

No Workers, No Problem

The Case for Increasing Productivity

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Montana businesses are working hard to keep up with demand for their goods and services. To keep pace with growing demand, businesses are hiring more workers, evidenced by continued employment growth in Montana. Hiring more workers is one solution for boosting output, but it can be difficult when there are few people in the labor market waiting for a job opportunity. Today's low unemployment rates and slow-growing labor force have made productivity improvements especially important for growth in Montana's economy. Productivity refers to the efficiency of the production process that turns capital, labor, and other inputs into goods and services with higher economic value than the individual inputs. Labor productivity specifically refers to the efficiency of the worker in converting inputs into value-added products. Higher labor productivity means that each worker is more efficient, producing more output per hour worked. This article explores productivity in Montana and its importance in helping the state maintain economic growth while workers are hard to find.

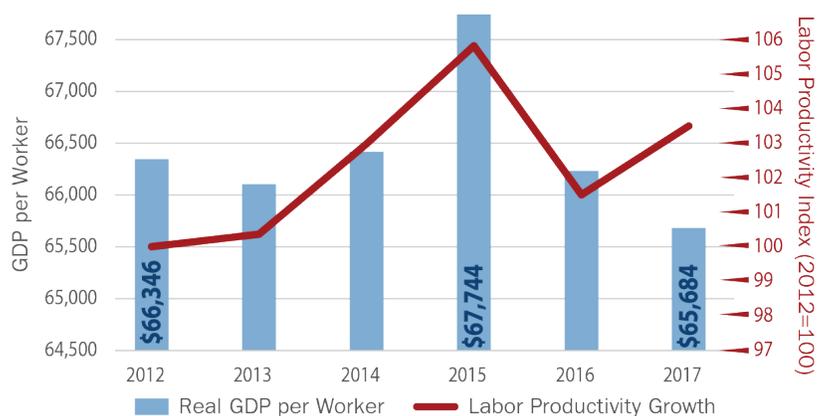
Measuring Productivity

Measuring productivity can be a difficult task, and labor productivity is only one piece of the puzzle. A worker's skillset and knowledge affect their output per worker hour (a rough measure of labor productivity), but labor productivity depends on more than worker abilities. Take Jake the cake maker, who wakes up and bakes cakes without mistakes, and averages 10 cakes baked in an 8-hour day. When Jake first began his job, he baked cakes with the occasional mistake, and therefore averaged only 7 cakes per day. Years of experience and annual baking conferences have boosted Jake's skills and knowledge, which has led to increased output and thus increased labor productivity. While labor productivity can be increased through worker education and training, it can also be improved by investments in capital equipment and technology, including automation, that increases the rate of output per worker. If Jake wants to take his productivity to the next level, he could invest in an industrial mixer and upgrade his kitchen to add oven space.

The technology used, capital equipment (or real estate) available, and the prices of inputs and outputs affect labor productivity. Real Gross Domestic Product (GDP) per worker can be used as a broad measure of productivity that encapsulates all these factors. Real GDP per worker measures the average dollar value of production per worker across the entire economy or for a specific sector.

Real GDP per worker is related to, but not entirely tied to labor productivity. According to the U.S. Bureau of Labor Statistics (BLS), labor productivity in Montana increased 3.49% between 2012 and 2017, while real GDP per worker dropped from \$66,346

FIGURE 1
Real GDP per Worker and Labor Productivity
Montana, 2012-2017



Source: U.S. Bureau of Economic Analysis and U.S. Bureau of Labor Statistics, 2012-2017

to \$65,684, a 1% decrease. As **Figure 1** shows, real GDP per worker (overall productivity), and labor productivity trended the same direction from 2013-2016, but went different directions in 2012 and 2017.

The divergence between real GDP per worker and labor productivity comes from changes in the mix and allocation of labor within the economy, quality of job matching, and the prices of production inputs and outputs. Real GDP per worker also does not account for changes in average hours worked per worker. According the U.S. Census Bureau’s 2017 American Community Survey, the average Montana worker’s hours worked per week decreased by about 1% from 2012 to 2017. Therefore, a portion of the decline in real GDP per worker was due to a reduction in average hours worked.

Industry Productivity

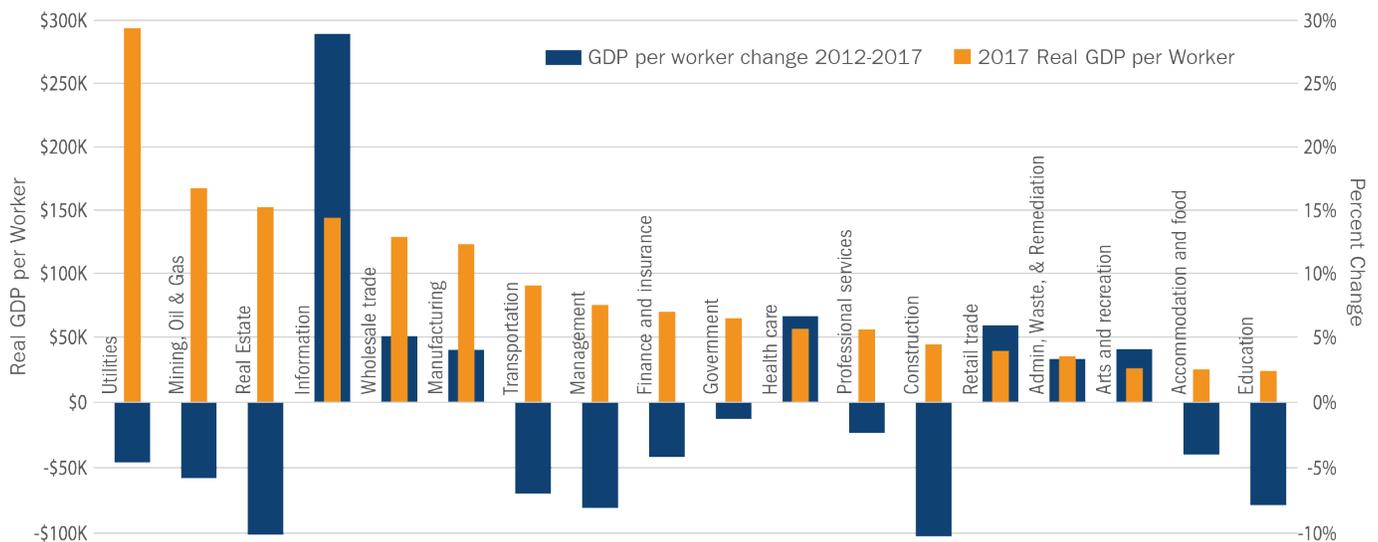
Montana’s industries have varying levels of productivity, with Utilities producing the highest real GDP per worker at nearly \$300,000 and the Education Services industry having the lowest at about \$25,000 per worker. **Figure 2** shows the 2017 real GDP per Worker and its change since 2012 for Montana’s major industry sectors. More productive industries, including Mining, Real Estate, and Manufacturing, tend to have large capital inputs and be less labor intensive. Hours worked plays a role here as well, with industries that have greater shares of part-time work

having lower real GDP per worker, including Retail Trade, Arts and Recreation, and Accommodations and Food Service. Healthcare and Construction are two interesting industries with generally low productivity per worker. These industries are both labor intensive and generally not suitable for automation, at least yet.

Within an industry, changes in GDP per worker can reflect changes in productivity, hours worked, and the mix of activities within an industry. For example, from 2012-2017, the Construction industry had productivity decreases. A pickup in residential construction, which is more labor intensive and lower productivity than heavy construction, could have contributed to the slight decline. Changes in the prices of outputs and hours worked can also have an impact. The Mining industry, and in turn the Transportation industry that served it, experienced decreased revenues and hours for workers due to dropping oil prices and coal prices, which decreased GDP per worker.

Finally, automation and technological improvements can also improve productivity and be used as a labor-saving tool to increase production while using the same or fewer labor inputs. The Information industry, which includes newspapers and magazines, is a good example of this. The industry’s well-documented financial difficulties resulting from changing media consumption habits necessitated productivity improvements, such as leveraging the internet as a publishing platform. This allowed many firms in the industry to stay in business in the face of reduced revenues and layoffs. Similarly, the Retail industry has had to

FIGURE 2
Real GDP per Worker and Change
 By Industry - Montana, 2012-2017



Source: U.S. Bureau of Economic Analysis, 2012-2017

improve productivity per worker in the face of pressures from online retailers. In the next decade, businesses will need to use productivity improvements to their advantage as the labor shortage makes workers harder to find or too expensive.

Productivity Gains from Labor Allocation

Statewide labor productivity can also be improved by better job matching and the reallocation of labor. Job matching refers to placing workers into jobs that maximize their skills and potential. For example, a worker with an advanced degree in chemistry working as a ski lift operator is not an efficient use of the worker’s most valuable skill set. Reallocating the worker into a job that improves the match between the worker’s skills and job demands improves productivity. Employers have productive benefits from job matching as well by improving alignment between their worker’s duties and skill sets.

The reallocation of labor is the movement of workers from jobs that are less productive to those that are more productive and profitable. Moves within an industry from a firm that is failing to one that is more successful can be a productive labor move. In the broader cycle of economic growth, workers and capital also move from mature industries towards emerging growth industries with greater productivity and profitability. More productive businesses generate more revenue per worker and can

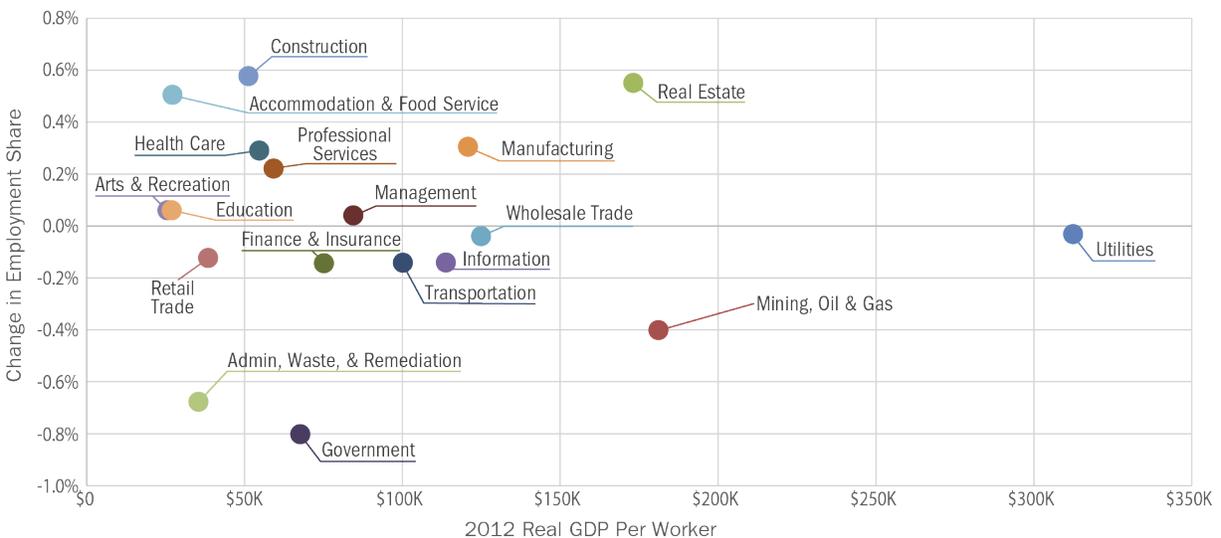
afford to pay higher wages to their workers than less productive competitors. As such, job switches for pay increases typically result in productive reallocations of labor.

Figure 3 plots each of Montana’s industries’ real GDP per worker against the industry’s growth in its share of total employment from 2012-2017. The overall decline in real GDP per worker is due, in part, to high productivity industries (Mining and Utilities) declining in employment share, while lower productivity industries (Construction and Accommodation and Food Services) gained in employment share. The Real Estate and Manufacturing industries, two higher real GDP per worker industries, gained in employment share, helping keep real GDP per worker from falling further. As workers become scarcer, Montana should expect more productive reallocations of labor driven by wage incentives.

The Benefits of Improving Productivity

Improving productivity makes it possible for real GDP to grow even when the supply of labor remains unchanged. **Figure 4** displays real GDP growth compared to employment growth, with blue counties having both real GDP and employment growth, grey counties having real GDP growth and employment losses, and the red counties having both real GDP and employment losses. County GDP growth is only shown from 2012 to 2015 due to data availability. From 2012 to 2015, 44 of Montana’s 56 counties had positive real GDP growth, while only 32

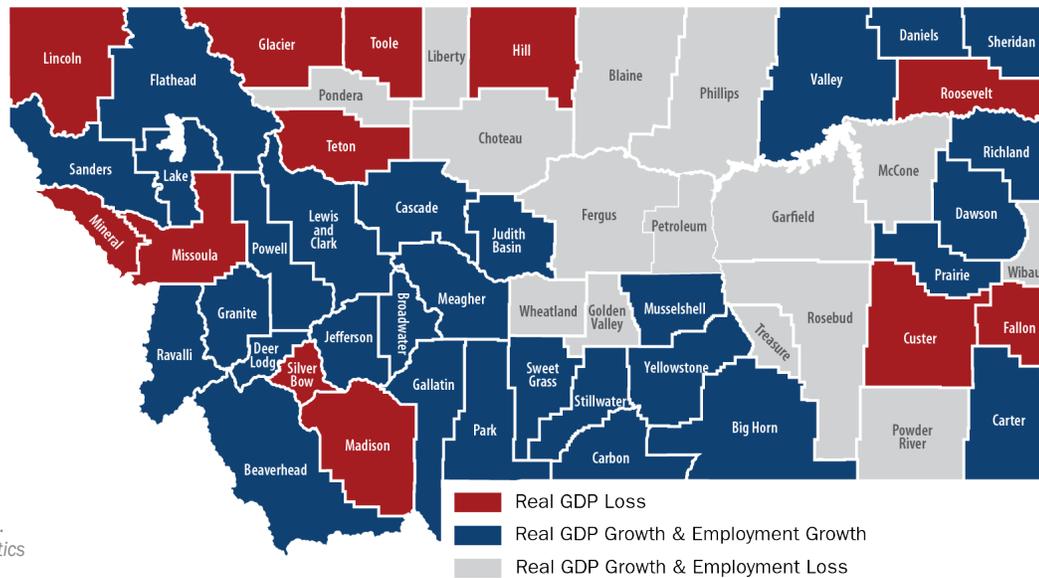
FIGURE 3
Employment Share Change vs. Real GDP per Worker
 Montana, 2012-2017



Source: U.S. Bureau of Economic Analysis, 2012-2017

FIGURE 4
Real GDP vs.
Employment
Growth

Montana,
 2012-2015



Source: U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics

experienced employment growth. While real GDP growth was widespread, employment growth had a regional pattern. The northwest and southwest regions experienced growth with employment losses occurring in a band across north central to southeast Montana.

However, most of the counties with employment decreases still experienced real GDP growth (grey counties on the map), a result of productivity improvements. Of the 24 counties that had negative employment growth, 15 had positive real GDP growth at the same time. Overall, 50 of Montana’s 56 counties had real GDP growth that outweighed employment growth. By having real GDP growth above employment growth (especially while employment declined), areas that may otherwise have experienced more severe economic decline were able to leverage productivity gains to maintain their local economies in the face of a shrinking labor force.

FIGURE 5
Labor Productivity and Hourly Compensation
 Montana, 2007-2017



Source: U.S. Bureau of Labor Statistics

Productivity improvements also beget improvements to worker wages. At least in theory, a business that produces more value per worker can pay those workers more. Although productivity and wage growth are not always in complete alignment, Montana did experience hourly compensation gains along with labor productivity gains over the last 10 years. Hourly pay increased about 31%, with labor productivity increasing about 14%. Other factors, including tight labor markets, also play a large role in compensation increases. However, improving labor productivity is also a meaningful way for workers to obtain higher pay.

Conclusion

Productivity increases will continue to be necessary for GDP to grow in Montana. The labor market is not expected to loosen up for another 5-10 years, and employment growth is predicted to slow to below-average growth rates as a result. For residents of Montana to continue to have gains in personal income, wages, and standard of living, growth in GDP will be essential. As seen in many of Montana’s rural counties, GDP growth despite lagging employment growth is possible. Businesses that enhance their workforce through training and education, or those that make investments in new technologies will be able to expand. The Montana Department of Labor & Industry continues to provide resources to workers to improve worker training, as well as labor market information that helps improve matching workers to occupations that suit them and maximizes their potential.