both durable and nondurable manufacturing sectors. For durable manufacturing, which often relies on national and international markets, the state's distance from major distribution hubs increases transportation costs and limits access to key supply routes. This geographic barrier makes it more expensive to ship goods and materials in and out of the state, which can diminish competitiveness on a national scale. Nondurable manufacturers, especially those dependent on local resources like agriculture, also face logistical challenges, though they are somewhat cushioned by proximity to their raw material sources. However, accessing larger markets beyond the state remains costly, particularly for smaller-scale producers.

Capital availability is another significant challenge facing Montana's manufacturing sector, particularly for smaller manufacturers. Montana's manufacturing firms tend to be smaller compared to those in more populated regions of the country. This smaller size makes them more sensitive to changes in interest rates, as even slight increases can significantly impact their ability to borrow or secure financing for operational needs or advanced technology. Additionally, while smaller manufacturers may be more agile and willing to adopt new technologies to improve

productivity and competitiveness, their ability to invest in such advancements is often constrained by limited access to capital. Securing the necessary funds for large-scale technological upgrades, automation, or equipment can be difficult, especially in the short term, as lenders may view smaller manufacturers as higher-risk borrowers. These constraints can slow the pace of modernization, limiting the ability of some Montanan manufacturers to remain competitive in a rapidly evolving industrial landscape.

These challenges highlight some of the key obstacles facing Montana's manufacturing sector, but they are by no means exhaustive. Manufacturers must contend with various other issues while striving to remain competitive in an increasingly globalized market. Factors such as broader market competition, regulatory and fiscal constraints, and environmental concerns also play important roles in shaping the sector's future. The forthcoming regional economic analysis will provide a more detailed examination of how these and other challenges manifest differently across Montana's diverse regions, offering insights into region-specific challenges and opportunities.

2.1 Regional Economic Analysis

Conducting a regional analysis of Montana's manufacturing sector is essential to understanding how manufacturing is geographically distributed and what factors influence their location and their success. Natural resource-based and traditional manufacturing sectors are primarily driven by their proximity to raw materials. These industries depend on the efficient extraction, processing, and transport of raw materials, making their proximity to supply chain critical for cost-effectiveness and competitiveness. While workforce challenges pervade all sectors of the economy, these industries tend to have lower skills required from their workforce.

In contrast, technology-driven sectors, including computer and electronics manufacturing, transportation equipment, and advanced machinery – are less dependent on the location of raw materials and more on the availability of a skilled and educated workforce. These sectors also prioritize access to major transportation routes for efficient supply chain integration.

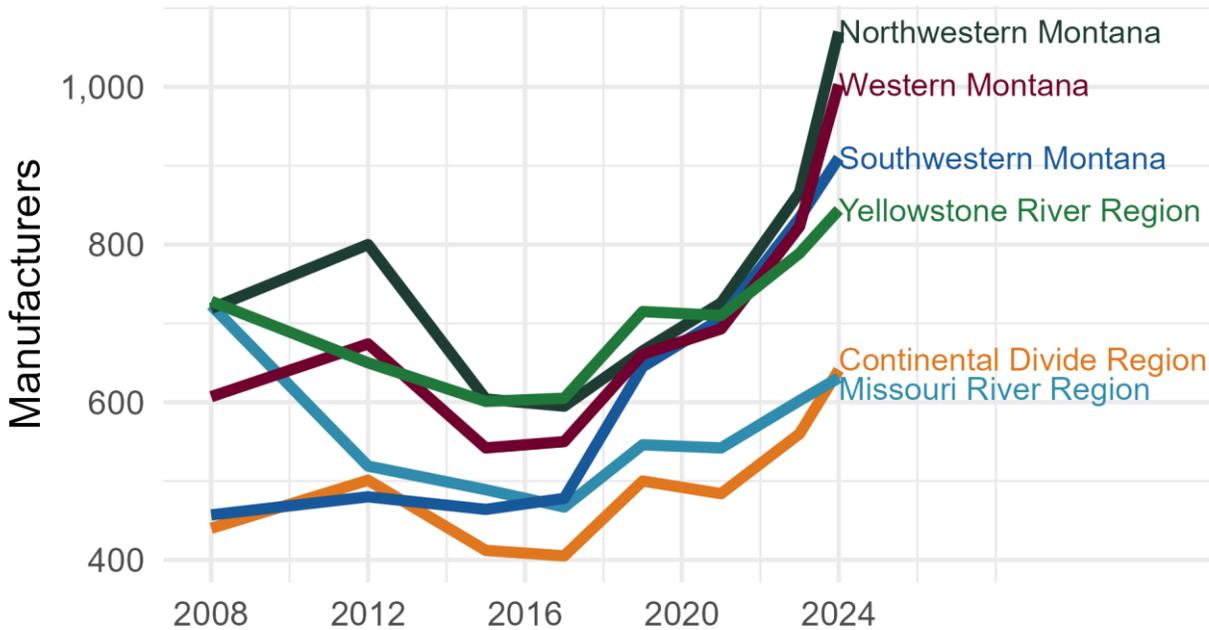
Each region in Montana's manufacturing sector faces a unique mix of challenges and opportunities that influence its overall contribution to the local economy. While access to resources keeps production costs lower, these industries are highly vulnerable to global commodity price fluctuations, environmental regulations, and natural disasters like flooding or drought. Furthermore, these industries must overcome the challenge of recruiting workers in sparsely populated areas.

In contrast, regions with access to universities and the ability to attract skilled labor have developed into hubs for technology-driven manufacturing, offering significant growth opportunities in advanced sectors. However, these regions face growing workforce challenges related to aging populations, housing shortages, and increasing domestic and global competition. These regional dynamics collectively shape the success or difficulties of manufacturing in each area, impacting their long-term contribution to local economies.

Within the state, the number of manufacturing establishments varies tremendously across the state's 56 counties, as the data from Dunn & Bradstreet Hoovers presented for the year 2024 in Figure 3.4 show. Gallatin County has the most manufacturing establishments (803), followed by Flathead (764), Missoula (687), and Yellowstone (599). Every county in the state except Petroleum County had at least one manufacturing establishment in 2024.

One way to look at the growth of manufacturing is to look at the number of establishments within the manufacturing sector over time regardless of size or composition. Figure 3.5 depicts the significant loss of manufacturers in Montana following the Great Recession, followed by a rapid recovery beginning in 2016. By 2020, most regions had either reached or surpassed their 2008 levels of manufacturing establishments.

Figure 0.5 Count of Manufacturers by Region, 2008 to 2024



(Dunn & Bradstreet, MMEC)

The Missouri River Region remains the only region that has not reached its prerecession levels. This period coincides with two major trends, the first of which is net out migration, either caused by, or causing, the economic decline of some of its communities. While Montana overall has seen a net in migration, communities such as Great Falls, Havre, and Glendive have seen much of their workforce leave over the past decade. Sidney’s population, while growing, has not been as robust in part due to the ripple effects that declining Bakken oil production is having on the region.

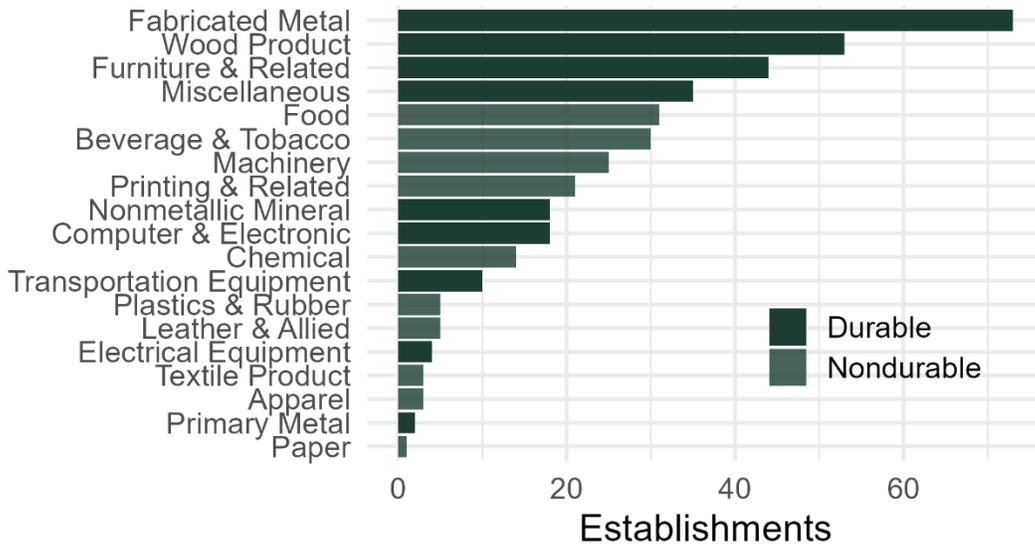
The following section will provide a more detailed analysis of each region, focusing on the number of establishments, employees, and earnings within each manufacturing subsector using data from the Bureau of Labor Statistics and the Montana Department of Labor and Industry’s Quarterly Census of Employment and Wages (QCEW). The QCEW primarily captures data from larger, more formal establishments that report under state unemployment insurance laws. By contrast, data from Dunn & Bradstreet includes a wider variety of business types, including small workshops and sole proprietors, which leads to a higher count of manufacturers in the D&B estimates, shown in Figure 3.5 above.

Nevertheless, the QCEW data provides a valuable long-term view of overall trends and the scale of manufacturing within each region and subsector. The section will also discuss unique challenges, potential opportunities, and emerging industries across Montana’s different manufacturing regions.

Northwestern Region

Northwestern Montana is characterized by its natural resource-based manufacturing, with a strong emphasis on wood products and fabricated metal industries. The region’s rich forest resources make it a center for timber-related activities, including sawmills, wood products, and furniture manufacturing. Additionally, fabricated metal production supports the growing construction and machinery sectors, but also contains Flathead County’s notable firearms industry. Manufacturing activity in the computer and electronic sectors have also begun to play a more significant role in the region.

Figure 0.6 Manufacturing Establishments by Industry, Northwestern Region, Montana, 2023



There are more than 70 manufacturing establishments in the six-county Northwest region of the state that are in Fabricated Metals, a classification which includes small arms and small arms ordnance manufacturers, as shown in Figure 3.6. Also prevalent are wood products, furniture, and miscellaneous manufacturing establishments. The latter includes a broad spectrum of health care, scientific, sporting goods, and other consumer good manufacturing.

In terms of employment counts and total wages, however, it is wood products and machinery manufacturing industries that dominate the mix of manufacturing in the Northwestern region, as shown in Figures 3.6 and 3.7. In machinery manufacturing, this reflects the presence of Applied Materials, a larger manufacturer of semiconductor manufacturing equipment with an important presence in Flathead Valley. Food processing and beverage manufacturing industry employers rank highly in terms of employment among manufacturing industries in the region.

Figure 0.7 Manufacturing Employees by Industry, Northwestern Region, Montana, 2023

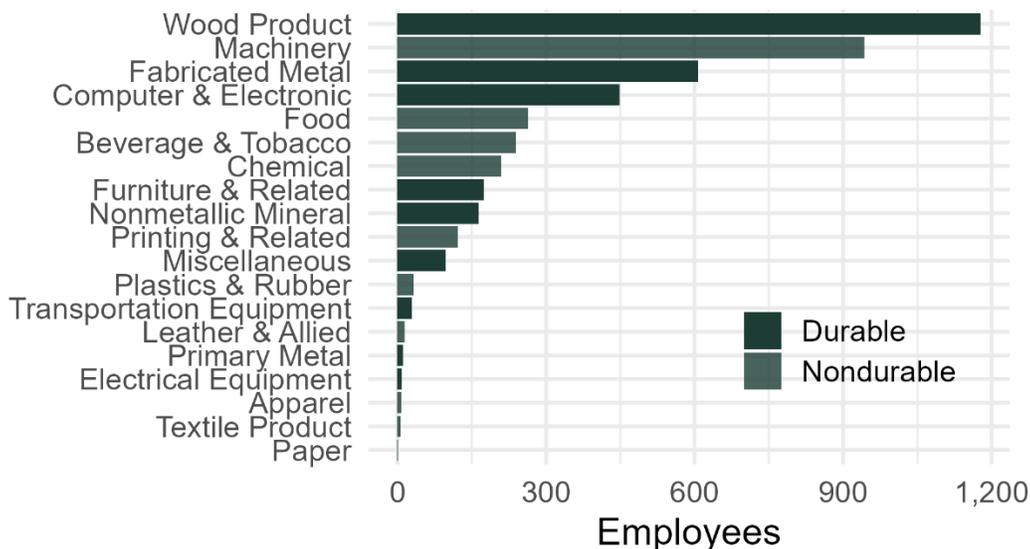
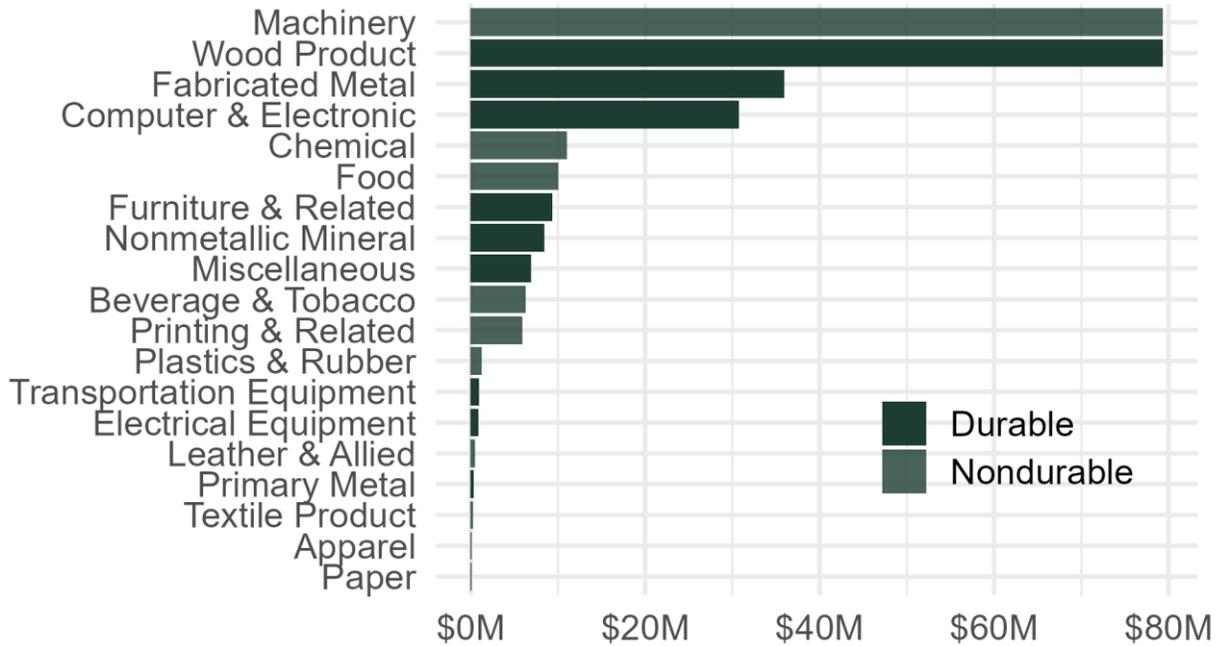


Figure 0.8 Manufacturing Total Wages by Industry, Northwestern Region, Montana, 2023



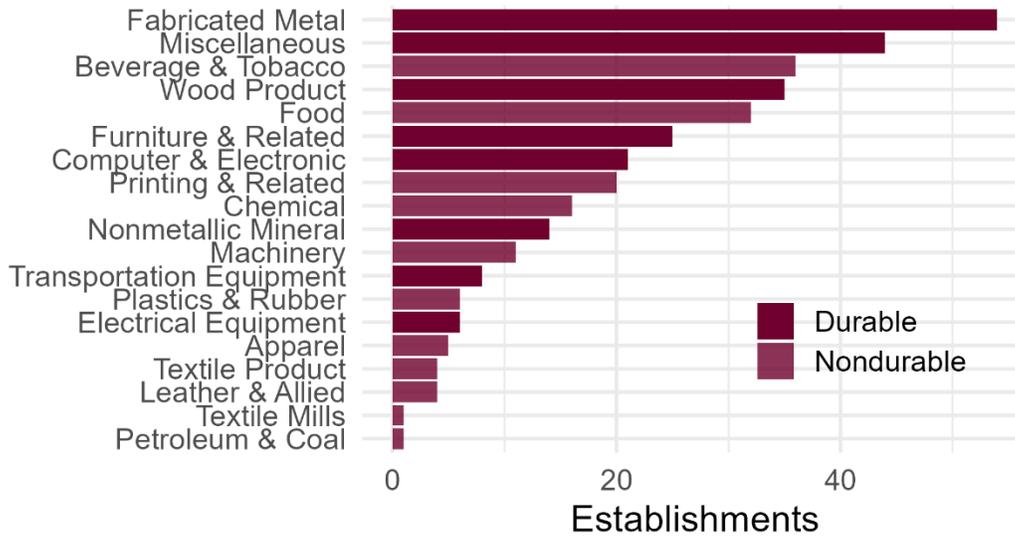
The region’s manufacturing mix reflects a variety of trends and events that have taken individual industries along different paths. The long-running challenges for the wood products industries in the western U.S. overall have clearly been felt in the region, and sawmill capacity reductions have continued to erode the share of the region’s manufacturing jobs in wood-related industries. On the other hand, growth in tech-related manufacturing has been strong, both from new and existing companies. The area continues to enjoy unique opportunities from its proximity to Canada as well.

The Northwestern region has been seriously challenged by labor force availability and housing costs, which have affected the ability to expand. Flathead County has recorded one of the highest rates of net domestic immigration in the region in recent years. This has put pressure on the housing stock which, in turn, has pushed housing prices and rents up and complicated efforts of regional manufacturing employers to recruit and fill open positions.

Western Region

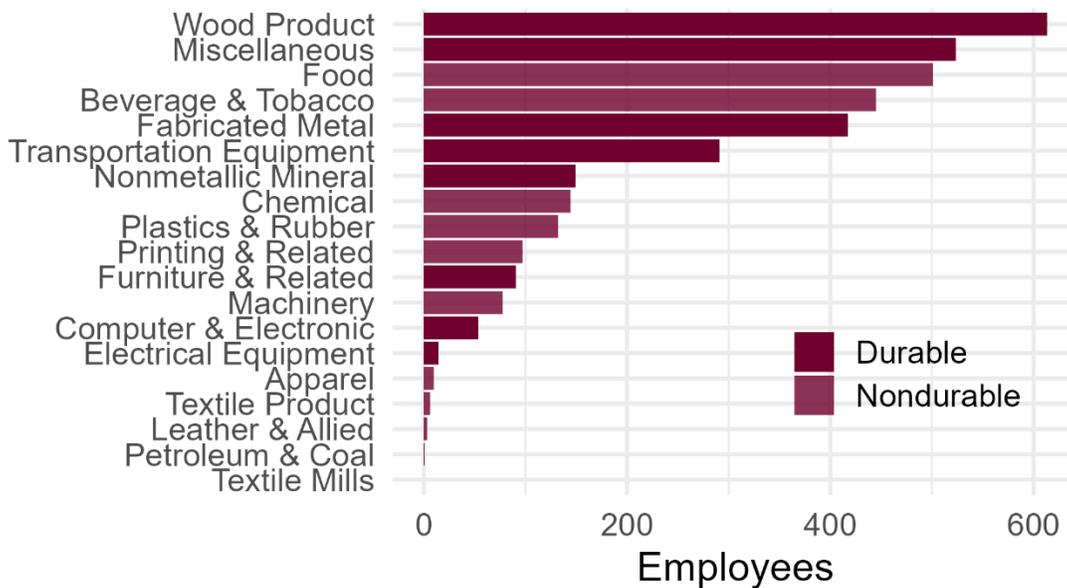
The three-county Western Region shares some of the same history and natural resources as the neighboring region to the north – especially for the wood products industry. There are important differences as well. Missoula is home to one of the state’s two larger universities, and much of the tech-related development that shows up in manufacturing activity has either a direct or indirect university connection. There is a strong history of pharmaceutical and medical related manufacturing in Ravalli County that stands apart from other regions as well. These manufacturers are mostly nested within the miscellaneous manufacturing sector show in Figure 3.9.

Figure 0.9 Manufacturing Establishments by Industry, Western Region, Montana, 2023



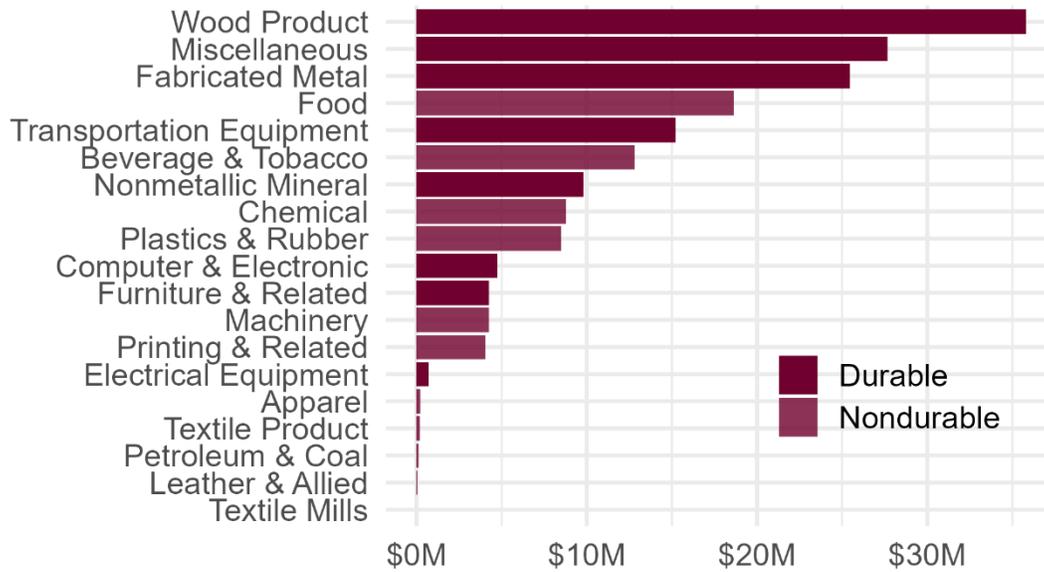
As in other parts of the state, the number of manufacturing business establishments classified in fabricated metals industries ranks highly in Western Montana, although the average size of the 73 businesses is relatively small. The smaller number of wood products manufacturers accounted for over 600 jobs in 2023 in the region, as shown in Figures 3.8, 3.9, and 3.10. Accounting for about \$28 million in total wages, as well as about 520 employees, the region’s 44 miscellaneous manufacturing establishments have an outsized share of the regional manufacturing base. Included in this category are the companies manufacturing medical-related items, including vaccine products and medical supplies.

Figure 0.10 Manufacturing Employees by Industry, Western Region, Montana, 2023



There has been considerable growth in the region’s food and beverage manufacturing in recent years as well. There are several breweries that have a presence in markets both inside and outside of Montana, located in Missoula. There is also considerable interest in small-scale, farm-to-table manufacturing of food products, with an emphasis on those adopting sustainable manufacturing practices.

Figure 0.11 Manufacturing Total Wages by Industry, Western Region, Montana, 2023



Recent negative developments in two of the largest wood products facilities in Missoula County will change these detailed industry profiles going forward. Pyramid Lumber in Seeley Lake ended 75 years of mill production in the summer of 2024, while Roseburg’s particle board facility also closed mid-year. Between the two facilities, more than 250 manufacturing jobs were lost. Reasons for the closures varied, but high on the list of factors were labor shortages, housing affordability, and profitability challenges.

Continental Divide Region

This mountainous, nine-county region in the southwestern corner of Montana is home to a diverse mix of world-class recreation, agriculture and forestry activities, and mining operations. The latter are part of the rich history of communities like Butte and Anaconda – the 2nd-largest mining operation in Montana still operates in Butte. Two urban areas – Butte and Helena, the state capital – are in the region. Both have enjoyed modest growth in high-tech activities in recent years, including manufacturing, partly due to their lower costs of living in comparison to other urban areas in the western third of the state.

The wider geography of the region helps to produce a manufacturing mix that is more diverse. In terms of employment and total wages, nonmetallic product manufacturing ranks the highest, as shown in Figures 3.12 and 3.13. This category includes glass, concrete, and other processing of stone, clay, and other products. There is also a larger footprint of transportation equipment manufacturing in the region than in other parts of the state, which the presence of Boeing’s facility in the Helena region helps to support.

Figure 0.12 Manufacturing Establishments by Industry, Continental Divide Region, Montana, 2023

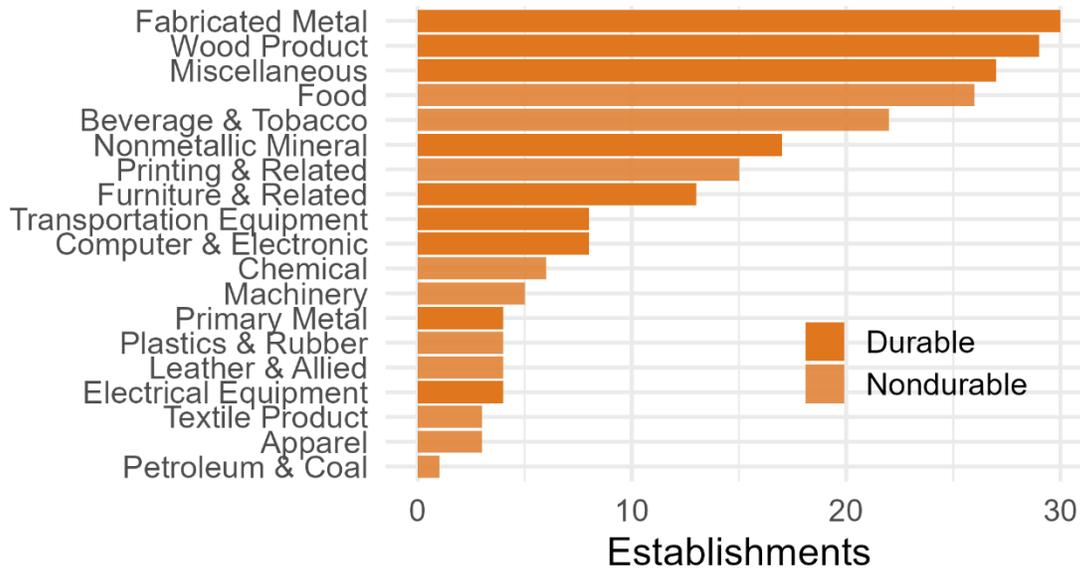


Figure 0.13 Manufacturing Employees by Industry, Continental Divide Region, Montana, 2023

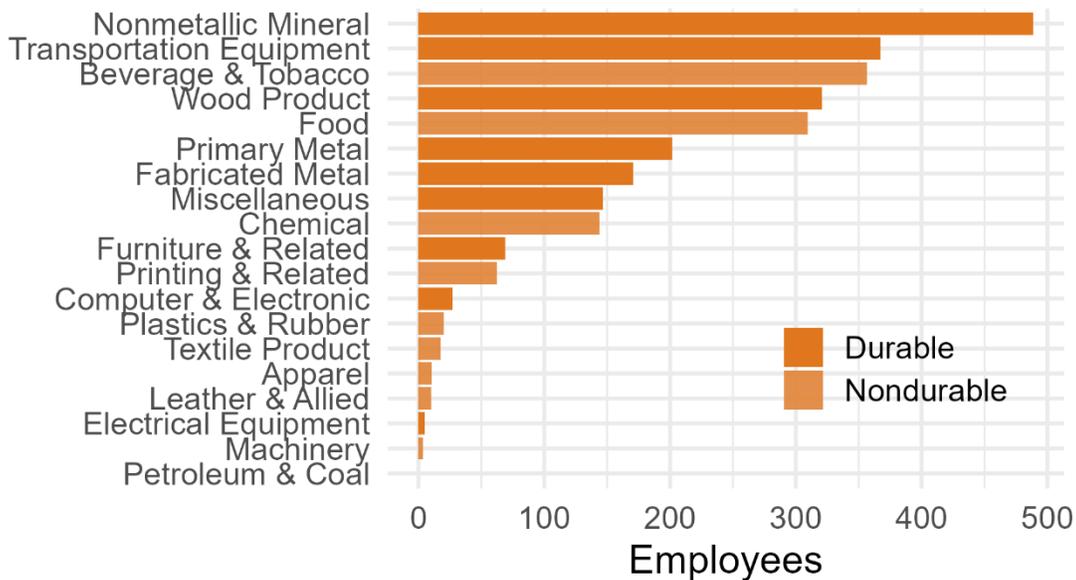
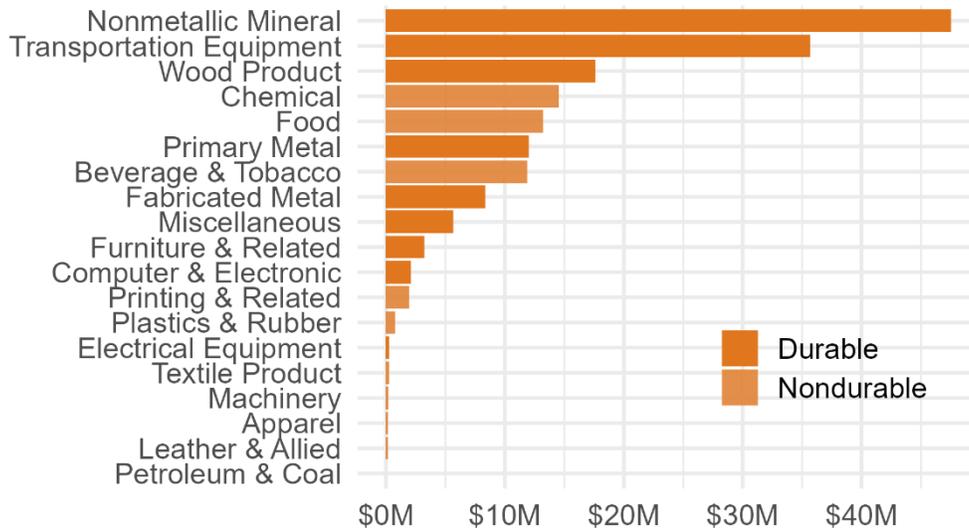


Figure 0.14 Manufacturing Total Wages by Industry, Continental Divide Region, Montana, 2023



Other key pieces of the manufacturing economy in the Continental Divide Region are similar to western Montana regions. Wood products manufacturing, food, beverages, and fabricated metals manufacturers are prominent. In the business establishment counts, shown in Figure 3.12, many smaller establishments in manufacturing fabricated metal products are found in the region as well.

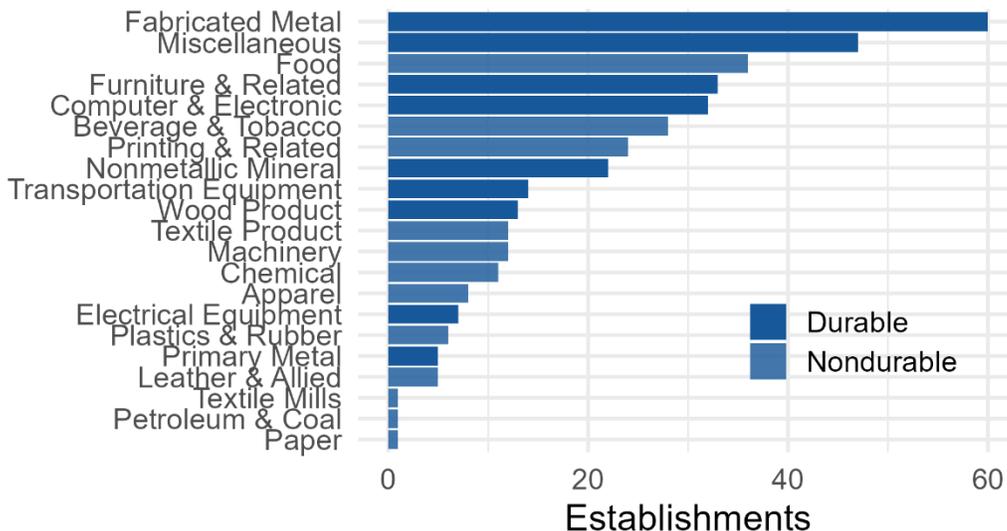
Recent years have seen some growth and diversification of the manufacturing mix in the region, while manufacturing activities linked to extractive and visitor-related industries remain prominent, and extension to products related to renewable energy technology is underway. A key challenge that is shared with other regions of the state is the need to upscale the skills of the workforce to speed the adoption of newer manufacturing technologies and new products.

Southwestern Region

One of the most vibrant and diverse manufacturing regions in the state is the two-county Southwestern Region. Embedded into the landscape of the fastest-growing region of the state, the region’s manufacturing mix tilts toward technology-related products, especially in photonics, sensors, and agriculture-related technology. Gallatin County has grown to become the 2nd-largest economy in the state, only slightly smaller than Yellowstone County to the east.

One of the drivers of that growth has been spinoffs and synergies with research conducted at Montana State University in Bozeman, home to the state’s largest engineering school. The state’s recent designation as a Tech Hub by the U.S. Economic Development Administration holds the promise of greater development of these valuable collaborations.

Figure 0.15 Manufacturing Establishments by Industry, Southwestern Region, Montana, 2023



In terms of employment and total wages, the diverse miscellaneous manufacturing classification ranks highest in the region, as shown in Figure 3.15 and 3.16. This category includes the manufacturing of medical supplies and

instruments, as well as sporting and athletic goods production. The latter reflects the presence of Simms Fishing Products, a well-known producer of sporting equipment and apparel. The largest number of manufacturing establishments in the region are in fabricated metals. Computers and electronics also have an important presence in the region's manufacturing base.

Figure 0.16 Manufacturing Employees by Industry, Southwestern Region, Montana, 2023

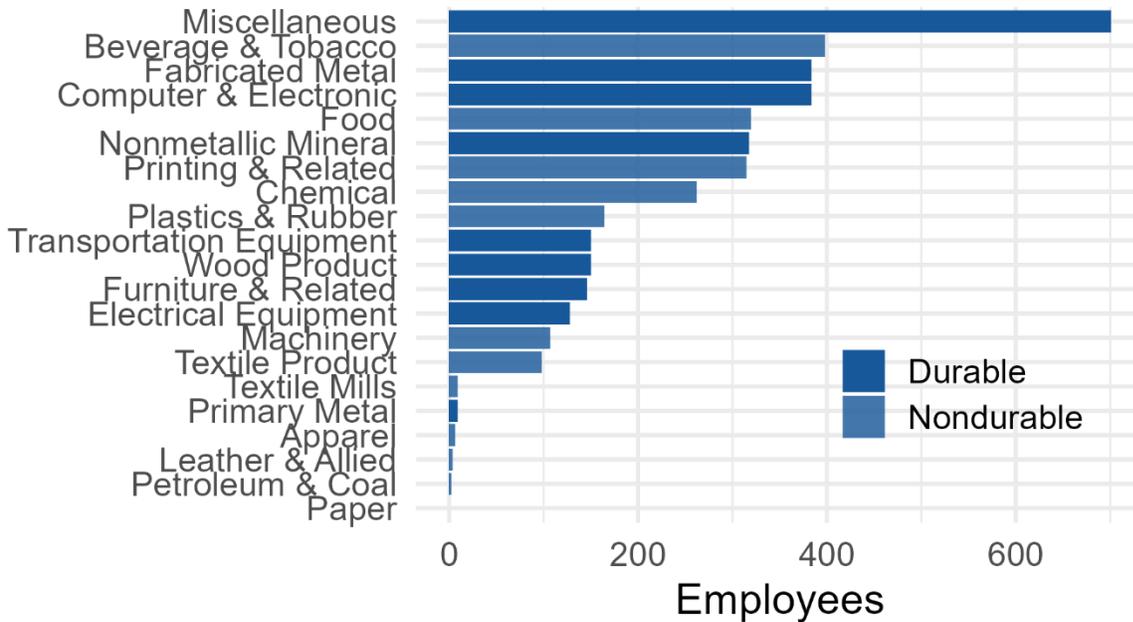
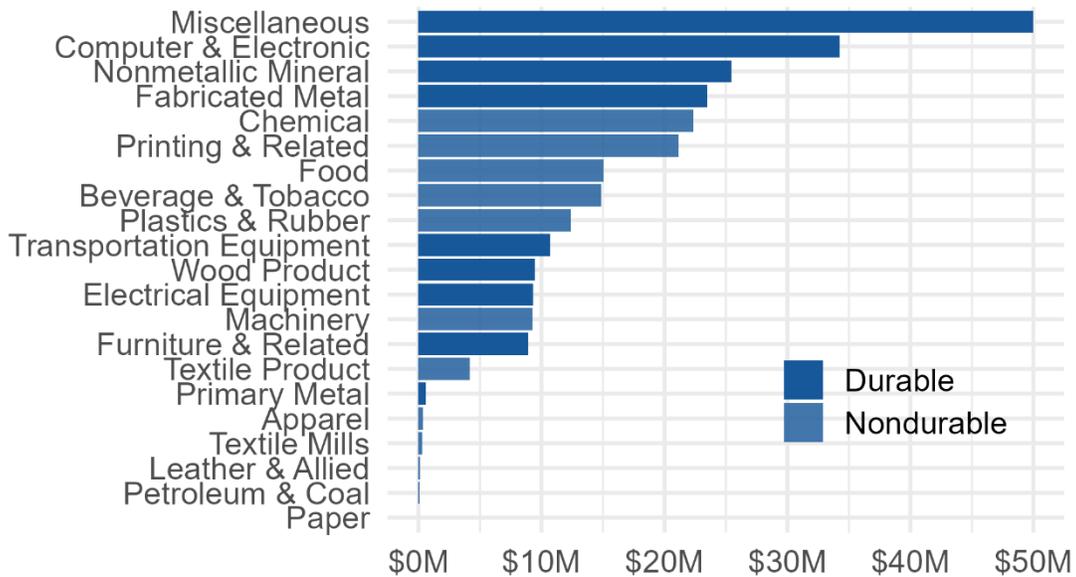


Figure 0.17 Manufacturing Total Wages by Industry, Southwestern Region, Montana, 2023



The largest number of manufacturing establishments in Southwestern Montana are classified as fabricated metals, serving agriculture as well as railroad demand. Food product manufacturing is also prominent in the ranking of manufacturing establishments counts by industry.

Manufacturing in Southwestern Montana faces some challenges that are common to manufacturing throughout the state, as well as some that are unique to the region. The physical distance to markets for many products is a barrier to effectively competing in terms of volume and cost for all Montana manufacturers – Southwestern Montana has been successful competing on the dimensions of quality and distinctiveness, particularly for specialty goods with lower transportation costs.

The workforce stands as another difficult challenge, especially given the unfortunate trends of late that have caused housing costs to soar beyond the reach of many working-class families. This is particularly true in Bozeman but

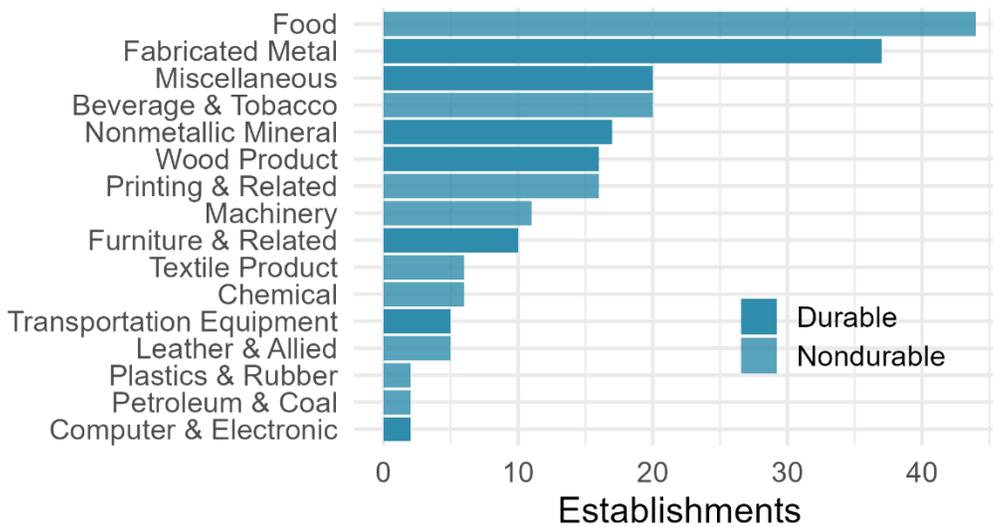
extends to outlying areas, including Livingston in adjacent Park County as well. Prospects for continued rapid growth ahead will continue to put pressure on affordability and employee recruitment.

Missouri River Region

The sprawling, 21-county Missouri River region encompassing the northern half of Montana east of the Rocky Mountains takes in the Great Falls MSA, four different American Indian reservations, the vastness of Montana’s farming and ranching prairies, and the oil-producing counties on the western edge of the Bakken oil field. Stretching across almost 700 miles, the area contains many of the most important rail and energy transportation systems in the state, with important trade connections to Canada to the north.

The more densely populated Great Falls area on the southwest edge of the region dominates the manufacturing statistics for the region, although important activities relating to agriculture and energy production take place along the Hi-Line (the communities spanning U.S. Highway 2) and in the oil patch counties such as Roosevelt and Richland Counties on the eastern edge of the state. A \$90 million plant to make vacuum components is slated for construction in Fergus County and is a significant event for that small community. Great Falls sits at the heart of the Golden Triangle region that is home to some of the most productive wheat and barley land in the state.

Figure 0.18 Manufacturing Establishments by Industry, Missouri River Region, Montana, 2023



That agricultural prowess flows directly into a thriving food processing industry, as shown in Figures 3.18, 3.19 and 3.20. Food processing manufacturing ranks highly by all measures in the regional mix, although the closure of the sugar beet refinery in Richland County was a blow to the local economy. The oil refinery in Great Falls, which recently converted half its capacity into renewable fuels production, is especially prominent in total wages. The prominence of small-sized fabricated metal manufacturing, both in support of agriculture and energy, shows up in the region as is the case in every other region of Montana.

Figure 0.19 Manufacturing Employees by Industry, Missouri River Region, Montana, 2023

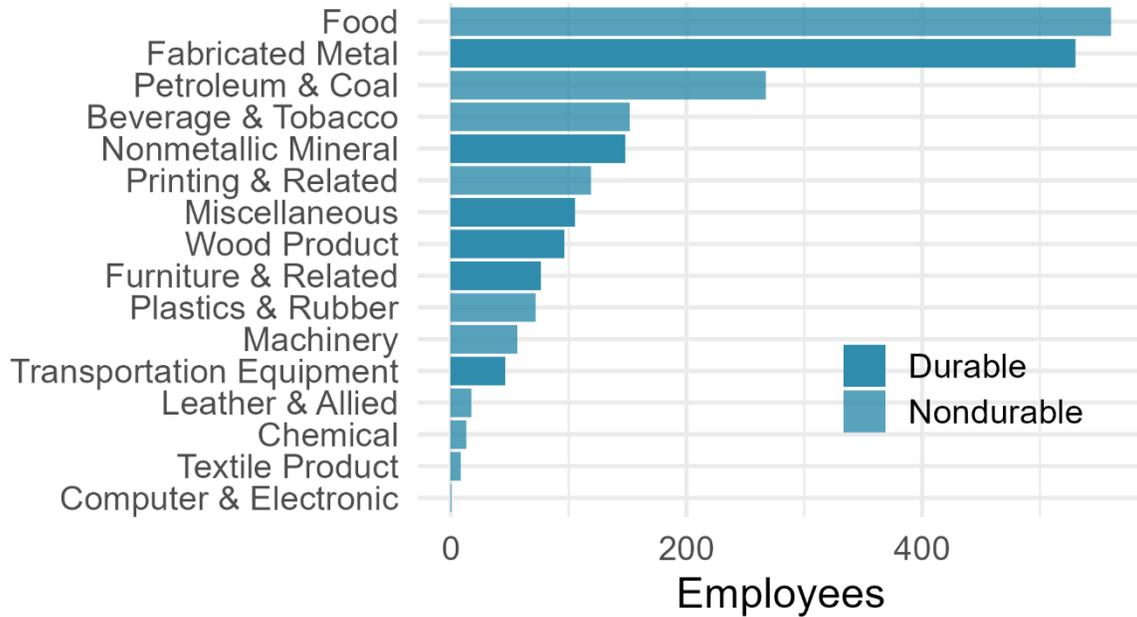
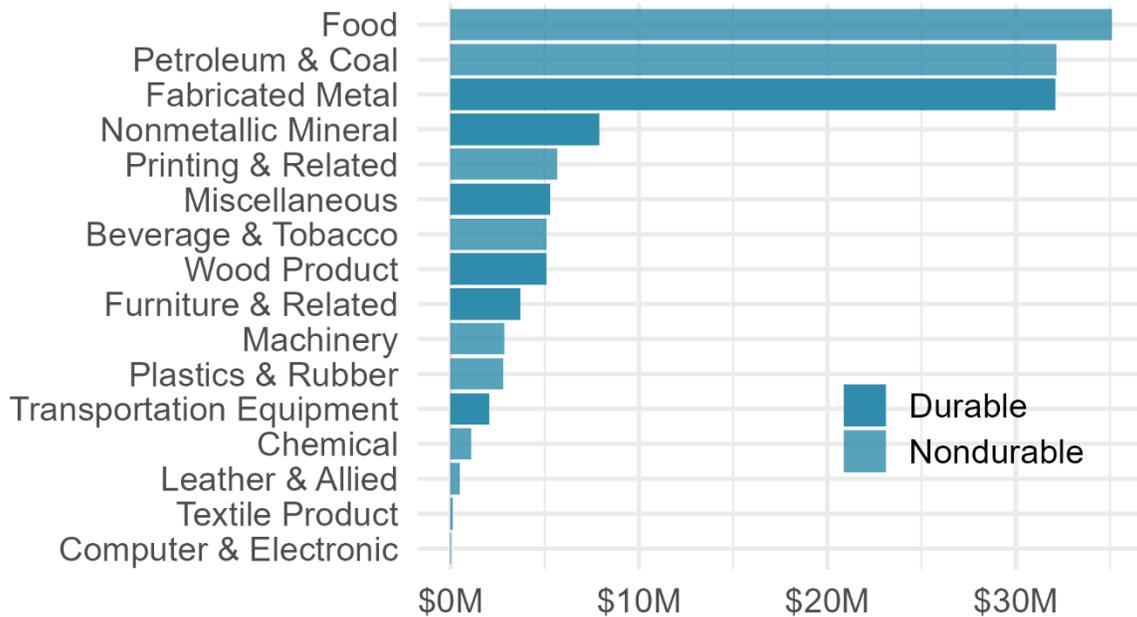


Figure 0.20 Manufacturing Total Wages by Industry, Missouri River Region, Montana, 2023



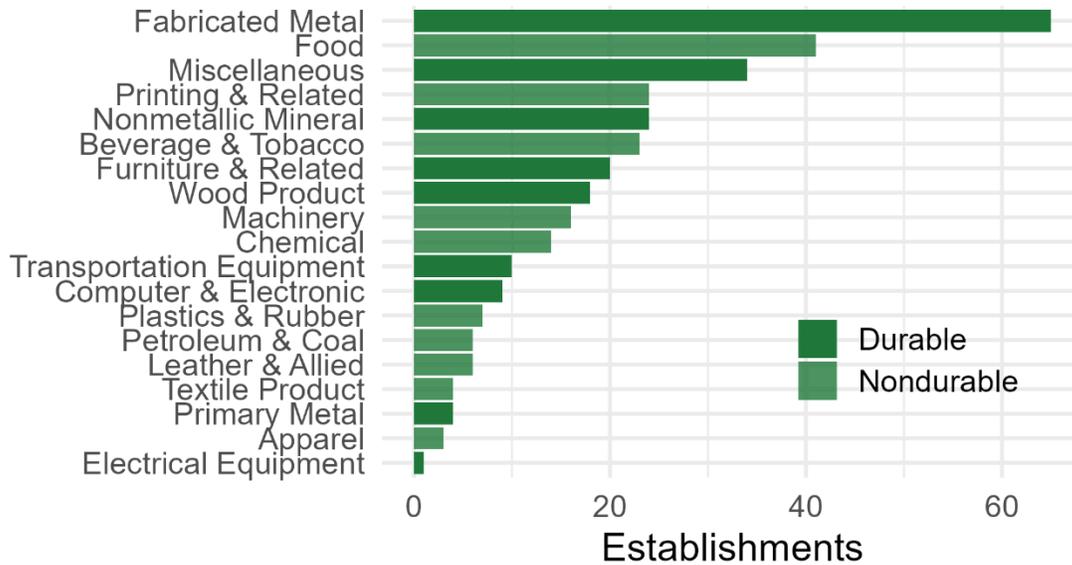
Great Falls has seen significant new investment across its economy, particularly in manufacturing. The conversion of part of Calumet Specialty Products into Montana Renewables, which processes plant-based feedstocks into aviation fuel and diesel, has opened new supply chain opportunities. Renewable energy manufacturing also holds potential for further expansion, though environmental challenges persist. However, slower economic growth has contributed to aging infrastructure in parts of the region, limiting efforts to fully leverage its geographic and resource advantages.

Yellowstone River Region

The Yellowstone River region includes the largest metropolitan area in the state, sparsely populated grazing land, coal and hard rock mining, and spectacularly beautiful landscapes. The Billings economy dominates the region. Indeed, its reach extends into three contiguous states. Thanks primarily to its three oil refineries, Billings dominates the state manufacturing economy in terms of value-added measures, such as GDP. It is home to more heavy industry, from fabricated metal production to food processing, machinery and transportation equipment, than other parts of the state.

Some of the state’s largest industrial facilities are located within the region as well, including the Colstrip electric generating station in Rosebud County and the Sibanye-Stillwater palladium concentrator and smelter facility in Columbus, Montana. Across the wide geography of the region there is agricultural production as well as energy transportation and production infrastructure,

Figure 0.21 Manufacturing Establishments by Industry, Yellowstone River Region, Montana, 2023



While there are more fabricated metals manufacturing establishments in the region than in any other manufacturing industry, as shown in Figure 3.21, the high wages and value add of the oil refineries in Billings pushes both the employee counts and total wages paid of Petroleum Products to the highest ranking in the region (Figures 3.22 and 3.23). The 2nd-highest number of manufacturing employees in the Yellowstone River Region are in Fabricated Metal.

Figure 0.22 Manufacturing Employees by Industry, Yellowstone River Region, Montana, 2023

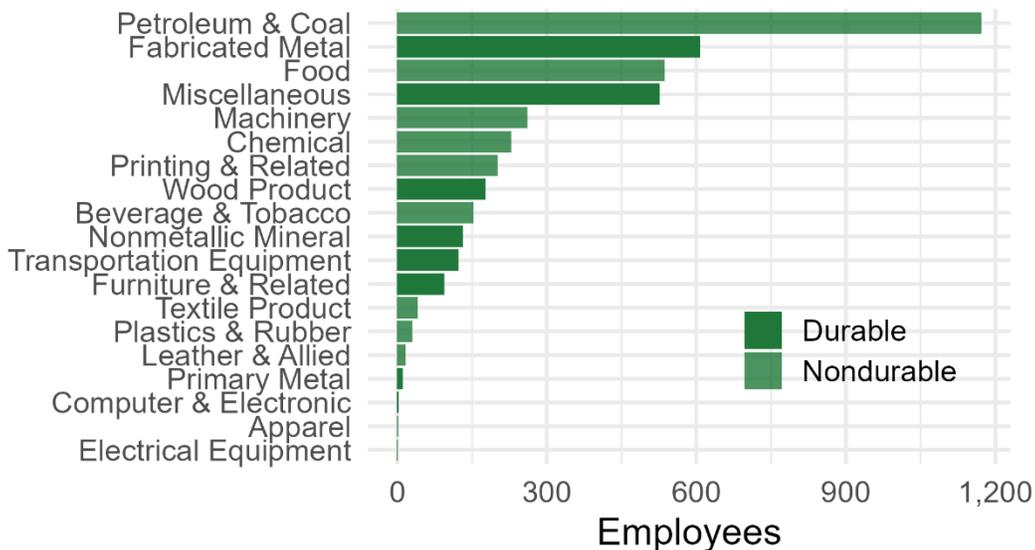
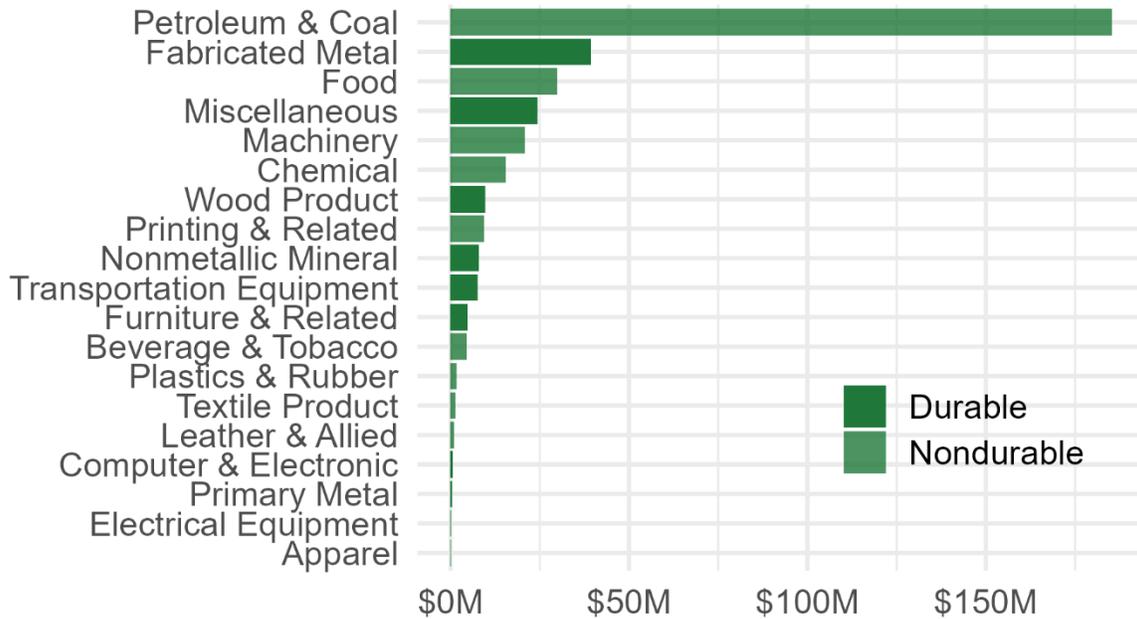


Figure 0.23 Manufacturing Total Wages by Industry, Yellowstone River Region, Montana, 2023



The presence of some of the larger industrial facilities, particularly in petroleum, mining, and energy production, has spurred growth in downstream industries linked to their production. New investments in transportation infrastructure, including pipeline and wind energy construction, have supported the manufacturing businesses as well.

But the presence of heavy industry also challenges the region’s continued prosperity. New EPA rules threaten the economic viability of both the Colstrip generating plant and the smaller oil refineries in Billings. As has been demonstrated many times in recent history, volatility in commodity prices, especially for oil and palladium, have precipitated some painful adjustments in the operations of industrial facilities.

Conclusion

Montana's manufacturing sector, while diverse and regionally distinct, faces both opportunities and challenges that are shaping its current and future trajectory. A comparative analysis of the state's six regions reveals several key strengths, such as access to natural resources in the Northwestern and Yellowstone River regions, and the strong synergies between technology-driven industries and academic institutions in regions like Southwestern Montana. These regional advantages offer Montana competitive positioning in sectors like primary metals, transportation equipment, fabricated metal products, photonics, and biotechnology.

However, common challenges persist across the state. Workforce shortages, particularly in both the rural and rapidly growing areas, threaten expansion and productivity. Housing affordability and the ability to attract and retain skilled workers are particularly pressing in regions like Flathead and Gallatin Counties. Additionally, aging infrastructure and relative geographic isolation present ongoing barriers, especially for regions more dependent on transportation and market access, such as the Missouri River Region.

Despite these challenges, the future of manufacturing in Montana holds promise. Montana’s comparative advantages in natural resources, emerging tech-driven industries, and renewable energy initiatives position the state well for sustained growth. Regions leveraging university partnerships and fostering innovation hubs will likely see continued development in advanced manufacturing sectors. However, Montana’s long-term success will depend on addressing infrastructure needs, workforce development, and adapting to global market fluctuations, particularly in commodity-based industries.

With strategic investments in education, infrastructure, and technology, and by capitalizing on its regional strengths, Montana’s manufacturing sector is poised to contribute significantly to the state's economic future while navigating the challenges that arise from its diverse landscape.

2.2 Montana's Manufacturing Exports

Over the past decade, Montana's manufacturing exports have experienced slow growth, averaging a 0.5% increase across all sectors. This slow but steady rise reflects a mixture of growth and decline in different industries. The chemical industry, for example, has long been Montana's largest export sector, and it continued to grow at an average annual rate of 4% over the past decade. The transportation sector also expanded considerably, with a 7.3% average growth rate, helping to boost Montana's export profile. Other sectors, like computer and electronic products, saw more moderate growth, averaging 2.8% annually, while machinery posted a more modest 2.1% growth over the decade.

However, several industries experienced long-term declines. The petroleum and coal sector, which once played a larger role, saw a sharp average annual decline of 19.2%, reflecting broader U.S. trends of shifting away from fossil fuels and the increasing focus on renewable energy sources. Global demand for fossil fuels has weakened in recent years as many countries have adopted cleaner energy technologies, resulting in less need for U.S. exports of petroleum and coal. Additionally, fluctuations in energy prices and market disruptions have contributed to Montana's declining exports in this sector. Domestically, more of Montana's fossil fuel production has been directed toward U.S. energy independence efforts, reducing the available volume for international trade.

Chemical manufacturing, which has consistently been Montana's leading export sector, remained dominant in 2023, accounting for 38.8% of total exports. This reflects the state's long-standing strength in industrial and agricultural chemicals, which are critical for global supply chains in agriculture, manufacturing, and construction. Montana's access to raw materials and its established industry base have allowed it to meet growing international demand, further cementing chemicals as the state's top export product.

Table 0.1 Manufacturing exports by sector ranked, 2023, (millions of 2023\$)

NAICS	Industry	2022	2023	Share 2023	Change 2022-23	Avg. 10-y Change
325	Chemical	\$374.73	\$520.31	38.8%	38.9%	4.0%
333	Machinery	\$264.14	\$238.31	17.8%	-9.8%	2.1%
336	Transportation	\$151.49	\$177.19	13.2%	17.0%	7.3%
331	Primary Metal	\$68.42	\$60.04	4.5%	-12.2%	1.0%
327	Nonmetallic Mineral	\$62.38	\$57.97	4.3%	-7.1%	-4.2%
334	Computer & Electronic	\$40.38	\$57.69	4.3%	42.9%	2.8%
339	Miscellaneous	\$37.54	\$43.42	3.2%	15.7%	4.0%
311	Food	\$58.72	\$38.39	2.9%	-34.6%	-7.5%
312	Beverage & Tobacco	\$45.40	\$36.83	2.7%	-18.9%	-5.2%
321	Wood Product	\$39.94	\$28.65	2.1%	-28.3%	-3.7%
335	Electrical	\$31.36	\$25.44	1.9%	-18.9%	-0.4%
332	Fabricated Metal	\$15.63	\$15.64	1.2%	0.1%	-11.0%
326	Plastics & Rubber	\$8.25	\$14.08	1.1%	70.7%	-6.3%
324	Petroleum & Coal	\$33.10	\$13.72	1.0%	-58.5%	-19.2%
316	Leather & Allied	\$6.92	\$6.99	0.5%	1.0%	3.6%
337	Furniture & Related	\$1.74	\$1.99	0.1%	14.8%	0.7%
315	Apparel	\$2.29	\$1.82	0.1%	-20.3%	-8.7%
314	Textile Product	\$0.97	\$1.07	0.1%	10.5%	1.7%
323	Printing & Related	\$0.66	\$0.77	0.1%	16.8%	-5.9%
322	Paper	\$0.66	\$0.50	0.0%	-23.4%	0.9%
313	Textile Mills	\$0.78	\$0.20	0.0%	-74.8%	-19.5%
31-33	Total	\$1,245.46	\$1,341.04	100.0%	7.7%	0.5%

Source: U.S. Census Bureau, USA Trade, Annual International Trade Datasets (AITD)

In 2023, Montana's international exports saw a significant overall increase of 7.7% compared to 2022, driven primarily by growth in key sectors. The chemical sector surged by 38.9%, reinforcing its leading position. The computer and electronic products sector also saw impressive growth, with exports rising by 42.9%. These gains, however, were offset by declines in other areas. The machinery sector, for instance, saw a decline of 9.8% and the primary metal

industry dropped by 12.2%. Petroleum and coal exports experienced one of the most dramatic declines, falling by 58.5%, continuing a downward trend from previous years.

Despite these mixed results, the growth in 2023 highlights the resilience of Montana's export economy, with a few key industries – particularly chemicals, machinery, and transportation – driving the overall expansion. While some sectors continue to face challenges, Montana's international trade remains bolstered by its strength in well-established industries like chemicals, which have long been central to the state's export success.

Montana's top export markets in 2023 reveal the state's significant trading relationships, particularly with Canada, which accounted for 34.2 % of exports, representing a 35.9 % increase from the previous year. Canada's proximity and demand for Montana's chemical, machinery, and agricultural products make it the most substantial partner by far. Other important markets include South Korea and Japan, which both saw increased imports from Montana in 2023, by 24.2 % and 21.1 %, respectively, reflecting strong demand for industrial and agricultural products. Meanwhile, China, Montana's 2nd-largest trading partner, decreased its imports by -32.4 %, a decline aligned with the ongoing U.S.-China trade tensions.

Table 0.2 Top 20 export markets, 2022, millions of 2023\$s

Rank	Country	Share 2023	2022	2023	Change 2022-23	Avg. 10-y Change
1	Canada	34.22%	\$337.78	\$458.94	35.9%	-3.0%
2	China	7.95%	\$157.81	\$106.66	-32.4%	2.5%
3	Korea, South	7.28%	\$78.58	\$97.58	24.2%	3.0%
4	Japan	5.69%	\$63.02	\$76.32	21.1%	3.6%
5	Belgium	5.25%	\$49.77	\$70.35	41.3%	1.8%
6	Mexico	3.48%	\$78.44	\$46.65	-40.5%	1.3%
7	Taiwan	3.42%	\$56.20	\$45.90	-18.3%	-4.7%
8	Brazil	2.93%	\$4.44	\$39.32	785.6%	21.2%
9	United Kingdom	2.64%	\$39.36	\$35.34	-10.2%	3.1%
10	Denmark	2.58%	\$12.40	\$34.60	179.1%	19.9%
11	Turkey	2.36%	\$5.95	\$31.65	432.0%	33.6%
12	France	1.83%	\$32.44	\$24.53	-24.4%	11.7%
13	Singapore	1.70%	\$32.97	\$22.82	-30.8%	-0.4%
14	Netherlands	1.57%	\$25.86	\$21.00	-18.8%	1.9%
15	Australia	1.46%	\$20.19	\$19.52	-3.3%	5.2%
16	Germany	1.32%	\$26.18	\$17.73	-32.3%	-6.1%
17	Costa Rica	1.18%	\$8.79	\$15.79	79.6%	18.9%
18	United Arab Emirates	1.07%	\$3.28	\$14.32	336.9%	28.7%
19	Malaysia	1.04%	\$15.49	\$13.94	-10.0%	2.8%
20	Norway	0.82%	\$10.08	\$11.04	9.5%	19.7%
	Rest of World	10.22%	\$186.42	\$137.04	-26.5%	1.8%
	Total	100.00%	\$1,245.46	\$1,341.04	7.7%	0.5%

Source: U.S. Census Bureau, USA Trade, Annual International Trade Datasets (AITD)

Notable emerging markets for Montana include Brazil, Turkey, and the United Arab Emirates, each of which saw extraordinary growth in trade with the state, at 785.6%, 432.0%, and 336.9%, respectively. This surge reflects Montana's expansion into high-value technologically-driven manufacturing, especially in the production of airplane parts, which are helping the state reach new international markets beyond its traditional partners in Canada, China, Pacific Tech Economies, and Europe. While well-established trading with neighboring Canada has sustained much of Montana's export base, innovative sectors are enabling entry into diverse global markets, making Montana's trade profile increasingly diversified.

Montana Manufacturers Survey

Montana’s manufacturing industry comprises small- to medium-sized firms that produce everything from sporting goods to agricultural chemical products. The Bureau of Business and Economic Research surveys manufacturers yearly to capture insights into the previous year and learn about their outlook for the coming year. In the 2024 survey, BBER received 143 responses – unchanged from 2023 – with most respondents from the durable manufacturing sector. The survey, conducted in May and June 2024, covers indicators such as financials, workforce dynamics, capital investments, and significant challenges for durable and nondurable manufacturers.

3.1 Year in Review

In the 2024 Montana Manufacturers Survey, responses reveal mixed outcomes across sales, production, and profits. Most firms reported steady or improved gross sales and production performance, with less than a quarter of respondents experiencing declines in these areas. Specifically, 46% of manufacturers reported increased gross sales, while only 24% saw a decrease. Similarly, production levels rose for 43% of firms, with just 23% noting any decline (see Table 4.1).

In 2023, 73% of durable goods manufacturers reported the same or better profits compared to last year. For nondurable manufacturers just 57% reported the same or better.

Table 0.1 For calendar year 2023, did your plant's ...?

	Durable	Nondurable	Overall
gross sales increase, stay about the same, or decrease from 2022?			
Increase	46%	46%	46%
Stay about the same	31%	28%	29%
Decrease	23%	26%	24%
production increase, stay about the same, or decrease from 2022?			
Increase	41%	45%	43%
Stay about the same	38%	29%	34%
Decrease	21%	26%	23%
profits increase, stay about the same, or decrease from 2022?			
Increase	42%	25%	34%
Stay about the same	31%	32%	32%
Decrease	27%	43%	35%

However, profitability tells a different story, with 35% of respondents indicating decreased profits over the previous year. This profit dip is concentrated in the nondurable manufacturing sector, where commonly tight margins combined with higher input costs led to more widespread financial strain. While durable goods manufacturers managed to sustain profitability to a greater extent, nondurable firms continued to face pressure from rising materials and energy costs, contributing to more frequent profit declines within that sector.

Capital Investment and Product Development

The survey results on capital investment and product development for Montana manufacturers in 2023 reveal a notable increase in efforts to enhance production capabilities and expand product offerings compared to 2022. In 2023, 55% of respondents reported making major capital expenditures in facilities or equipment, a significant rise from 43% the previous year. This increase underscores a strong commitment to modernizing infrastructure and addressing operational needs despite ongoing economic uncertainties. Durable manufacturers led these efforts, with 56% making major investments in 2023, up from 43% in 2022. Nondurable manufacturers also saw a substantial increase, with 52% reporting capital expenditures compared to just 42% the year prior. This marked improvement likely reflects a post-pandemic resurgence in confidence, supported by federal and state initiatives.

Most capital investments made in 2023 were focused on equipment upgrades, accounting for 76% of expenditures, highlighting manufacturers' strategic focus on operational efficiency and modernization. Investments in new or

expanded facilities were less common, representing 21% of reported expenditure, while spending on information systems or software was minimal.

Federal and state policies likely played a pivotal role in encouraging this growth in capital investment. The Inflation Reduction Act offered tax credits for clean energy and advanced manufacturing projects, motivating firms to modernize and adopt new technologies. At the state level, programs such as the Montana Manufacturing Automation Loan Program provided financial support for automation and productivity-enhancing upgrades, helping firms address rising input costs and labor shortages. Additionally, many manufacturers resumed deferred projects as economic conditions stabilized, while others invested in automation to mitigate workforce constraints and supply chain disruptions.

Table 0.2 In calendar year 2023, did your plant ...?

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>make any major capital expenditure in facilities or equipment?</i>			
Yes	56%	52%	55%
No	44%	48%	45%
<i>introduce any new product lines?</i>			
Yes	18%	35%	26%
No	82%	65%	74%

The survey also highlights a sharp divergence in product innovation between durable and nondurable manufacturers. In 2023, 26% of respondents introduced new product lines, a dramatic increase from just 4% in 2022. Nondurable manufacturers were particularly active in this area, with 35% launching new products compared to only 18% of durable manufacturers. This trend underscores the agility of nondurable firms, which often respond to shifting consumer preferences and market demands by diversifying their offerings. Durable manufacturers, by contrast, focused more heavily on maintaining and upgrading existing infrastructure to ensure operational stability.

These findings illustrate a sector balancing investment need with economic pressures. While durable manufacturers emphasize infrastructure improvement, nondurable firms are driving product innovation to remain competitive in changing markets. The increases in both capital investment and product development signal a more optimistic outlook for Montana’s manufacturing sector as it leverages recovery programs to modernize itself for long-term growth and resilience.

Employment

Montana’s manufacturing employment landscape in 2023 reflects ongoing struggles to find enough workers to fill vacancies, a continuation of challenges manufacturers faced in previous years. However, there are signs of improvement in employee recruitment compared to 2022. A greater percentage of manufacturers reported increasing their workforce in 2023, with 23% reporting growth compared to 16% in 2022. Meanwhile, the percentage of respondents reporting a decrease in employees remained relatively stable at 17%, down slightly from 18% in the previous year, suggesting that workforce reductions have not worsened.

Table 0.3 Over calendar year 2023...?

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>did your plant’s number of employees ...</i>			
<i>Increase</i>	23%	23%	23%
<i>Stay about the same</i>	60%	58%	59%
<i>Decrease</i>	17%	18%	17%
<i>have a significant shortage of workers in 2023?</i>			
Yes	29%	35%	32%
No	71%	65%	68%

Additionally, the percentage of manufacturers experiencing significant worker shortages declined from 44% in 2022 to 32% in 2023. This improvement may reflect some easing of labor market pressures, potentially due to stabilizing demand for labor or more effective recruitment efforts. However, given the comparison spans a period of economic recovery, the decline might also indicate a return to more typical hiring conditions rather than a substantial resolution

of workforce challenges. While labor shortages remain a critical issue, the shift suggests that manufacturers are stabilizing their workforce.

Ongoing Challenges

The top three challenges facing Montana manufacturers in 2023 were inability to find employees, availability or cost of raw materials, and transport problems, fuel cost, shipping, supply chain problems. The inability to find employees remains a top issue, with 26% of respondents reporting difficulty. While this represents a decrease from 2022, when 44% of manufacturers overall cited labor shortages, it remains a pervasive issue. Nondurable manufacturers continue to face greater challenges in this area, with 29% reporting difficulty compared to 23% of durable manufacturers. This divergence highlights ongoing recruitment and retention struggles in the nondurable sector, which tend to occur in more rural areas with limited labor pools.

Table 0.4 Major issues that affected individual manufacturing plants: % responding yes

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>Inability to find employees</i>	23%	29%	26%
<i>Availability or cost of raw materials</i>	14%	28%	20%
<i>Transport problems, fuel cost, shipping, supply chain problems</i>	9%	15%	12%
<i>Decreased demand</i>	12%	8%	10%
<i>Inflation or bad economy</i>	9%	8%	8%
<i>Equipment issues</i>	8%	8%	8%
<i>Increased competition</i>	6%	3%	5%
<i>Other</i>	5%	3%	4%

The availability and cost of raw materials was the second most common issue, reported by 20% of respondents in 2023. This is down from 34% in 2022, reflecting some improvement in the cost or availability of inputs. However, nondurable manufacturers again faced greater difficulty, with 28% citing this challenge compared to 14% of durable manufacturers. This gap underscores the reliance of nondurable manufacturers on agricultural and consumable inputs, which are more sensitive to commodity price fluctuations and supply chain disruptions.

Also related to their supply chains, 12% of respondents reported transport, fuel cost, shipping, and supply chain problems, up slightly from 8% in 2022, highlighting potentially growing concerns about transportation costs. The divergence between sectors is particularly notable, as this was a major issue for 15% of durable manufacturers compared to 9% of nondurable manufacturers. This difference reflects how much more sensitive the nondurable sector is to transportation costs due to its reliance on sourcing larger quantities of raw materials, often from rural or more disconnected regions, making logistics a critical component of their operations.

The durable sector's challenges with decreased demand, reported by 12% of respondents, reflect the ongoing normalization of household consumption patterns. During the pandemic, spending on goods surged as services were curtailed by restrictions, driving unprecedented demand for durable products. As household spending gradually shifts back toward pre-pandemic trends, declining gradually as a fraction of income, durable manufacturers must adjust to a more stable but less inflated level of consumer interest in their products.

While the overall frequency of these top challenges shifted slightly between 2022 and 2023, the divergence between durable and nondurable manufacturers remains clear. Labor shortages and raw material costs continue to weigh more heavily on nondurable manufacturers, while durable manufacturers face increased challenges related to economic conditions and competition. These ongoing issues reflect the unique dynamics within each sector as Montana's manufacturing industry continues to adapt.

3.2 How will 2024 turn out?

Montana manufacturers anticipate that 2024 will closely mirror 2023, with stability in key metrics but persistent challenges, particularly around workforce and input costs. The cautious optimism reflected in 2023 results – where most manufacturers reported steady or improved sales and production – continues into the forecast for 2024. However, concerns about labor shortages, rising input costs, and the pace of economic recovery remain prominent.

Capital Investment and Supply Chain

In 2023, 55% of manufacturers reported making major capital investments, reflecting ongoing efforts to maintain and improve infrastructure despite economic uncertainties. This figure exceeded expectations from the previous year’s survey, where only 36% of manufacturers anticipated making such expenditures in 2023. The higher-than-expected investment levels were concentrated in Montana’s durable manufacturing sector, which saw significant infrastructure upgrades and modernization efforts. This could reflect the sector’s need to maintain competitive production capabilities, particularly in industries like machinery and fabricated metals, where operational efficiency and technological advancements are critical.

Looking ahead to 2024, 41% of manufacturers plan to make major capital investments, reflecting a slight increase in expectations compared to their forecasts for 2023. Durable manufacturers are showing greater optimism, with 39% planning to invest, up from 32% in their 2023 expectations. In contrast, nondurable manufacturers are slightly less optimistic, with investment expectations declining from 45% in 2023 to 43% for 2024.

Table 0.5 In 2024 do you anticipate ...?

	Durable	Nondurable	Overall
...major capital investment expenditures?			
Yes	39%	43%	41%
No	61%	57%	59%
...the cost of your plant’s major inputs to?			
Increase	53%	53%	53%
Stay about the same	35%	42%	38%
Decrease	12%	5%	9%

This divergence highlights the distinct dynamics within each sector. Durable manufacturers appear more confident in future investment opportunities, likely driven by the potential long-term returns of automation and advanced manufacturing. These investments are critical for maintaining competitiveness in sectors like machinery and fabricated metals. On the other hand, nondurable manufacturers remain cautious, constrained by tighter margins and the continued cost pressures highlighted in the previous section. This cautious approach reflects their focus on immediate operational needs.

These persistent cost pressures are further reflected in manufacturers' expectations for 2024. Input costs remain a significant concern, with 53% of respondents anticipating prices to increase further. This aligns with trends manufacturers experienced in 2023, where rising costs heavily impacted profitability – particularly in the nondurable sector. A smaller proportion, 38%, expect costs to stabilize, with nondurable manufacturers slightly more optimistic than their durable counterparts. Only 9% anticipate cost decreases, reflecting Montana manufacturers' expectations that inflation and supply chain challenges will remain significant factors in the coming year.

Amid lessons learned from COVID-19 – including increased consumer spending on goods over services and the accompanying supply chain disruptions – the BBER surveyed Montana manufacturers on their anticipated supply chain adjustments for 2024. The responses reveal varied strategies as firms work to manage ongoing challenges and reduce vulnerabilities in their supply chains.

Nearly half of respondents, 48%, expect no major changes to their current supply chain setup, with durable manufacturers more likely to maintain the status quo at 51% compared to 45% of nondurable manufacturers. Among those planned changes, 28% aim to "de-risk" by identifying alternative or backup suppliers, a strategy slightly more common in durable manufacturing (29%) than in nondurable manufacturing (26%). This de-risking approach reflects the durable sector’s reliance on specialized materials where supply stability is essential.

Efforts to onshore or localize supply chains – sourcing suppliers within the U.S. or closer to Montana – highlight both strategic considerations and product-specific needs. Durable manufacturers, who produce goods like machinery and electronics, often depend on unique materials typically sourced internationally due to limited domestic options. For

this sector, moves toward onshoring (13%) and localizing (12%) enable firms to secure critical supplies closer to home, mitigating risks tied to global disruptions.

Table 0.6 Do you anticipate the need to ... your plant's supply chain in 2024?

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>No change</i>	51%	45%	48%
<i>De-risk (find alternative or backup suppliers)</i>	29%	26%	28%
<i>Optimize (work with your suppliers to find savings opportunities)</i>	24%	38%	31%
<i>On-shore (find domestic suppliers)</i>	13%	6%	10%
<i>Localize (find suppliers that are in Montana or close-by)</i>	12%	9%	10%

Employment

The employment outlook for Montana manufacturers in 2024 reflects cautious optimism, with slight improvements anticipated compared to 2023. Most manufacturers (66%), expect their workforce size to remain stable in the coming year. This marks an increase from 59% in 2023, indicating growing confidence in maintaining current staffing levels. Workforce growth is expected by 24% of respondents, with nondurable manufacturers slightly more optimistic at 25% compared to 22% in the durable sector. Only 10% of respondents foresee workforce reductions, with durable manufacturers (13%) more likely than nondurable manufacturers (6%) to anticipate cutting jobs. These projections suggest that while hiring challenges persist, many firms are focused on achieving stability in their workforce.

Table 0.7 In 2024, do you anticipate...?

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>... the number of employees in your plant to?</i>			
<i>Increase</i>	22%	25%	24%
<i>Stay about the same</i>	64%	68%	66%
<i>Decrease</i>	13%	6%	10%
<i>...human resources/employment challenges?</i>			
<i>Recruiting new employees</i>	39%	40%	39%
<i>Retaining existing employees</i>	5%	16%	10%
<i>Recruiting and retention will be equal challenges</i>	31%	27%	29%
<i>Neither recruiting nor retention will be a challenge for this plant</i>	25%	17%	21%

A notable 21% of manufacturers – predominantly from the durable sector – expect neither recruiting nor retention to be a significant challenge in 2024. This suggests that some firms have successfully stabilized their workforce, either by meeting their hiring needs or retaining employees effectively in a competitive labor market.

However, for most respondents, human resources remain a significant hurdle, with 79% of manufacturers expecting some combination of recruiting or retention challenges. Recruiting new employees is the most common concern, cited by 39% of respondents across both durable and nondurable sectors. Additionally, 29% anticipate recruiting and retention to pose equal challenges, further emphasizing the difficulty of maintaining a stable workforce. Together, these two categories represent nearly 70% of respondents, highlighting the dual pressure to attract new workers while also retaining existing ones.

Only 10% of respondents reported that retaining employees alone is their primary challenge. This issue is heavily concentrated in the nondurable sector, where 16% of firms anticipate retention as a significant problem, compared to just 5% in the durable sector. The higher turnover in nondurable manufacturing likely stems from the nature of the work, narrower profit margins, and potentially fewer long-term incentives for employees.

Roughly 35% of nondurable goods manufacturers reported a significant shortage of workers compared to 29% of durable firms.

These findings reflect the ongoing complexity of workforce challenges in Montana's manufacturing sector. While some firms have stabilized their workforce, others continue to grapple with attracting and retaining employees in a competitive labor market, particularly in the nondurable sector. Survey responses reveal the top three workforce challenges, highlighting significant divergences between durable and nondurable manufacturers.

The inability to compete with higher wages offered elsewhere was the most frequently cited issue, affecting 27% of respondents. This challenge was reported at similar levels by durable (28%) and nondurable (26%) manufacturers, underscoring the widespread impact across sectors. However, quality of hires emerged as a more pronounced concern for nondurable manufacturers, with 32% citing this issue compared to just 13% of durable manufacturers. This disparity highlights the additional recruitment difficulties faced by nondurable firms, which often operate in rural areas with smaller labor pools.

Table 0.8 What is the primary challenge you face in recruiting or retaining employees for your plant?

	<i>Durable</i>	<i>Nondurable</i>	<i>Overall</i>
<i>Wages or benefits' offered cannot compete with higher wages</i>	28%	26%	27%
<i>Quality of hires is low</i>	13%	32%	22%
<i>Skill or ability lacking need to train</i>	22%	15%	19%
<i>Cost of living and housing</i>	15%	18%	17%
<i>General lack of applicants</i>	9%	15%	12%
<i>None</i>	8%	5%	6%
<i>Unclassifiable</i>	1%	5%	3%
<i>Regulations too strict</i>	0%	0%	0%

Skill or ability gaps requiring additional training were noted by 19% of respondents, with durable manufacturers (22%) identifying this issue more frequently than nondurable manufacturers (15%). This reflects the durable sector's reliance on technically skilled workers for advanced manufacturing processes, where training demands are higher.

The cost of living and housing, although not among the top three primary challenges, was reported by 17% of respondents overall and remains a growing concern. Housing costs, a significant component of consumer spending, have far-reaching implications for workforce availability and recruitment efforts. High housing costs may indirectly exacerbate other reported challenges, such as the inability to compete with higher wages elsewhere or issues related to the quality, skill, and number of applicants. Potential employees may be discouraged from relocating to or staying in areas where housing is limited or prohibitively expensive, further complicating manufacturers' ability to address workforce shortages.

It is important to note that this 17% reflects only those respondents explicitly citing cost of living and housing as a recruitment or retention challenge. The true impact of housing costs is likely extending beyond this figure, as it intersects with and amplifies many of the other workforce difficulties manufacturers face.

Looking back at 2023, manufacturers demonstrated resilience in maintaining stable sales and production despite rising input costs and labor shortages. As manufacturers look to 2024, workforce challenges persist, particularly in recruitment and training, reflecting the ongoing difficulties of attracting skilled workers in a limited labor pool. These pressures, combined with evolving supply chain and cost considerations, will shape how Montana manufacturers navigate the coming years.

The Montana Manufacturing Extension Center

The Montana Manufacturing Extension Center (MMEC) is a statewide manufacturing outreach and assistance center staffed by full-time professionals with extensive experience in manufacturing and business in a variety of industries. MMEC’s mission is to grow Montana’s economy by helping manufacturers succeed.

MMEC serves the manufacturers of Montana by helping them assess and improve their manufacturing operations, providing training and workforce development, and leveraging research and technological developments to keep manufacturing competitive in the state.



An MMEC Instructor leads a training course in food safety

Established in 1996, MMEC is housed in the Norm Asbjornson College of Engineering at Montana State University in Bozeman, with remote offices in Billings, Missoula, Kalispell, Great Falls, Butte, and Sidney. The Center’s staff has a combined experience of hundreds of years in manufacturing and offers expertise on a broad range of topics.

MMEC is also part of the National Institute of Standards and Technology’s Manufacturing Extension Partnership (MEP) National Network. NIST is a non-regulatory agency of the U.S. Department of Commerce that promotes U.S. innovation and industrial competitiveness. The MEP National Network is a unique public-private partnership with centers in all 50 states and Puerto Rico dedicated to serving only small- and medium-sized manufacturers that pay fees for services provided.

Since 2000, MMEC’s clients have reported project impacts on their businesses through an independent third-party survey. Results of these surveys show that MMEC has strengthened Montana’s manufacturing economy between 2000 and 2024 by generating:

Table 0.1 Economic Impacts, 2000 to 2024.

\$405 million	new investment
\$1,532 million	new and retained sales
7,732	new and retained jobs
\$197 million	cost savings

The MMEC evaluation process follows guidelines developed by NIST as part of its management information reporting procedures. NIST specifies the timing of the evaluation and provides a standardized questionnaire distributed to

manufacturing firms served by MMEC. The analysis of the surveys and a written report are provided by an independent analyst.

Manufacturing clients are asked to evaluate the effectiveness of MMEC and to quantify the economic impact of MMEC’s activities on their business and its effects on the Montana economy. Clients are surveyed six months after a project is complete and asked about their satisfaction with the services they received. These respondents are also asked to quantify certain economic impacts and outcomes associated with the MMEC projects as well as provide feedback on their biggest challenges. MMEC sent an independent analyst preparing this report the questionnaires for the 2023 evaluation period. There were 104 responses in the 2023 evaluation. These responses provided the largest sample size since the evaluations began, exceeding the 99 responses in 2022.



Bequet Caramels is a long-time food manufacturer in Bozeman.

4.1 Overall Satisfaction

Manufacturing clients said they relied on MMEC and were very satisfied with the services they received. In 2023, about 38% of the respondents said they relied on external services (Table 5.1), up from 2022 when 33% of respondents relied on external services.

Table 0.1 Have you used any external providers for business performance services?

	<i>Frequency</i>	<i>Percent</i>
Yes	38	37.6%
No	63	62.4%

Montana manufacturers were asked if they would recommend MMEC to other potential clients. They were asked to rate the likelihood of a positive recommendation with one being the least likely and 10 being the most likely. As shown in Table 5.2 about 96% of 2023 respondents chose a score between 8-10. Three did not respond to this question. The net promoter score, which is the percentage of respondents choosing nine or 10 minus the percentage of respondents with scores of six or below, is 94 up from 2021 and 2022.

Table 0.2 Would You Recommend MMEC to Other Companies (Scale 0 – 10)

<i>Score</i>	<i>Frequency</i>	<i>Percent</i>
NA	3	2.88%
3	1	0.96%
8	1	0.96%
9	5	4.81%
10	94	90.38%

Client Comments

The NIST questionnaire provides several opportunities for Montana manufacturers to provide suggestions and comments to MMEC. These responses were edited slightly to preserve anonymity and grouped by topic. These comments provide insight into the many ways manufacturers benefit from MMEC services. Most of the comments are highly positive and detailed. As in the past, respondents made several specific suggestions concerning ways in which MMEC may further tailor its services in the future.

Professionalism and Relevance

- “Working with [MMEC employee] over the past few years has been a very positive experience. [MMEC employee] helped us focus on priorities and long-term goals.
- “We have enjoyed working with MMEC over the years and look forward to a continued partnership.”
- MMEC has been, and continues to be, an incredible resource for our company and our team. [MMEC employee] especially has gone above and beyond in his support flexibility and continued general awesomeness - we appreciate them and the MMEC team so much and will continue to use and recommend them in the future! I could go on forever!
- Keep doing what you are doing. I specifically had [MMEC employee] come teach my entire team about Lean Manufacturing basics. It was invaluable to the business. I still talk to other business owners and manufacturers all the time that have no idea what lean manufacturing is.
- For me, MEP's horsepower is the knowledge and expertise in helping guide me through the battles of getting certified in ISO... The connections and guidelines provided to understand what needs to be done and how to do it are extremely helpful and I would otherwise not go down this road on my own.
- Not only has [Manufacturer] benefited directly from the services of MMEC (an entire new group of customers), many of our employees have had the opportunity to meet and share experiences with other Montana Manufacturers. In addition, I have ... learned an immense amount about manufacturing in Montana, as well as the diverse opportunities for employment in Manufacturing, and have met many helpful people through this association.
- The MMEC Team has been instrumental in helping us get our business up and running. We could not have completed our patent application or filed internationally without the help of MMEC. They helped us to save an incredible amount of time and money with their expertise and industry knowledge and streamlined processes that made huge impacts to our bottom line. We are very thankful for the professional support of the amazing Team at MMEC. I would strongly recommend their services to any manufacturing business large or small in Montana.
- [MMEC employee] is a wonderful addition to the MMEC team! We highly appreciate their training practices and excellent personality.

Suggestions for MMEC

- Keep it up and let more people know you exist so they can take advantage of the resource.
- Improving communication about available options for training. Onsite training by region could help. Focus on a few topics with links to additional ones. Options for training closer to us [Northwestern Montana].
- More field trip opportunities. More visibility of what is going on from an educational standpoint. Operational excellence course was great. I would like to see more attendance from [Montana Manufacturer]. How do I get the executive team to attend?
- [MMEC employee] is an excellent instructor and very knowledgeable.
- Focus less on lean manufacturing and more on getting things done.
- Funding sources for projects.



Breweries are a fast-growing sector of manufacturing in Montana

4.2 Why Choose MMEC

Over the past five years, the reasons manufacturers choose MMEC have shifted, with several trends emerging from the data. The most prominent reason firms cite for selecting MMEC continues to be its staff expertise, which is consistently ranked highest. In 2019, 69.8% of respondents identified expertise as a primary factor, and by 2023, this had increased to 72.1%. This suggests that manufacturers continue to prioritize the technical and advisory capabilities of MMEC's personnel when seeking external support.

At the same time, MMEC's reputation for results has gained importance. In 2019, 17.5% of respondents indicated this as a key reason for choosing MMEC, but by 2023, this had risen to 27.9%. The data shows a steady increase in firms' emphasis on MMEC's ability to deliver successful outcomes, reflecting a growing focus on measurable performance and track records.

Similarly, industry-specific knowledge has become more important over this period. In 2019, 11.1% of respondents highlighted this factor, but by 2023, 26% considered MMEC's understanding of their specific industry as a significant reason for their choice. This suggests that manufacturers increasingly value expertise that is not just broad but also tailored to the needs of their sector.

Table 0.3 Important factors for your firm choosing MMEC

Factor	2019	2020	2021	2022	2023
1 Center staff expertise	69.8%	67.6%	63.3%	70.7%	72.1%
2 Reputation for results	17.5%	22.1%	22.2%	23.2%	27.9%
3 Knowledge of your industry	11.1%	19.1%	20.0%	18.2%	26.0%
4 Cost price of services	36.5%	33.8%	28.9%	22.2%	19.2%
5 Fair and unbiased advice services	25.4%	25.0%	25.6%	29.3%	19.2%
6 Specific services not available from	7.9%	20.6%	13.3%	15.2%	18.3%
7 Other	11.1%	4.4%	6.7%	6.1%	5.8%
8 Lack of other providers nearby	9.5%	5.9%	4.0%	2.0%	1.9%

In contrast, the cost of services has become less important as a deciding factor. In 2019, 36.5% of respondents cited cost as a reason for choosing MMEC, but this has steadily declined, dropping to 19.2% in 2023. This reduction indicates that while cost remains relevant, it is no longer as decisive as it was five years ago.

The factor of fair and unbiased advice has also seen a decline in importance. It fluctuated around 25% from 2019 to 2021, but by 2023, only 19.2% of respondents highlighted this as a key reason for selecting MMEC. This could suggest that while neutrality is still valued, it is not as critical a concern for manufacturers as it once was.

One area that has grown in significance is the availability of specific services not offered elsewhere. In 2019, just 7.9% of respondents mentioned this as a reason for choosing MMEC, but by 2023, this had increased to 18.3%. This rise suggests that MMEC is increasingly seen as offering unique capabilities that firms cannot easily find with other providers.

Meanwhile, the factor of geographic proximity has sharply declined in relevance. In 2019, 9.5% of respondents cited the lack of other nearby providers as a reason for choosing MMEC, but by 2023, this had dropped to just 1.9%. This trend likely reflects the reduced importance of location in an era of virtual services and remote collaboration from other service providers.

In summary, the data from 2019 to 2023 shows that manufacturers are increasingly prioritizing staff expertise, industry-specific knowledge, and reputation for results, while cost considerations and proximity have become less critical. These shifts indicate changing priorities in how manufacturers evaluate external service providers, with a growing emphasis on manufacturing expertise, reputation for measurable outcomes, and specific industry knowledge.

4.3 Future Challenges

Over the past several years, manufacturers have faced an evolving set of challenges, and the data from the NIST questionnaire from 2019 to 2023 provides insight into these shifting priorities. These challenges reflect both the broader changes in the industry and the impact of specific disruptions, such as the COVID-19 pandemic, supply chain instability, economic fluctuations, and ongoing workforce challenges faced by the industry broadly.

One of the most consistently mentioned concerns has been employee recruitment and retention. By 2023, this challenge was cited by 56.7% of respondents, maintaining its position as one of the top issues manufacturers faces. The difficulty in attracting and retaining skilled labor has been a prominent issue throughout the period, especially as labor market conditions have tightened. Even though there has been a slight dip from its peak in 2021, when 60% of respondents highlighted it as a key challenge, recruitment and retention remain critical concerns for manufacturers striving to maintain their workforce in a competitive market.

Another major challenge that has been present over the years is ongoing continuous improvement and cost reduction strategies. In 2019 and 2020, this was the leading concern, with more than 70% of respondents identifying it as a priority. However, its prominence has decreased slightly, with 59.6% mentioning it in 2023. Despite this decline, the need for continuous improvement remains crucial for manufacturers as they seek to optimize operations and maintain competitiveness, particularly in an environment where cost pressures are ever-present.

Manufacturers have also focused on identifying growth opportunities, which have steadily risen in importance. In 2023, 52.9% of respondents cited this as a future challenge, up from 42.4% in 2022. The ability to find and capitalize on new markets, products, and expansion opportunities is a consistent priority, though it has faced ups and downs, particularly in light of economic uncertainty and market disruptions over recent years.

Table 0.4 Important future challenges facing your business.

<i>Factor</i>	2019	2020	2021	2022	2023
<i>Ongoing Continuous</i>	71.4%	70.6%	61.1%	55.6%	59.6%
<i>Employee Recruitment and</i>	46.0%	54.4%	60.0%	58.6%	56.7%
<i>Identifying Growth Opportunities</i>	36.5%	45.6%	44.4%	42.4%	52.9%
<i>Product Innovation/Development</i>	42.9%	45.6%	27.8%	33.3%	37.5%
<i>Sustainability in products and</i>	20.6%	14.7%	21.1%	20.2%	21.2%
<i>Managing partners and suppliers</i>	20.6%	16.2%	24.4%	31.3%	20.2%
<i>Financing</i>	11.1%	17.6%	11.1%	12.1%	15.4%
<i>Technology Needs</i>	12.7%	10.3%	7.8%	10.1%	10.6%
<i>Exporting/Global Engagement</i>	12.7%	7.4%	5.6%	7.1%	6.7%

Product innovation and development has shown fluctuating importance across the years, with 42.9% of respondents identifying it as a challenge in 2019, then dipping to 27.8% in 2021, and rebounding slightly to 37.5% in 2023. This fluctuation may reflect changing priorities during the pandemic, as manufacturers shifted their focus to short-term survival strategies before returning to longer-term goals like innovation once conditions stabilized.

The impact of supply chain issues has also emerged as a significant concern. Managing partners and suppliers peaked as a priority in 2021 and 2022, when 31.3% of respondents identified it as a challenge. This rise was likely due to the global supply chain disruptions caused by the pandemic, which affected the availability of materials and the reliability of supplier networks. By 2023, concerns about managing partners and suppliers had decreased to 20.2%, suggesting some stabilization in supply chains, though the issue remains a persistent challenge for many manufacturers.

Another area that has remained steadily relevant is sustainability in products and processes. Between 2019 and 2023, around 20% of respondents consistently mentioned sustainability as a challenge. In 2023, 21.2% of manufacturers highlighted this issue, reflecting a growing awareness of the need to incorporate environmentally responsible practices into their operations. While sustainability is not yet a top concern for the majority of manufacturers, it is an increasingly important issue that is likely to gain more attention as environmental regulations tighten and consumer demand for sustainable products grows.

Financing has also seen an increase in prominence over the years. In 2023, 15.4% of respondents indicated that securing financing was a challenge, up from 11.1% in 2019. This increase likely reflects the rising difficulty in obtaining affordable financing due to economic conditions such as tightening credit and rising interest rates, as central banks, including the Federal Reserve, have taken measures to control inflation. For many manufacturers,

securing the necessary funds for expansion, or even maintaining operations, has become more complex and uncertain.

Meanwhile, technological needs have remained a relatively lower-level concern throughout the period, with around 10% of respondents consistently mentioning it. In 2023, 10.6% cited technology as a challenge. This indicates that while technology adoption and the need for digital transformation are important, they do not yet represent the most pressing concern for most manufacturers when compared to issues like labor shortages and cost management.

Lastly, exporting and global engagement has consistently been the least frequently mentioned challenge, though it did see a slight rise in concern during 2022. By 2023, only 6.7% of respondents identified this as a key issue. This suggests that while some manufacturers are focused on global markets, the majority are more concerned with addressing domestic operational challenges, such as workforce shortages and supply chain disruptions, rather than international expansion or engagement.

In summary, the challenges facing manufacturers over the last five years reveal a shift in priorities driven by both short-term disruptions and long-term strategic concerns. Labor shortages, cost management, and growth opportunities have remained central concerns, while issues such as sustainability, financing, and supply chain management have gained importance in response to broader economic and market conditions. The data show that manufacturers are increasingly grappling with a complex mix of operational and strategic challenges, with many factors playing a role in shaping their future business priorities.

4.4 Quantitative Estimates of MMEC Visit Outcomes

The most recent survey results for 2023 offer valuable insight into the impact of MMEC's services on Montana manufacturers, highlighting both successes and areas of change. Despite a 5% increase in survey participation, many key metrics showed slight declines compared to the previous year, reflecting the evolving challenges facing the industry. Nevertheless, MMEC continues to deliver meaningful outcomes, particularly in job creation, sales growth, cost savings, and investment management. Table 5.5 summarizes these results over the past three years as well as the total of the past decade.

In 2023, MMEC helped create or retain a total of 487 jobs, marking a notable increase from the 367 jobs reported in 2022. This rebound included 367 retained jobs and 120 new jobs, reflecting MMEC's strong impact on workforce development in a challenging labor market. The increase in job outcomes suggests that MMEC's services continue to provide critical support for employment stability and growth in the manufacturing sector.

Table 0.5 Total sales, costs, investments and jobs earned or saved

	2021	2022	2023	2013-2023
Total jobs saved/retained	479	367	487	4,796
Retained jobs amount	269	115	367	--
Created jobs amount	210	252	120	--
Total sales increased/retained	\$74,502,332	\$73,503,080	\$46,002,282	\$770,253,209
Increased sales amount	\$39,056,836	\$37,059,140	\$14,147,861	--
Retained sales amount	\$35,445,496	\$36,443,940	\$31,854,421	--
Total Investment	\$21,534,252	\$17,266,674	\$27,517,315	\$243,592,050
New products	\$2,734,879	\$2,530,417	\$2,874,328	\$19,995,081
Human capital	\$1,380,794	\$792,749	\$1,556,839	\$10,013,566
Plant or equipment	\$9,823,817	\$11,712,765	\$21,237,251	\$96,757,365
Information systems/software	\$725,420	\$652,803	\$608,097	\$6,998,999
Other areas	\$6,869,342	\$1,577,940	\$1,240,800	\$109,827,039
Avoid unnecessary investment	\$3,290,337	\$4,778,000	\$4,317,500	\$18,238,882
Cost savings amount	\$8,496,615	\$5,847,830	\$8,724,871	\$86,008,872

The sales outcomes in 2023 saw a decrease from the previous year. Manufacturers reported a total of \$46 million in new and retained sales, down from \$73.5 million in 2022. This included \$14.1 million in new sales and \$31.9 million in retained sales. While this represents a significant drop in new sales, retained sales remained relatively steady. The decline in total sales could be attributed to broader economic factors, such as slowing market expansion or difficulties in reaching new customers, but MMEC's role in helping businesses preserve their existing revenues remains critical.

Cost savings in 2023 recovered from the previous year's dip, with manufacturers reporting \$8.7 million in savings, up from \$5.8 million in 2022. This increase reflects MMEC's ongoing ability to help companies identify and implement cost-cutting measures, allowing firms to operate more efficiently and preserve resources in a volatile economic environment. These savings provide a valuable buffer for manufacturers looking to navigate rising costs and other operational challenges.

In terms of capital and workforce investments, 2023 saw a significant increase compared to 2022. Total investments rose to \$27.5 million, up from \$17.3 million the previous year. This surge was driven primarily by increased spending on plant and equipment, which reached \$21.2 million in 2023. Investments in human capital also grew, with companies allocating \$1.6 million toward workforce development, compared to just \$792,749 in 2022. This rise in investment suggests that manufacturers are feeling more confident about their long-term growth prospects and are committing resources to expand their operations and improve their capabilities.

Another area that remained strong in 2023 was the ability of MMEC to help companies avoid unnecessary investments. Manufacturers reported avoiding \$4.3 million in unnecessary spending, a slight decrease from the \$4.8 million in 2022 but still a substantial figure. MMEC's expertise in advising firms on optimal investment strategies continues to prevent costly missteps, saving manufacturers significant amounts of money that might otherwise have been wasted.

In summary, the 2023 survey results reflect both positive and challenging trends for Montana manufacturers. Job creation and retention saw a notable increase, with MMEC playing a key role in helping businesses maintain and grow their workforces. Cost savings also rebounded, and capital investments surged, signaling renewed confidence in growth. However, sales declined, particularly in new sales, suggesting that manufacturers may be facing headwinds in expanding market share. Despite these challenges, MMEC's ability to deliver substantial savings and guide firms in avoiding unnecessary investments underscores its ongoing value to the manufacturing sector in Montana.

4.5 Economic Impacts of MMEC Visits and Services

MMEC clients were asked about the number of new jobs created and the number of jobs retained because of working with MMEC. The 2023 respondents reported 120 new jobs created and 367 jobs retained for a total of 487 jobs.

The preliminary data suggest that average wages for Montana manufacturing jobs were about \$65,057 in 2023 – compared to the state average income of \$56,859. Total wages associated with the new and retained jobs were approximately \$23.9 million. Using an average tax rate of 4.95%, the new and retained workers paid approximately \$1.18 million in Montana individual incometaxes.

The BBER's economic policy model, REMI, estimates that the employment multiplier of these created and retained jobs in 2023 is 3.07. This suggests that about 3.07 new jobs will be created in other sectors because of one new manufacturing job.

Calculations based on the REMI model are reported in Table 4.6. The 487 new and retained jobs associated with MMEC services reported in 2023 led to a total of 1,481 new jobs in Montana and approximately \$88.2 million in statewide wages. The additional wages generated \$4.4 million in Montana individual income tax revenue.

Table 4.6: Economic impacts of MMEC services, 2023

<i>Sector</i>	<i>Jobs</i>	<i>Wages</i>	<i>Income taxes</i>
<i>Manufacturing</i>	487	\$31,682,759	\$1,568,297
<i>Other industries</i>	994	\$56,517,846	\$2,797,633
<i>Total</i>	1,481	\$88,200,605	\$4,365,930

4.6 Return on Investment and Fees

In 2023, the Montana Manufacturing Extension Center (MMEC) continued its crucial role in supporting the state's manufacturing sector with significant public and private funding. In this year, MMEC was awarded \$839,000 from the National Institute of Standards and Technology (NIST), with the same requirement to match those federal funds. MMEC matched the federal award with \$625,000 in funding from the state of Montana and an additional \$827,435 in project fees paid by Montana manufacturers who utilized MMEC's services.

To assess the effectiveness of these investments in 2023, BBER calculated the Return on Investment (ROI) for both the state of Montana and MMEC clients based on the economic impact they realized through these funds.

In 2023,
 - MMEC's ROI to the Montana taxpayer was **5.99 to 1**.
 - ROI for private firms was **20.32 to 1**

ROI for the State of Montana

The ROI for the state of Montana is calculated by comparing the increase in Montana individual income taxes generated from jobs created or retained due to MMEC's efforts, to the state's contribution to MMEC. In 2023, MMEC's activities generated approximately \$2.9 million in Montana individual income taxes from both direct and indirect jobs related to their work.

Using the ROI formula:

$$ROI = \frac{\text{Benefits from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}} = \frac{\$4,365,930 - \$625,000}{\$625,000} = \$5.99 \text{ to } \$1$$

This means that for every dollar Montana invested in MMEC in 2023, the state gained \$5.99 in additional individual income tax revenue.

ROI for MMEC Clients

The calculation for MMEC clients' ROI remains the same as previously explained, based on the cost savings, avoided unnecessary investments, and gross margin from new or retained sales.

Benefits to MMEC Clients:

- Cost savings: \$8,724,871
- Avoided unnecessary investments: \$4,317,500.
- New or retained sales: \$46,002,282, with a 10% gross margin resulting in \$4,600,228.

Total benefits for MMEC clients:

$$\text{Total benefits} = \$8,724,871 + \$4,317,500 + \$4,600,228 = \$17,642,599$$

The cost of investment for MMEC clients in 2023 is \$827,435 in project fees.

Using the ROI formula:

$$ROI = \frac{\text{Benefits from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}} = \frac{\$17,642,599 - \$827,435}{\$827,435} = \$20.32 \text{ to } \$1$$

This means that for every dollar MMEC clients paid in project fees to MMEC in 2023, they saved or gained \$20.32 resulting in increased profits.