Rounds Consulting Group, Inc.
Economic and Policy Analysis

Advancing Arizona's Economy - Investment in Workforce Development

Spring 2022

Special Report Commissioned By:

Arizona Chamber of Commerce & Industry

Greater Phoenix Chamber

Northern Arizona Leadership Alliance
Diversified Thought. Unified Action.

SALC
Southern Arizona Leadership Council

Table of Contents

Executive Summary

Since 2008, the Arizona economy has become more diversified. Efforts made by public and private sector stakeholders to implement aggressive economic development policies and initiatives led to expansions in high value industries including manufacturing, financial activities, healthcare and professional and business services.

However, Arizona's education system is struggling to keep pace with the demands of our rapidly evolving economy. Arizona trails the national average in key measures of educational attainment. While the public university system has scaled-up quickly to educate and train more students – especially in STEM fields vital to the New Economy – it is apparent that growth will not meet the workforce demands now required.

This report endeavors to review several core questions about the relationship between Arizona's economic performance and post high school education:

- **How is Arizona's economy performing vs the national economy?**
- **Can Arizona reach national performance in key economic quality measures?**
- **How limiting is the lack of in state post-high school educational attainment to Arizona's continuing economic performance?**
- **Is Arizona's continued economic performance at risk due to a lack of post-high school educational attainment?**

While each of these questions is answered in detail, the bottom line is despite strong economic growth in terms of volume, Arizona has yet to reach its full potential. Arizona continues to trail the national economy in key quality measures such as per capita GDP, and unless Arizona sees significant improvements in degree production either through in-state education or through in-migration, current economic output levels are at risk.

With additional targeted investment in workforce development, including postsecondary education, Arizona will be well-positioned to attract competitive industries with high relative pay and opportunity for advancement. As documented by this study, Arizona would reap a sizable economic return on its investment.

The reason is two-fold – a better-educated citizenry not only earns more and generates greater economic growth, it also utilizes social services and government welfare at a much-reduced rate. The fiscal impacts are staggering…

Simply by reaching the U.S. average for educational attainment, Arizona would benefit by nearly $5 billion in additional state and local tax revenues over ten years.

Furthermore, fully resolving the bachelor's degree shortage would result in a 10-year cumulative state and local fiscal impact of $8 billion.

The needed boosts in workforce development and educational attainment will not occur by happenstance. It will require a coordinated effort involving state and local policymakers; private employers; public and private universities, community colleges and technical schools; Arizona's K-12 system; non-profits; and more. Each entity will need to play a specific role.

Arizona has an opportunity to become a national hub of technology, research and innovation. However, unless our state meets the workforce challenges inherent in these growing industries, Arizona's potential will be severely constrained by labor shortages.

In order to develop the workforce Arizona needs, efforts are necessary across post-secondary education – and earlier, through enhanced emphasis on skills development and technical education in high school. The consequences of inaction are equally stark. Between now and 2030, Arizona will experience an annual shortfall of 26,300 bachelor's degrees. That means 26,300 jobs will not develop or go unfilled. This translates into reduced capital investment, fewer quality jobs and less economic opportunity for Arizona families.

Tomorrow's prosperous economy and competitive workforce is dependent on investment in higher education today.

This investment is a crucial opportunity for Arizona and it is essential that the state's public universities, business organizations, economic development leaders and state and local policymakers work together to ensure Arizona reaches its potential – to the benefit of everyone in the state.

This analysis makes clear the crossroads ahead and the opportunity for Arizona's future. We are called to act. As leaders of Arizona's business organizations, we are eager to work together with the universities, policy and economic leaders to advance the future of our state.

Next Steps

As previously addressed, state policymakers will need to work on the full continuum of academic achievement, from high school graduation to community college and trade schools to university degrees. While this specific report monetizes the benefits related to closing the educational attainment gaps, extra emphasis was placed on bachelor's degrees.

It is recommended that further research be completed at the community college and trade school levels. It is also recommended that additional research be conducted on what specific proposals should be listed and then placed in a proper queue in order to close the achievement gaps that are listed and monetized in this analysis.

In other words, the intent of this review is to highlight the opportunities (and potential losses) related to closing the achievement gap. The next step is to identify the specific projects that need to be implemented so the state can benefit at the levels calculated in this report.

Note: This report was made possible with support and cooperation from the state's business community organizations.

Introduction and Methodology

Arizona is currently among the national leaders across various metrics of economic growth, including population, employment and GSP. While the state is currently among the nation's leaders across various metrics of economic growth, including population, employment growth and GSP, and is widely considered a best place to live and do business, there remains work to be done in enhancing the quality of Arizona's economic growth.

This study, commissioned by Arizona's leading business organizations, is intended to provide perspective on the extent which greater educational attainment will positively impact the Arizona economy. Conversely, it demonstrates the correlation and risk of lower educational attainment and an underperforming economy.

The analysis begins by studying Arizona's economic strengths and the performance of various industries during business cycle contractions and expansions. This provides context on the industries that are the most resilient during business cycles.

Industry trends, growth projections, and market outlooks are used to determine future demand for the industries in Arizona. A review of current workforce conditions and educational requirements for each industry was conducted to determine what is required to bring the economic output to the national level.

The analysis also includes case studies on the economic successes in Salt Lake City and Austin (Appendix A), providing insight as to best practices that can be implemented in Arizona.

Key Findings Indicate Opportunity for Improvement

The Arizona economy has consistently been more resilient and has outperformed the national economy with the exception of the Great Recession of 2008. Despite recent economic advancements, Arizona continues to lag nationally in values of per capita personal income, per capita gross state product (GSP) and average wages. Addressing these economic deficits begins with enhancing educational attainment in Arizona, which trails national levels.

This should be viewed as an opportunity. The state is outperforming most others in terms of volume growth, and opportunities exist to expand the economy even further in terms of job quality. Consider:

- The demand for jobs in Arizona that require higher educational attainment has been increasing over the previous 10 years, and will continue to increase over the next decade and beyond.

- In 2019, those with a high school diploma in Arizona earned $7,200 more than someone without a high school diploma. Those with a bachelor's degree earned $22,500 more than someone with a high school diploma.[1]

- During the most recent recession, the number of jobs in Arizona that required less than a high school diploma declined by 21.8%. This compares to the 11.4% decline in jobs that require at least a high school diploma, and only a 0.2% decline in jobs that require at least a bachelor's degree.

- As of 2019, 29.5% of people in Arizona above the age of 25 report having a bachelor's degree or higher, compared to the national average of 32.1%.[2] This includes individuals currently employed, as well as those retired or not working by choice.

- However, from 2010-2020, the share of Arizona jobs that required a bachelor's degree or higher increased from 16.1% (or 380,900 jobs) to 26.5% (or 751,100 jobs). By 2030, it is estimated that 27.6% (or 920,800 jobs) of Arizona's jobs will require a bachelor's degree or higher.

- Thus, at the present time, Arizona is ***underproducing*** bachelor's degrees. Arizona will produce an estimated 68,000 annual job openings that require a bachelor's degree from 2020-2030.[3] Under current conditions, including migration patterns, there will be an annual shortage of 26,300 bachelor's degrees. State leaders will need to support workforce initiatives at the universities, community colleges and technical schools.

- Enhancements in the number of graduates with degrees from private education institutions in Arizona, and enhancements in the in-migration of workers with at least a bachelor's degree, will help to modestly reduce this shortage. However, Arizona will need to improve educational outcomes from within the state in order to fully meet the future workforce demand.

- At the present time, Arizona lags behind the national average in measures of economic quality including per capita personal income, per capita GSP, and average wages. These measures will improve with increases in educational attainment.

[1] U.S. Census Bureau, American Community Survey, 2015-2019 5-year estimates
[2] U.S. Census Bureau, American Community Survey, 2015-2019 5-year estimates;
[3] U.S. Bureau of Labor Statistics; Rounds Consulting Group, Inc.

- In one scenario, to reach national averages in the economic quality measures, the state would need to add 623,100 jobs, 165,300 of which are base sector jobs earning an average of $140,500.[4] In the same scenario, 257,300 of the 623,100 jobs would require at least a bachelor's degree.

- The increase in productivity related to enhanced GSP and employment counts would increase the state's economic output by $83.6B and generate $4.0B in new tax revenues for the state and local governments each year, far exceeding investment costs related to policy implementation.

- For a more modest goal, if Arizona avoids the current decaying trend and reaches the national average in the high school graduation rate, college enrollment rate and college completion rate, an additional 9,500 high school graduates, 19,500 college enrollees, and 14,800 new college graduates would be produced each year. Even this accomplishment would leave Arizona short of the degrees required to maintain current economic output.

- The advancements related to expanded educational attainment to match the national average would generate approximately $500M in additional state and local tax revenues each year. The related economic advancements will be small at first but will grow similar to how compound interest impacts an initial investment over time. This effort can be considered "compound economic development."

Impact of Increased Educational Attainment is Significant Over Time

The economic and fiscal benefits related to matching the nation as a whole on educational attainment includes two separate calculations. First, Arizona's performance compared to the U.S. as a whole is declining. Therefore, the state must first reverse the downward trend. The second calculation assumes the State improves its educational attainment to the national average.

For example, the high school graduation rate in Arizona was 80.2% in 2016. In 2020, this rate declined to 78.2%. The analysis assumes as a baseline that this rate would further decline to 75.0%. In contrast, the national high school graduation rate has risen since 2016, from 84.0% to 86.0% in 2019 (the latest available data). The calculations are made by comparing the further decayed educational attainment level for Arizona (i.e., 75.0% vs. the 86.0% posted by the nation as a whole. Since policy impacts are often described over a 10-year period, the $500M fiscal impact of raising educational attainment in Arizona per year, on a cumulative basis, equals roughly $5.0B over a decade.

As noted, in our analysis, reaching national levels of high school graduation rates and college enrollment rates will still fail to meet Arizona's growing demand for bachelor's degrees. The economic impact analysis suggests if the supply of additional bachelor's degrees advances to meet the aforementioned shortage of 26,300 per year, resolving the bachelor's degree shortage would result in a 10-year state and local fiscal impact of approximately $8.0B.

Regardless of the method of analysis (i.e., either matching the nation's educational attainment rate or eliminating the estimated annual shortfall in bachelor's degrees), the benefits to the state are significant and a well-designed plan to improve Arizona's position in these statistics will likely produce a very high ROI for taxpayers as well as the business community.

[4] U.S. Bureau of Economic Analysis; Rounds Consulting Group

Economic Performance and Resiliency

Arizona's Performance During Business Cycles

The National Bureau of Economic Research (NBER) reports that, in the last 20 years, there have been three recession periods and two expansion periods. As defined by the NBER, a recession is a period between a peak of economic activity and its subsequent trough, whereas an expansion is a period between the trough and peak.

The earliest recession that was reviewed for this report began in March 2001 and ended in November 2001 (an 8-month recession period). This was followed by a 120-month expansion period from December 2001 until December 2007, when an 18-month recession period started, (also referred to as the Great Recession) lasting until June 2009. Following the Great Recession, an expansion period lasted for 128 months from July 2009 until February 2020, when the COVID-19 pandemic caused the most recent economic contraction.

Table 1: U.S. Business Cycle Expansions and Contractions

Business Cycle Reference Dates				Length of Cycle (months)	
Peak of Cycle		Bottom of Cycle		Contraction	Expansion
Month	Year	Month	Year	Peak to Bottom	Previous Bottom to Peak
March	2001	November	2001	8	120
December	2007	June	2009	18	73
February	2020	April	2020	2	128

Source: National Bureau of Economic Research

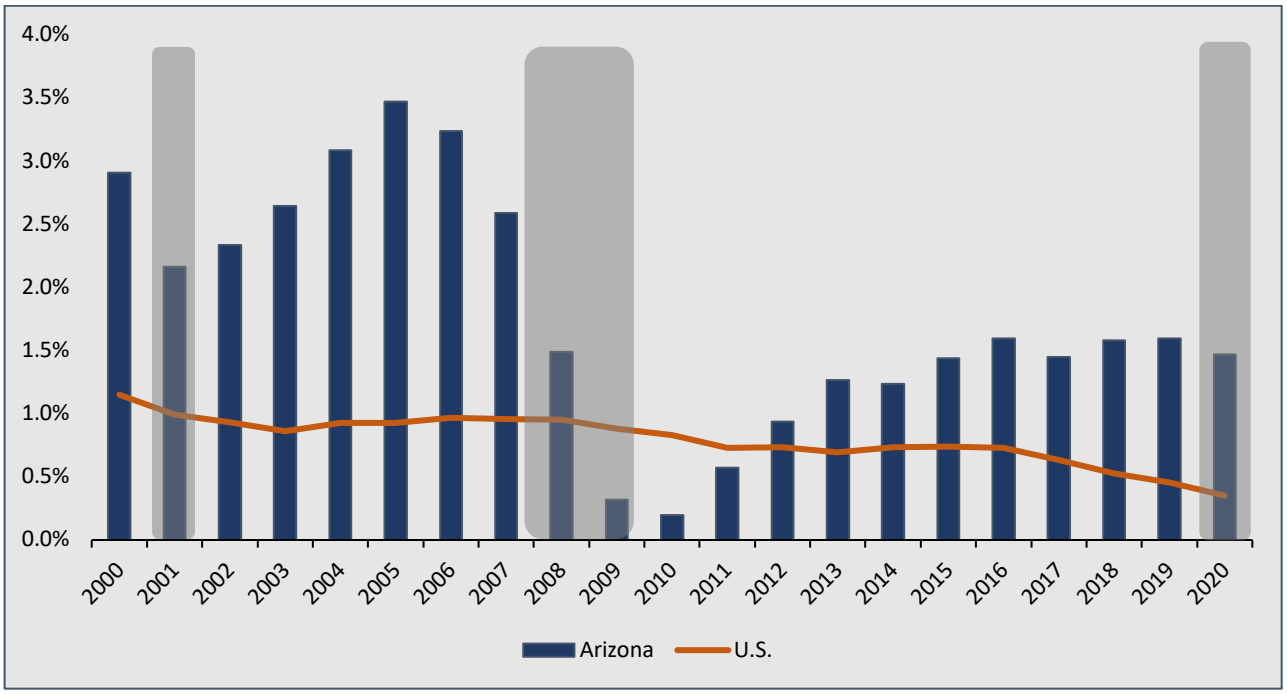
Population Growth Cycles in Arizona Compared to the U.S.

Over the previous two decades, Arizona's population growth has exceeded the nation's population growth. From 2000-2020, Arizona's population grew at an average rate of 1.8% per year while the national average annual population growth rate was 0.8% over the same timeframe.

During periods of economic recession, annual population growth in Arizona regularly outpaced the U.S., apart from the years immediately following the Great Recession. For example, from 2001-2002, Arizona's population grew 2.3% compared to the national growth rate of 0.9%. However, following the Great Recession, Arizona's population growth declined below the national average. Population in Arizona grew by 0.3% from 2008-2009 compared to a 0.9% growth nationwide during the same time frame.

Population growth in Arizona continued to lag the national level until 2012 when Arizona once again exceeded the national annual growth. This trend continued through the latest recession and is expected to continue into the future.

Figure 1: Annual Population Change in Arizona and the U.S.



Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity

Employment Growth Cycles in Arizona Compared to the U.S.

Prior to the Great Recession, Arizona's employment was also consistently more resilient than the national economy. Beginning in the 2001 recession, from 2001-2002, employment in Arizona grew by 0.1% while employment across the U.S. declined by 1.1%. Arizona also recovered the 27,000 jobs lost during the 2001 recession in 11 months. This was faster than the U.S., which returned to its pre-recession employment level in 37 months.

Arizona's economy grew exceptionally well compared to the national average in terms of employment growth during the period of economic expansion from 2002-2007. Employment in Arizona grew at an average annual rate of 3.4% during this time, while national employment grew at an average annual rate of 1.1%.

However, this trend did not continue during the Great Recession. Employment in Arizona declined 7.2% (189,900 jobs) during the Great Recession (2008-2009), while national employment fell 4.3% (5.9M jobs). It took 79 months for Arizona to recover the 189,900 jobs lost during the Great Recession. This was nearly 2 years longer than the national recovery, which took 58 months.

The struggles experienced in Arizona during the Great Recession presented an opportunity to address Arizona's resiliency. After the Great Recession, policy and economic development leaders seized the opportunity to shore up the economy by implementing favorable tax regulations for business recruitment and began to heavily invest in economic development initiatives that focused on creating jobs throughout the state. This effort was successful and from 2010-2019 Arizona was among the nation's leaders in employment growth.

During this time, employment in Arizona grew at an average growth rate of 2.5% per year, while employment in the U.S. grew at an average rate of 1.7%. While Arizona's economic growth rate was less than the growth

experienced over the previous expansion period (2002-2007), the growth was more aggressively driven through base sector development and enhancing the state's economic fundamentals.

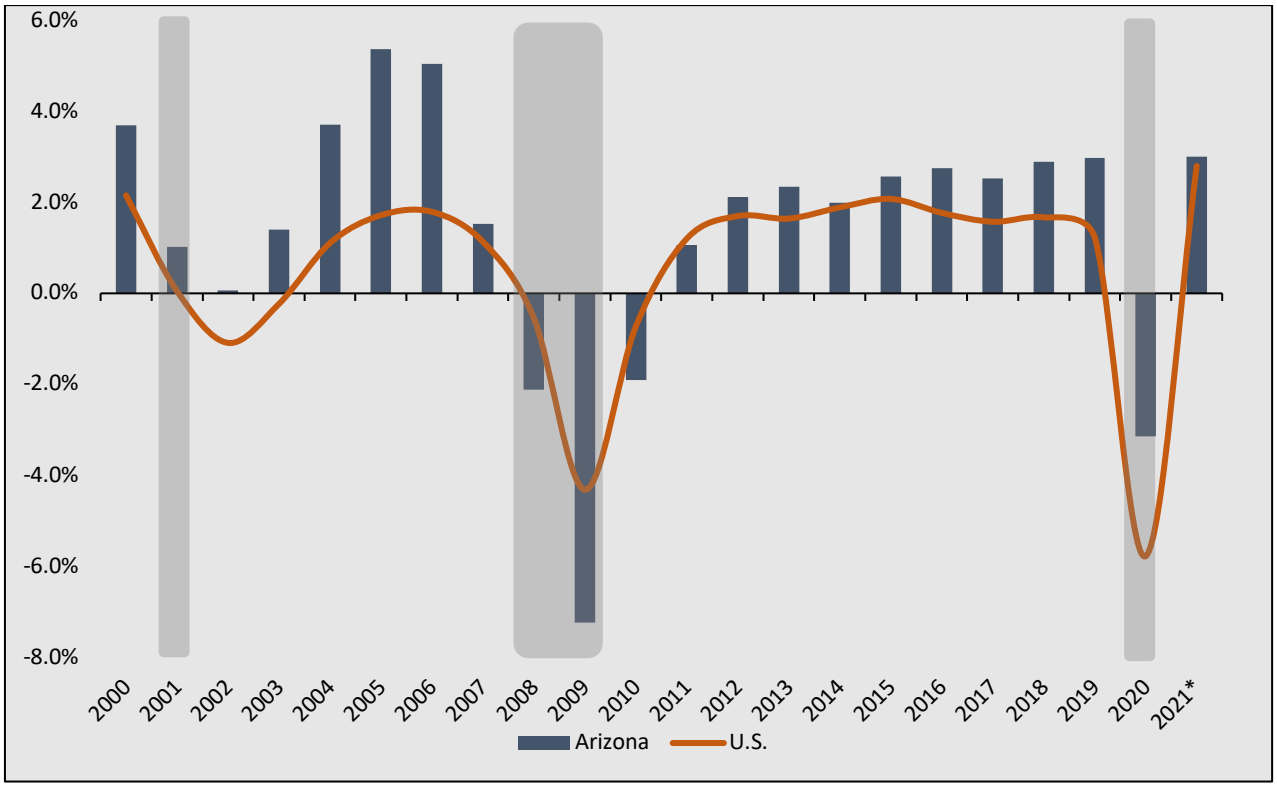
The increased focus on fundamentals stabilized the Arizona economy and increased its resiliency. The stability and resiliency were tested during the most recent recession. In 2020, the COVID-19 pandemic forced the regional, national, and global economies to close, and significantly reduced national and global economic activity.

During and following the Covid-19 recession, Arizona performed well relative to the overall U.S. economy in terms of job resiliency. This was a result of quality public policy design. ***Similar to the period following the Great Recession, state leaders are now provided with an opportunity to further enhance Arizona's economic growth trajectory and prepare against future economic threats.***

From peak employment levels in February of 2020, national employment declined 14.7% (22.4M jobs), while Arizona employment fell 11.1% (331,500 jobs). Arizona also recovered the lost jobs of the most recent recession at a quicker pace than the U.S. as a whole. As of November 2021, Arizona has recovered 101.5% of the jobs lost during the most recent recession, while the U.S. has recovered 84.0%.

Overall, employment in Arizona performed better than the U.S. from 2000-2020, growing at an average annual rate of 1.2% compared to a national average growth rate of 0.4% per year over the same time period.

Figure 2: Annual Change in Arizona and U.S. Employment



Note: Gray bars represent recession periods. *Through November 2021.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

Economic Output in Arizona Compared to the U.S.

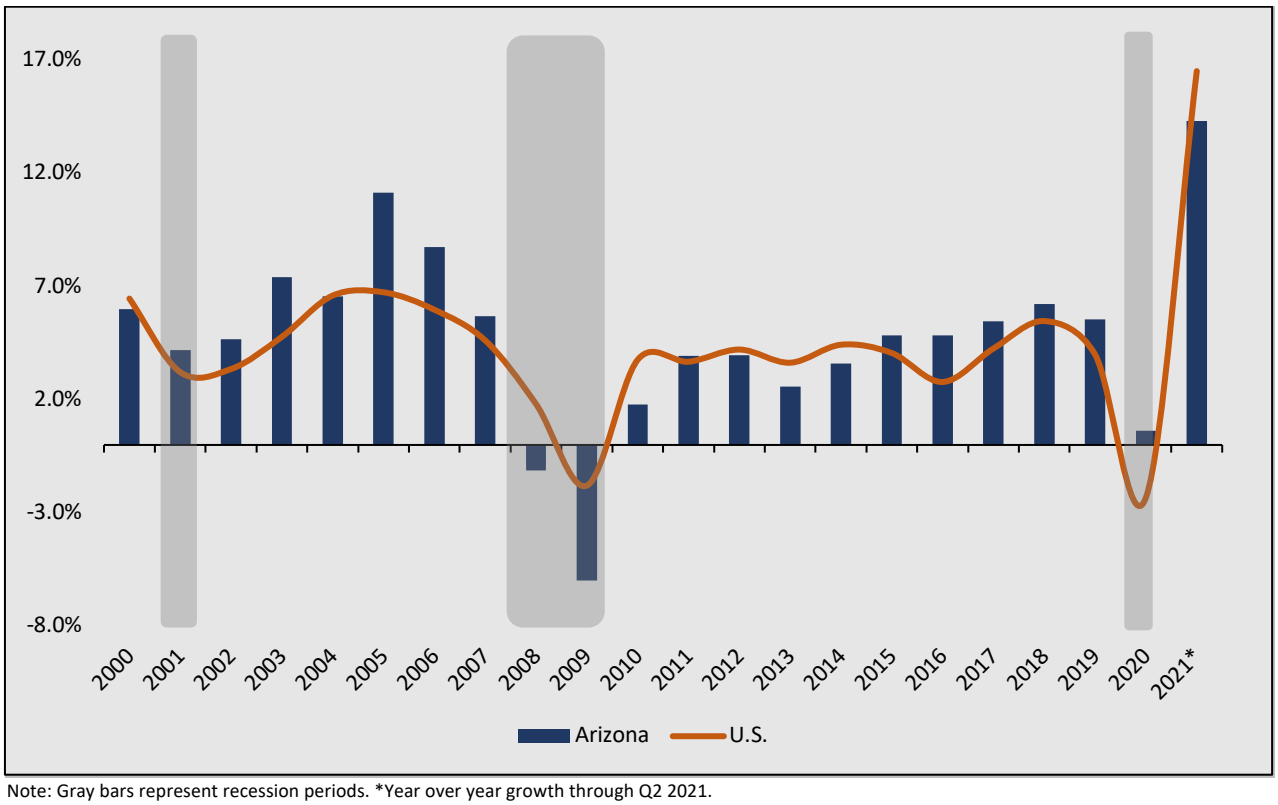
When compared to the U.S. and measured across periods of economic expansion and contraction, economic output in Arizona follows a similar pattern as employment.

Data available from the U.S. Bureau of Economic Analysis (BEA) reports that total economic production (as measured by GSP) in Arizona performed better relative to the U.S. during the 2001 recession period and worse during the Great Recession. From 2001-2002, Arizona's GSP grew 4.7% while U.S. GDP grew 3.4%. During the Great Recession, economic production declined by 6.0% in Arizona. This compares to a 1.8% decline in national economic production.

During the expansion period that followed the Great Recession, Arizona continued to strengthen its economic base while maintaining levels of GSP growth that exceeded national averages. GSP in Arizona grew at an average annual rate of 4.5% from 2010-2019, while U.S. GDP grew at an average annual rate of 4.1% over the same period.

Both Arizona and the U.S. have recovered well since the most recent recession. As of Q2 2021, GSP in Arizona has grown 14.3% compared to 2020, while national GDP has grown 16.5% compared to Q2 2020 (Figure 3). Overall, for the last two decades, Arizona has performed better than the U.S. in terms of economic production. From 2000-2020, Arizona's GSP grew at an average rate of 4.2% per year. Over the same timeframe, U.S. GDP grew at an average annual rate of 3.6%.

Figure 3: Annual Change in Arizona GSP and U.S. GDP



Note: Gray bars represent recession periods. *Year over year growth through Q2 2021.
Source: U.S. Bureau of Economic Analysis

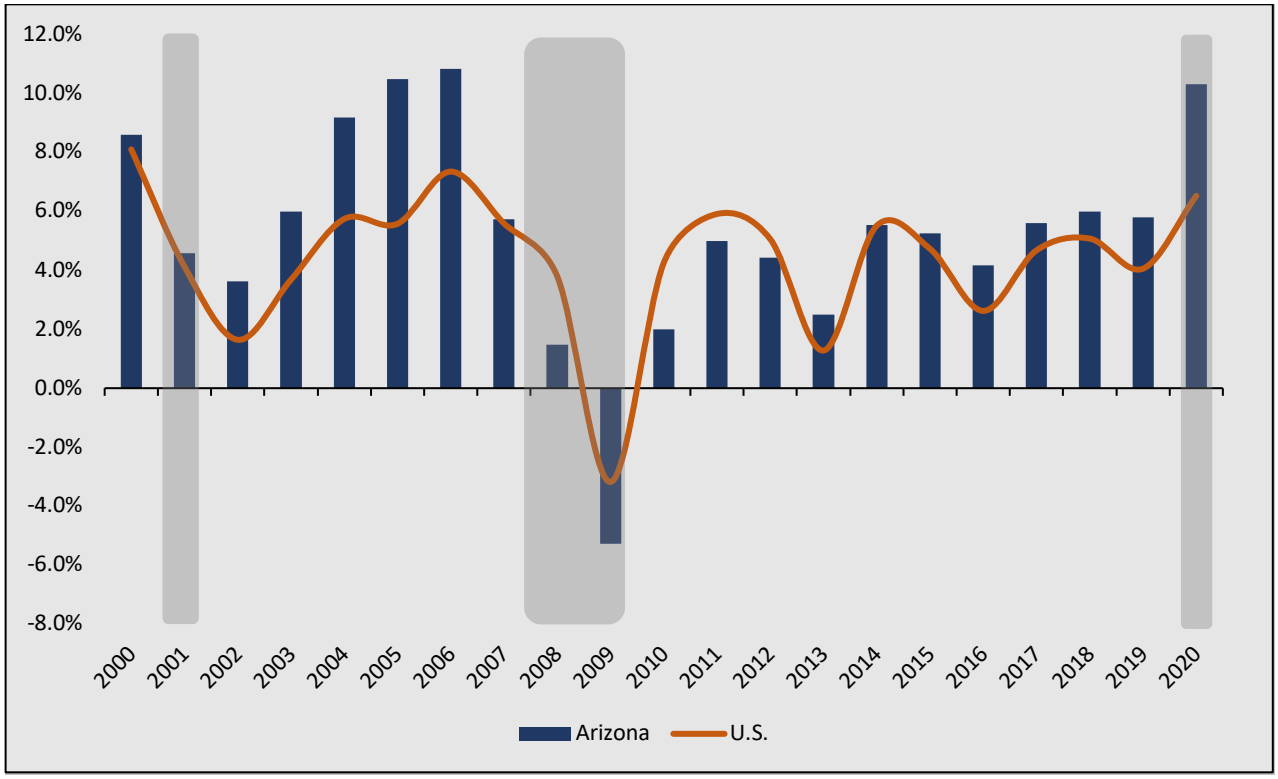
Personal Income in Arizona Compared to the U.S.

The high levels of economic production have also led to strong personal income growth. Personal income is an economic metric that measures the total amount of income that is being produced in an economy. It includes salaries and wages, employer contributions to pension funds, and payments to welfare and social security, as well as income collected from personal assets and dividends. In other words, it measures the amount of wealth being created in the economy.

Personal income growth in Arizona follows a similar pattern as GSP and employment growth. Arizona performed well during the 2001 recession period relative to the U.S., growing at a greater rate than the U.S. in the expansion period that followed, and experienced a greater decline during the Great Recession.

Following the Great Recession, the increased economic stability throughout the state supported stronger personal income growth than the U.S. as a whole and enhanced the state's business cycle resiliency. Personal income in Arizona grew by 10.3% in 2020 compared to a 6.5% growth across the nation.

Figure 4: Annual Change in Arizona and U.S. Personal Income



Note: Gray bars represent recession periods.
Source: U.S. Bureau of Economic Analysis

Arizona's Performance in Measures of Quality Economic Growth

The economic growth and success experienced in Arizona since the Great Recession has come as a result of aggressive yet responsible economic development policies that focused on enhancing fundamentals that strengthen Arizona's economic base (i.e., population and employment growth, among others).

However, the goal is not only to grow but to grow well, and in measures of quality economic growth there exist opportunities for Arizona to improve.

For example, while personal income is a measure of wealth, per capita personal income (PCPI) is a more effective measure for evaluating quality economic growth. PCPI is often displayed as a percent of the U.S. and is used to measure the standard of living in Arizona relative to the national average.

Per capita GSP as a percent of the U.S. is used to measure Arizona's position related to economic productivity compared to national averages. The average wage as a percent of the U.S. can provide additional perspective on employment and workforce conditions in Arizona compared to national averages. When viewed over time, the quality-based economic measures can indicate whether or not the quality of life of the people living in the state is rising compared to the nation.

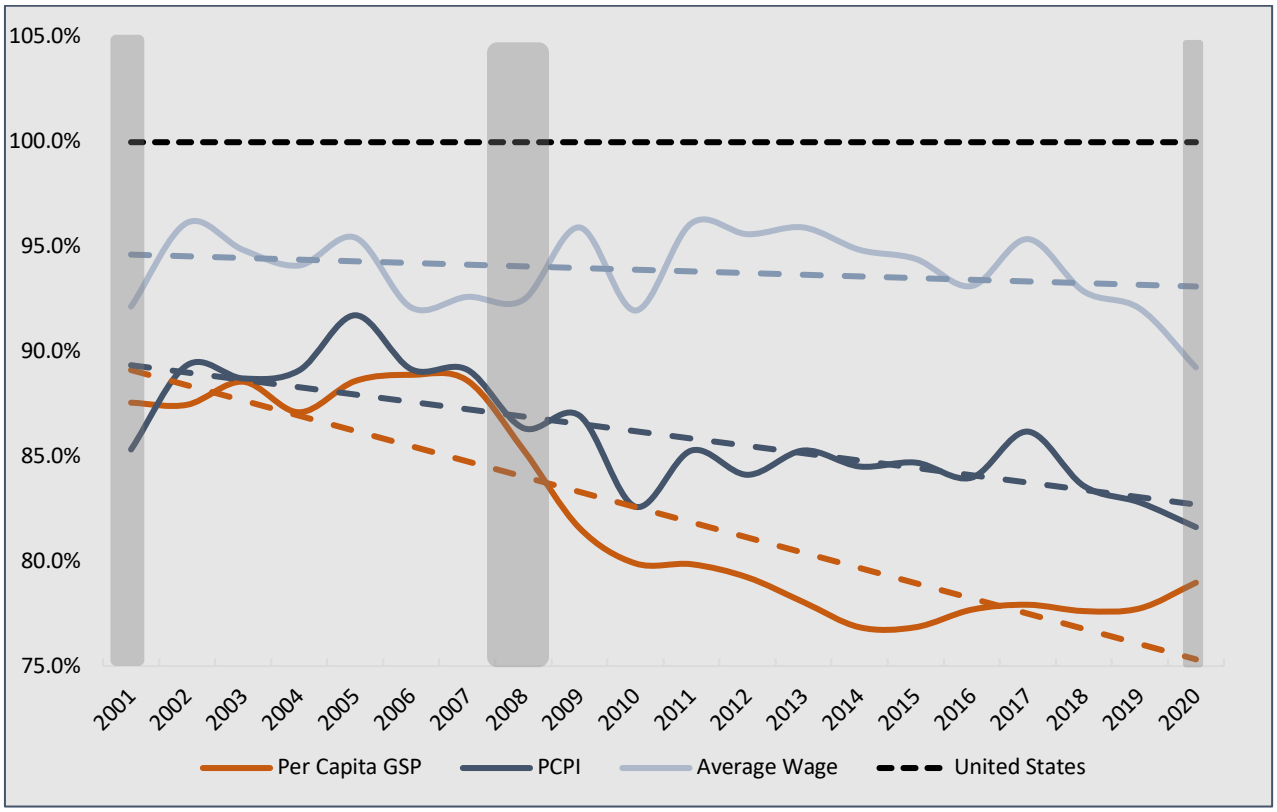
If the metric is trending upward over time, the standard of living for Arizona residents is improving in relative terms. If the metric is declining, the standard of living in Arizona may be stagnant, despite a strong economic performance in other metrics.

Economic vitality can certainly be captured by reviewing simple rates of growth in key economic categories such as employment and population. A review of wages, income, and the production and consumption of goods and services more thoroughly captures the quality of economic growth that is being examined. For this reason, certain economic statistics will need to be adjusted for the cost of living, among other factors.

Figure 5 displays the Arizona PCPI adjusted for cost of living, the per capita GSP, and average wages as a percent of the U.S. level. The dotted lines indicate that despite strong performance in population, employment, and total GSP growth; PCPI, per capita GSP, and average wages have declined relative to the U.S. averages.

In 2020, Arizona's PCPI was 81.6% of the U.S. level, down from 82.8% in 2019 after adjusting for the cost of living. In 2020, per capita GSP in Arizona was 79.0% of the U.S. level. The average wage level in Arizona, adjusted for cost of living, was 89.3% of the U.S. level in 2020. Average wage levels were the highest as a share of the U.S. level in 2002 when Arizona's average wage was 96.2% of the national level.

Figure 5: Arizona PCPI, Per Capita GSP, and Average Wage as a Percent of the U.S.



Note: Gray bars represent recession periods.
Source: U.S. Bureau Labor Statistics; U.S. Bureau of Economic Analysis

Overall, Arizona has increased its resiliency since the Great Recession compared to the nation as a whole, and is regarded as an economic leader. However, the performance of Arizona's PCPI, average wage level, and per capita GSP indicates that there is work to be done in terms of addressing the quality of Arizona's economic growth.

State leaders have an immediate opportunity to positively impact key economic statistics, both in terms of the quantity of growth as well as the quality of growth.

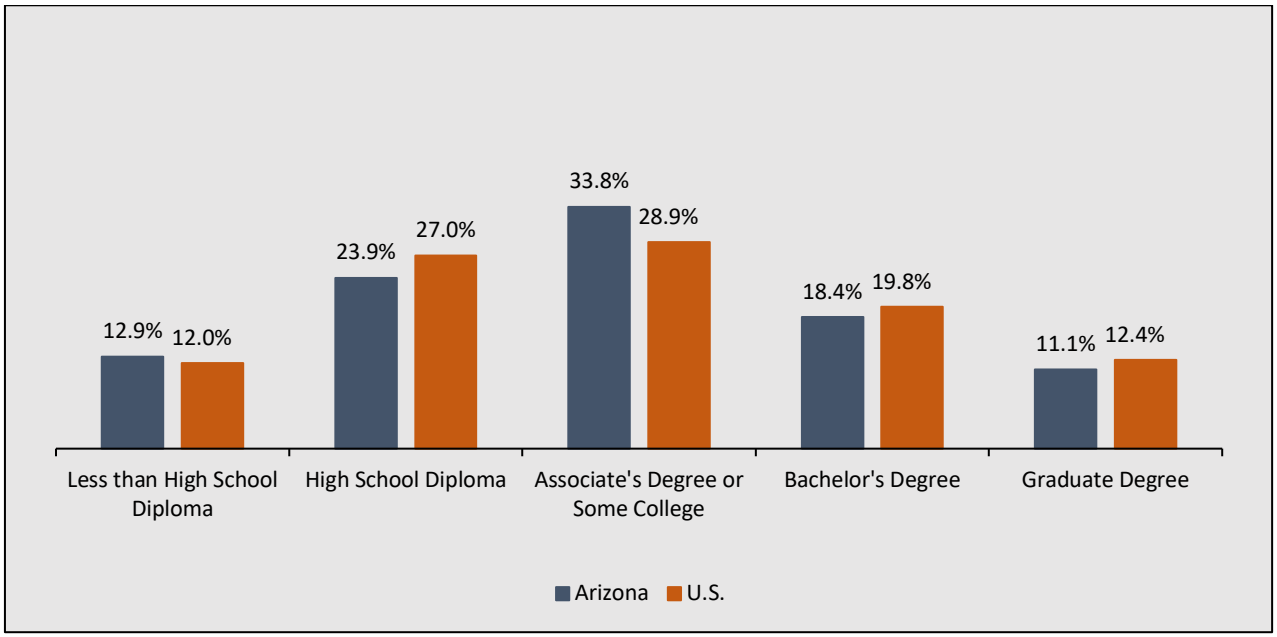
Educational Attainment and Economic Resiliency

Arizona's Educational Attainment Performance

The educational attainment of a state's workforce has significant impacts on economic quality and resiliency. Arizona lags national averages in educational attainment in 2019 (the most recently available data). This disparity will continue to impede the state's ability to improve economic output.

A higher percentage (12.9%) of Arizona's population has less than a high school diploma compared to the U.S. (12.0%). Additionally, 18.4% of Arizonans 25 years and over report that a bachelor's degree is their highest level of education. This compares to the national average of 19.8%.

Figure 6: Educational Attainment in Arizona and the U.S.



Note: Includes population 25 years and over.
Source: U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates.

Further, Arizona's workforce educational attainment profile will potentially devolve against national averages. Arizona students complete high school, enroll in college and complete post high school degrees at significantly lower rates than national averages.

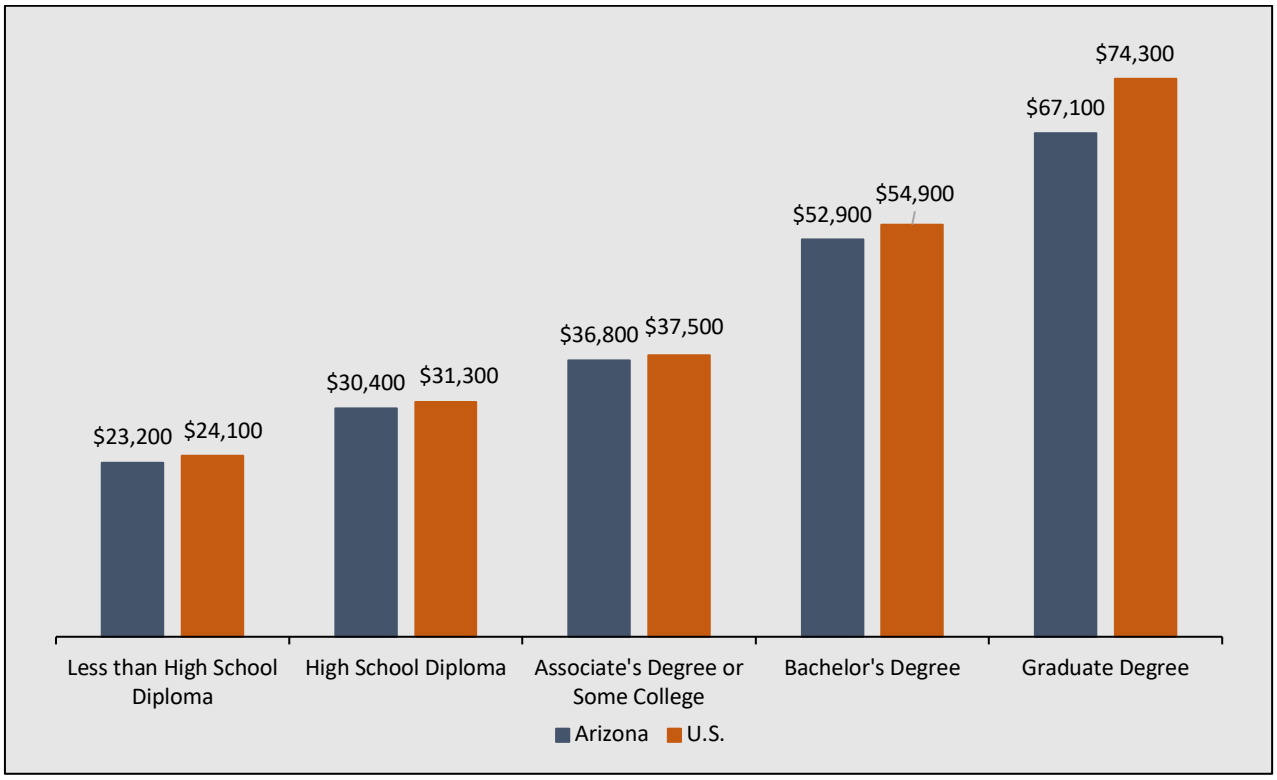
A lower level of educational attainment is a significant contributor to lower average wages and PCPI in Arizona relative to the U.S. This is because there are significant wage disparities for workers with different education levels.

According to the U.S. Census Bureau, a worker in Arizona without a high school diploma will earn approximately $7,200 less than someone with a high school diploma (as of 2019)[5]. This gap is significant as Arizona's high school graduation rate (78.2%) also lags the U.S. level (86.0%).[6]

[5] U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates
[6] AZ School Report Cards: Arizona Department of Education, 2020. Public High School Graduation Rates: U.S. Department of Education's National Center for Education Statistics, 2019.

Those with a bachelor's degree or higher in Arizona earned $16,100 more in 2019 than those with an associate degree and $22,500 more than a worker with a high school diploma. In 2019, the U.S. Census Bureau estimated that 29.5% of the Arizona population 25 years or older had a bachelor's or higher, compared to 32.1% of the U.S. population.[7]

Figure 7: Median Wages by Educational Attainment in Arizona and the U.S.



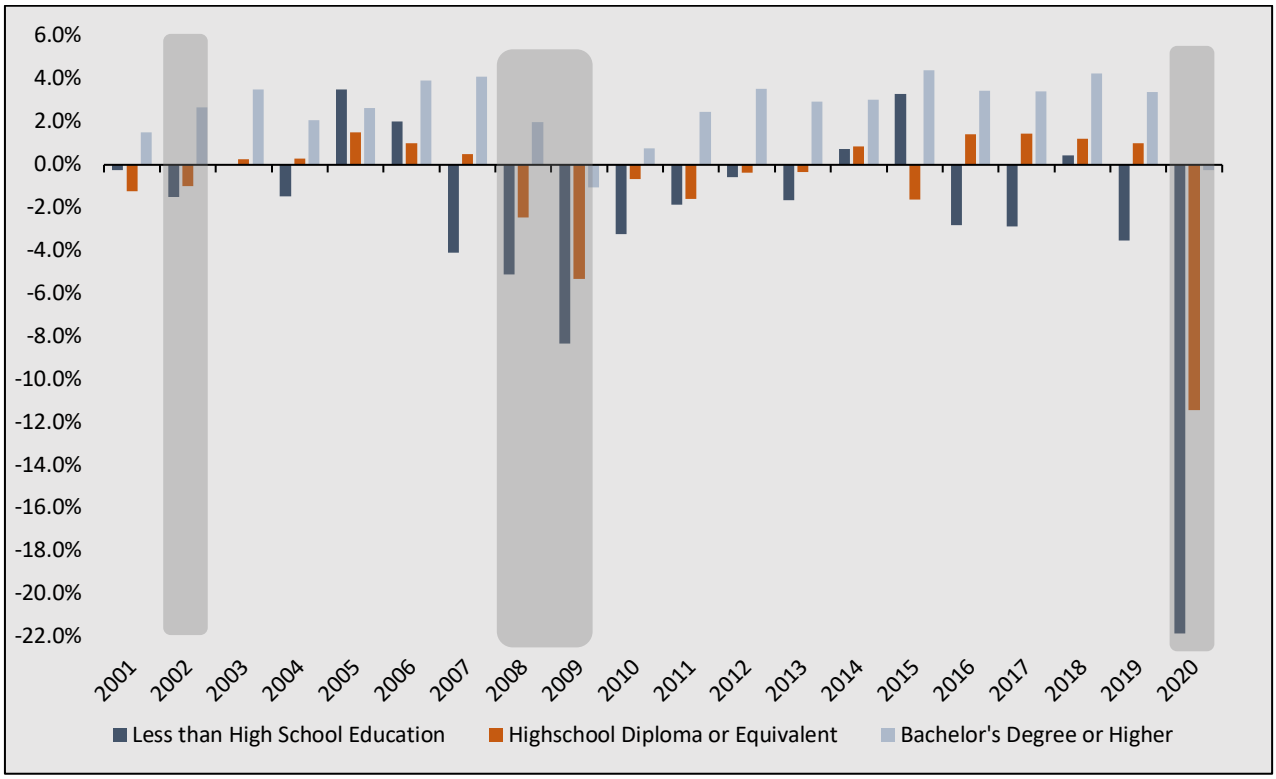
Note: Includes population 25 years and over.
Source: U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates.

In addition to higher wages and reduced poverty, advancing educational attainment will also enhance the resiliency of the Arizona economy. For example, the jobs in Arizona that require a bachelor's degree as the minimum requirement for entry experienced a smaller decline in employment during recession periods than the jobs that do not require a bachelor's degree.

During the Great Recession, employment in the jobs that require, at minimum, a high school diploma declined by 5.3% compared to a 1.1% decline for jobs that required at least a bachelor's degree. During the most recent recession, jobs that did not require any formal education declined 21.8%, jobs that required at least a high school diploma declined 11.4%, while the jobs that required at least a bachelor's degree declined by just 0.2%.

[7] U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates.

Figure 8: Annual Change in Employment by Educational Attainment in Arizona



Note: Gray bars represent recession periods.
Source: U.S. Bureau of Labor Statistics

Educational Attainment and the New Economy Workforce

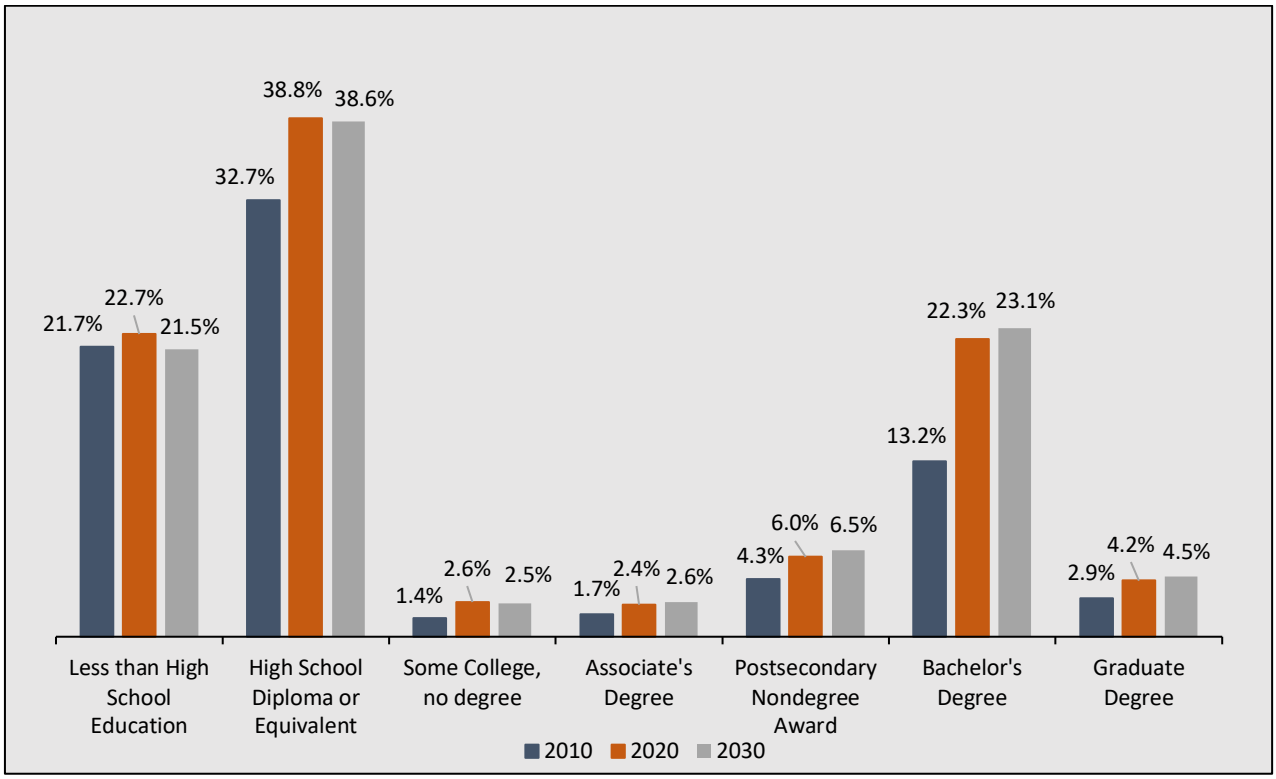
High school graduation rates, college enrollment rates, and college completion rates in Arizona need to be improved as the share of total available jobs that require at least a bachelor's degree have increased since 2010 and is expected to continue over the next ten years. Arizona's economic growth potential will be limited if the state cannot supply the sufficient workforce.

For perspective on how educational attainment relates to the future workforce needs in Arizona, consider the following. The BLS estimated that in 2020 there were approximately 751,100 jobs in Arizona that required a bachelor's degree or higher. This represented 26.5% of the state's total employment (i.e., 22.3% required a mimimum of a bachelor's degree and 4.2% required a mimimum of a graduate degree).

This compares to 2010, when an estimated 16.1% of all jobs in Arizona required a bachelor's degree or higher. By 2030, it is estimated that 27.6% of the jobs in Arizona will require a bachelor's degree or higher (i.e., 23.1% will require at least a bachelor's degree and 4.5% will require at least a graduate degree).

Further, the percentage of jobs that require at least a postsecondary certificate (i.e., postsecondary nondegree award) has also increased. In 2010, these jobs made up 4.3% of the total jobs in Arizona. As of 2020 they were 6.0%, and it is estimated that by 2030, they will make up 6.5% of the jobs in Arizona. These are often high-skilled trade jobs commonly found in industries such as manufacturing or construction.

Figure 9: Share of Total Jobs in Arizona by Minimum Educational Requirement



Note: May not sum to 100 due to rounding.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

In 2020, Arizona's three public universities (i.e., Arizona State University, University of Arizona, and Northern Arizona University) produced 34,000 bachelor's degrees.[8] The number of bachelor's degrees awarded by Arizona's public universities has increased 4.4% each year on average. While the production of bachelor's degrees has increased, not all of the graduates are expected to remain employed in Arizona.

One year following the graduation of a bachelor's degree program, approximately 76.0% of graduates that are Arizona residents remained employed in Arizona. However, including nonresident students, only 55.0% of graduates remain employed in Arizona one full year following graduation.[9] Further, degree production is trending towards non-resident students. Since 2016, non-resident degrees make up nearly 75.0% of all degree growth.

Between 2020 and 2030, Arizona's three public universities will produce an estimated 40,800 bachelor's degrees annually. If 55% of these graduates remain and work in Arizona, the public universities will supply 22,500 graduates to Arizona's workforce annually.

From 2020 to 2030, the BLS estimates that there will be a total of 68,000 annual openings for jobs that require at least a bachelor's degree. This indicates that there will be an annual shortage of approximately 45,500 bachelor's degrees per year in Arizona over the next 10 years.

[8] ABOR Annual Report 2021.
[9] ABOR 2020 Alumni Wages Report.

Population in-migration projections from the state indicate that, on average, 19,200 people with at least a bachelor's degree will be added to Arizona's workforce each year. If this group is considered, the annual degree shortage is reduced to 26,300. This shortage assumes that over the next 10 years, Arizona's economy continues to grow at its current pace. This leaves no opportunity for the Arizona economy to improve its position relative to the U.S. related to measures of economic quality. Instead of a potential catalyst for improvement, Arizona's educational output is a threat to maintaining current economic performance standards.

Table 2: Annual Supply and Demand for Bachelor's Degrees in Arizona

	Under Current Economic Conditions	Reaching the U.S. per capita GSP Level
Total Employment	2,823,800	3,446,900
GSP per Employee	$131,900	$164,100
Demand for Bachelor's Degrees	68,000	257,300
Bachelor's Degrees from Recent Graduates	22,500	22,500
Bachelor's Degrees from In-Migration	19,200	19,200
Shortage of Degrees	**26,300**	**215,600**

Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

Investment in Education Output

Advancing the state's performance in the aforementioned "quality growth" categories can be monetized to provide perspective on what can be spent on improving the educational measures while still generating a positive ROI for taxpayers. This report looks at three scenarios: Reaching national levels in economic quality measures; filling the current gaps in degree demands; and finally reaching national averages in educational outputs.

Reaching National Levels in Economic Quality Measures: As of 2020, Arizona's GSP was $372.5B (in current dollars). The per capita GSP in Arizona, or the economic output generated per person, was $51,100 in 2020. This compares to the national per capita GSP of $63,500 during the same year.[10] The GSP per employee in Arizona was $131,900 in 2020. In other words, the average employee in Arizona produced $131,900 worth of goods and services during 2020. This is 12.4% below the national average of $150,500 worth of goods and services produced in 2020.

Reaching the national average in economic quality measures should be a key goal for Arizona. However, this is a lofty and long-term goal. For example, in order to reach the U.S. average in per capita GSP, Arizona would need a one-time increase of 623,100 jobs. Of these, 165,300 would need to be "base sector" jobs with an average annual wage of $140,500. The increased productivity of these new jobs would raise the GSP per employee in Arizona to $164,100. Of the 623,100 new jobs, an estimated 257,300 would require at least a bachelor's degree.

Arizona would need to generate an additional 215,600 bachelor's degrees (i.e., 257,300 new jobs that require at least a bachelor's degree minus the 22,500 bachelor's degrees currently supplied from recent graduates and the 19,200 that move to Arizona each year that have a bachelor's degree) in order to reach the U.S. level of per capita GSP.

It is important to remember that improvements to educational attainment are not immediately accomplished and the goal for policymakers should be to establish programs and initiatives that encourage the meaningful pursuit of higher education by Arizona residents.

[10] U.S. Bureau of Economic Analysis

This will primarily be accomplished by enhancing educational outcomes for Arizona students from K-12 through college as well as targeting the current workforce by providing opportunities for continued education.

Filling Current Degree Demand Shortfalls: As noted above, Arizona's current economy will demand an additional supply of 26,300 bachelor's degrees per year. Resolving the bachelor's degree shortage results in a 10-year state and local fiscal revenue impact of approximately $8.0B. Note: The $8.0B figure also represents the opportunity cost of not advancing the state's educational attainment levels in relation to bachelor's degrees.

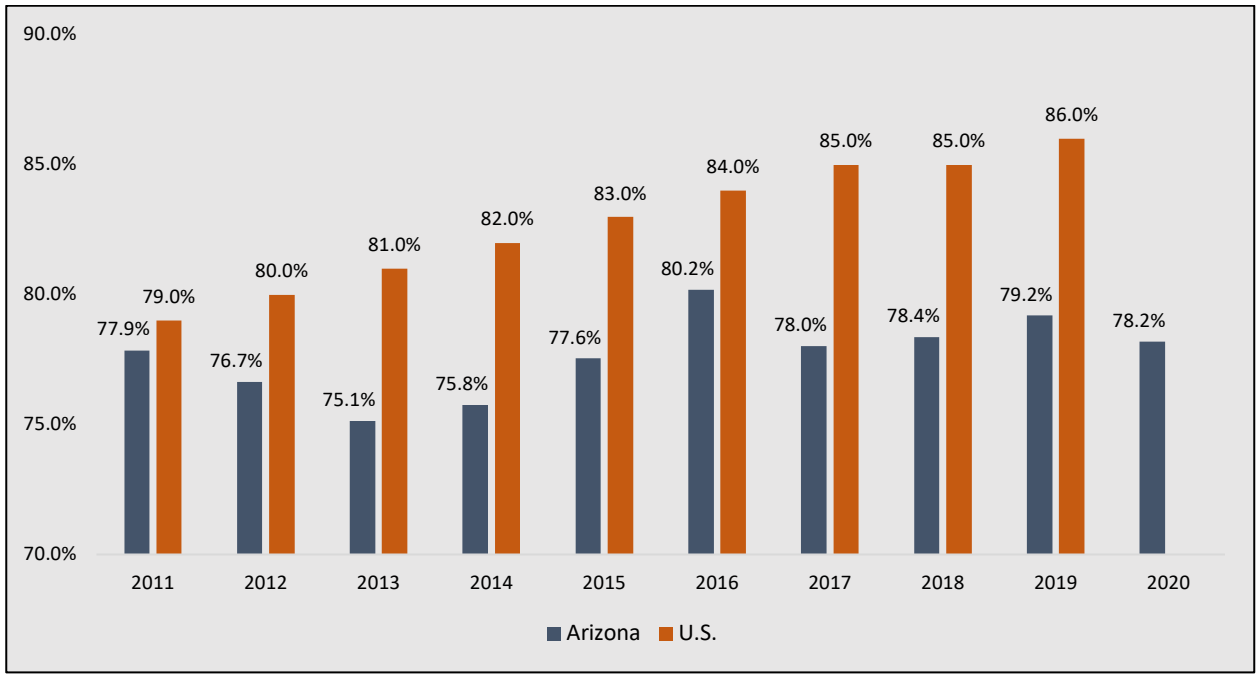
Reaching National Levels of Educational Output: As noted, advancing educational attainment will lead to significant benefits. However, quantifying these benefits can be a challenge as some benefits are difficult to measure (i.e., increased health, greater social mobility, reduced crime, etc.), while other benefits are more clearly measured (i.e., greater productivity, higher wages, etc.).

In order to best quantify the fiscal benefits of improved attainment, we developed an economic model focused on those benefits that are more easily identified. Specifically, the model identifies and quantifies the benefits of wage and productivity improvements that occur as a result of raising the high school graduation rate, college enrollment rate, and college completion rate in Arizona to the U.S. average. In Arizona, the 2020 statewide high school graduation rate was 78.2%.[11] Across the country, the average high school graduation rate in 2019 (latest available data) was 86.0%.[12]

The state's high school graduation rate reached a high of 80.2% in 2016; however, the rate declined to 78.0% in 2017. [13] The rate slightly declined from 79.2% in 2019 to 78.2% in 2020, according to the Arizona Department of Education (ADOE). If Arizona can reverse this decline and raise the high school graduation rate to the U.S. average, approximately 9,500 additional students will graduate high school each year.

[11] Graduation Rates, Dropout Rates, and Enrollment Reports: Arizona Department of Education, 2020.
[12] Public High School Graduation Rates: U.S. Department of Education's National Center for Education Statistics, 2019.
[13] Graduation Rates, Dropout Rates, and Enrollment Reports: Arizona Department of Education, 2020.

Figure 10: High School Graduation Rate in Arizona and the U.S.



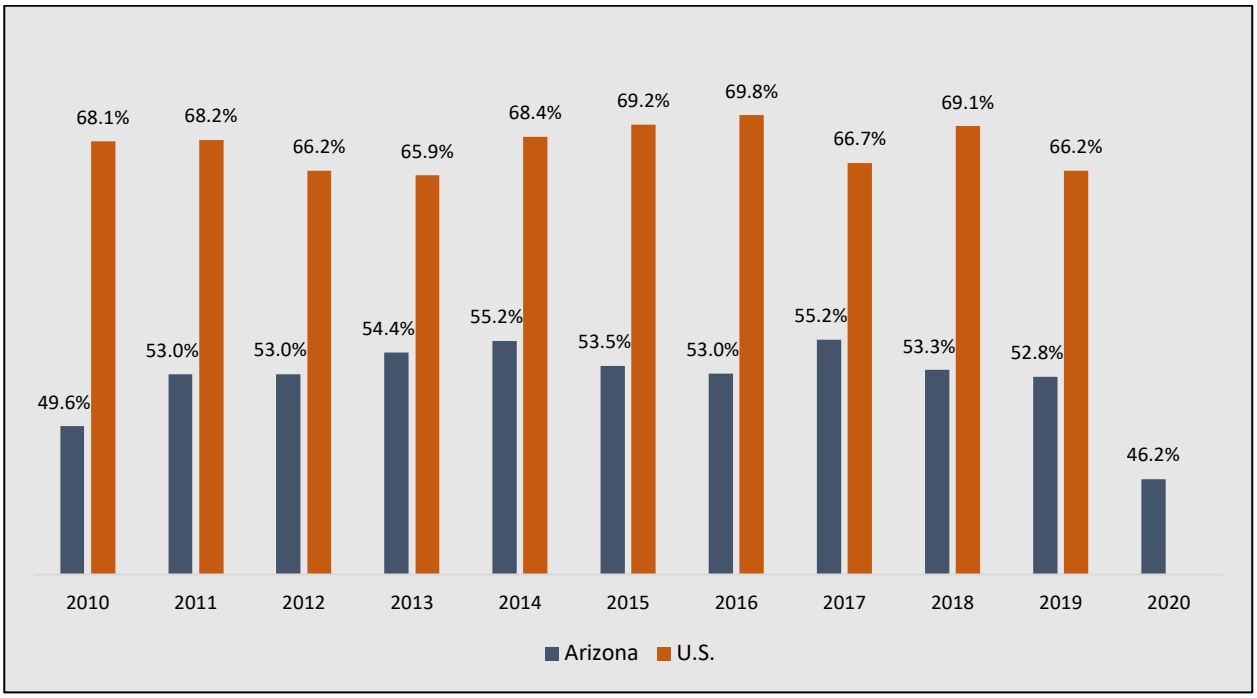
Note: 2020 U.S. data not available.
Source: Graduation Rates, Dropout Rates, and Enrollment Reports: Arizona Department of Education, 2020; Public High School Graduation Rates: U.S. Department of Education's National Center for Education Statistics, 2019.

Among the 68,700 public high school students who graduated across Arizona in 2020, approximately 46.2% enrolled in a 2- or 4-year college (latest available data).[14] The overall college enrollment rate for the nation as a whole was 66.2% as of 2019.[15]

If Arizona increases the college enrollment rate to the U.S. level (i.e., 46.2% to 66.2%), an estimated 19,500 additional students will enroll in college each year. A portion of these new college enrollees will come from the new high school graduates that previously would not have graduated high school. Another portion will be high school graduates that previously would not have enrolled in college. All of these students will have a higher earnings potential by enrolling in college.

[14] Postsecondary Attainment Report, Arizona Board of Regents, 2020.
[15] Conditions of Education: U.S. Department of Education's National Center for Education Statistics, 2019.

Figure 11: College Enrollment Rates in Arizona and the U.S.



Note: 2020 U.S. data not available.
Source: Postsecondary Attainment Report, Arizona Board of Regents, 2020; Conditions of Education: U.S. Department of Education's National Center for Education Statistics, 2019.

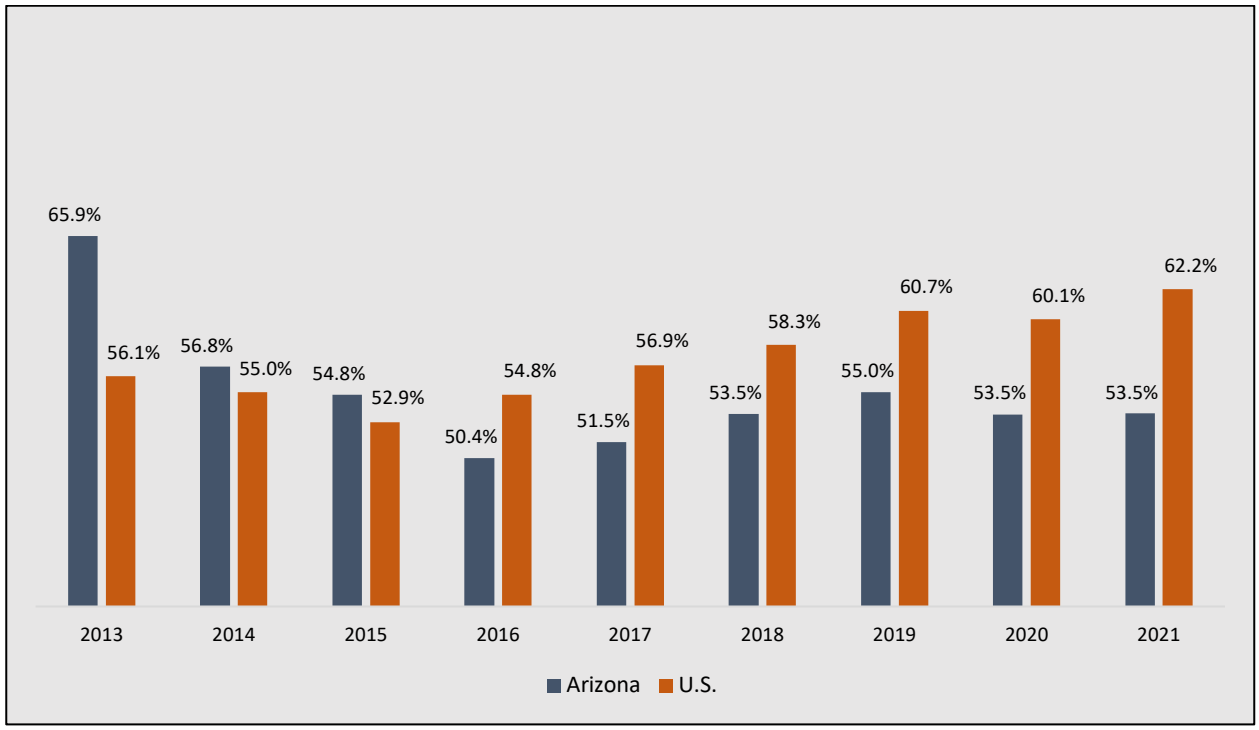
As college enrollment increases, more students are likely to complete college and earn a degree. Completing college provides students with the knowledge and skills for specialized careers, increases other marketable skills (i.e., computer proficiency, communication skills, discipline, etc.), and provides the opportunity to earn higher incomes.

Overall, the Arizona 2-or 4-year college completion rate was 53.5% in 2021 (i.e., the percent of college enrollees that received a 2-or 4-year degree or certificate within 6 years).[16] The U.S. 2-or 4-year college completion rate was 62.2%.[17]

By raising the Arizona college completion rate to that of the U.S. (53.5% to 62.2%), an additional 14,800 new college graduates would be produced each year. These graduates will be made of those high school graduates that previously would not have graduated, those new college enrollees that would have not previously enrolled, as well as those that enrolled in college that would not have previously graduated.

[16] Completing College National and State Reports: National Student Clearinghouse, 2021.
[17] Completing College National and State Reports: National Student Clearinghouse, 2021.

Figure 12: College Completion Rate in Arizona and the U.S.



Note: Completion of a 2- or 4-year college degree within 6 years of enrollment. The 2020 Arizona completion rate was calculated by Rounds Consulting Group using data from ABOR.
Source: Postsecondary Attainment Report, Arizona Board of Regents, 2020; Rounds Consulting Group, Inc.; Completing College National and State Reports: National Student Clearinghouse, 2021.

If Arizona's educational attainment is raised to match national averages, our model estimates additional wages earned through educational advancements will produce $1.4B in earned income annually. This increase in income will also yield an additional $497.6M in state and local tax revenues annually, or $5 billion over ten years.

Figure 13: The Annual Impact of Raising Educational Attainment in Arizona to the U.S. Level

9,500 Additional High School Graduates	19,500 Additional College Enrollees	14,800 Additional College Graduates	$1.4B Additional Annual Earnings	$497.6M New Statewide Tax Revenues

Source: Public High School Graduation Rates: U.S. Department of Education's National Center for Education Statistics, 2019; Graduation Rates, Dropout Rates, and Enrollment Reports: Arizona Department of Education, 2020; Postsecondary Attainment Report, Arizona Board of Regents, 2020; Conditions of Education: U.S. Department of Education's National Center for Education Statistics, 2019; Completing College National and State Reports: National Student Clearinghouse, 2021; Arizona Department of Revenue; IMPLAN; Rounds Consulting Group, Inc.

In addition to the direct benefits listed above, advancing educational attainment and the skills of the labor force will create a domino effect that will improve state economic development. The availability of an educated and highly skilled workforce is an important consideration for businesses seeking to expand or locate in new markets. This is especially true when considering higher value-added businesses in high-growth industries such as advanced manufacturing, high-tech, health services, and finance that require a talented workforce.

Growth in these higher value-added businesses creates additional demand in supplier industries (e.g., supplier of raw materials, transportation industries, etc.) and other service industries (e.g., janitorial services, food services, etc.).

An enhanced local supplier network in turn results in a larger "multiplier effect", resulting in a larger number of jobs being created locally and more income flowing throughout the economy.

Policymakers as well as educational and business leaders should consider these sizeable economic and fiscal impacts when designing and implementing educational programs and initiatives. The programs should be focused on preparing the Arizona workforce for employment in high-growth industries that are economically resilient.

Workforce Resiliency by Industry in Arizona

Macro Review of Select Target Industries

While Arizona's economy as a whole has become increasingly resilient compared to the national economy, a deeper analysis of Arizona's major economic industries will provide direction to the economic development and educational initiatives that will be most effective in preparing the Arizona workforce to participate in high-skill and high-wage jobs. Pending this additional research, the following industry analysis was conducted to provide early guidance on possible policy initiatives for the health care, construction, professional and business services, financial activities and manufacturing industries. These industries were selected as major drivers of Arizona's future employment growth.

What is clear is that different recessions impact the target industries in different ways. During the 2001 recession period, the state reported that the healthcare industry experienced a gain in employment in Arizona of 3.0%. Employment in the manufacturing industry declined by 3.9% during this period, the largest decline among Arizona's major industries.

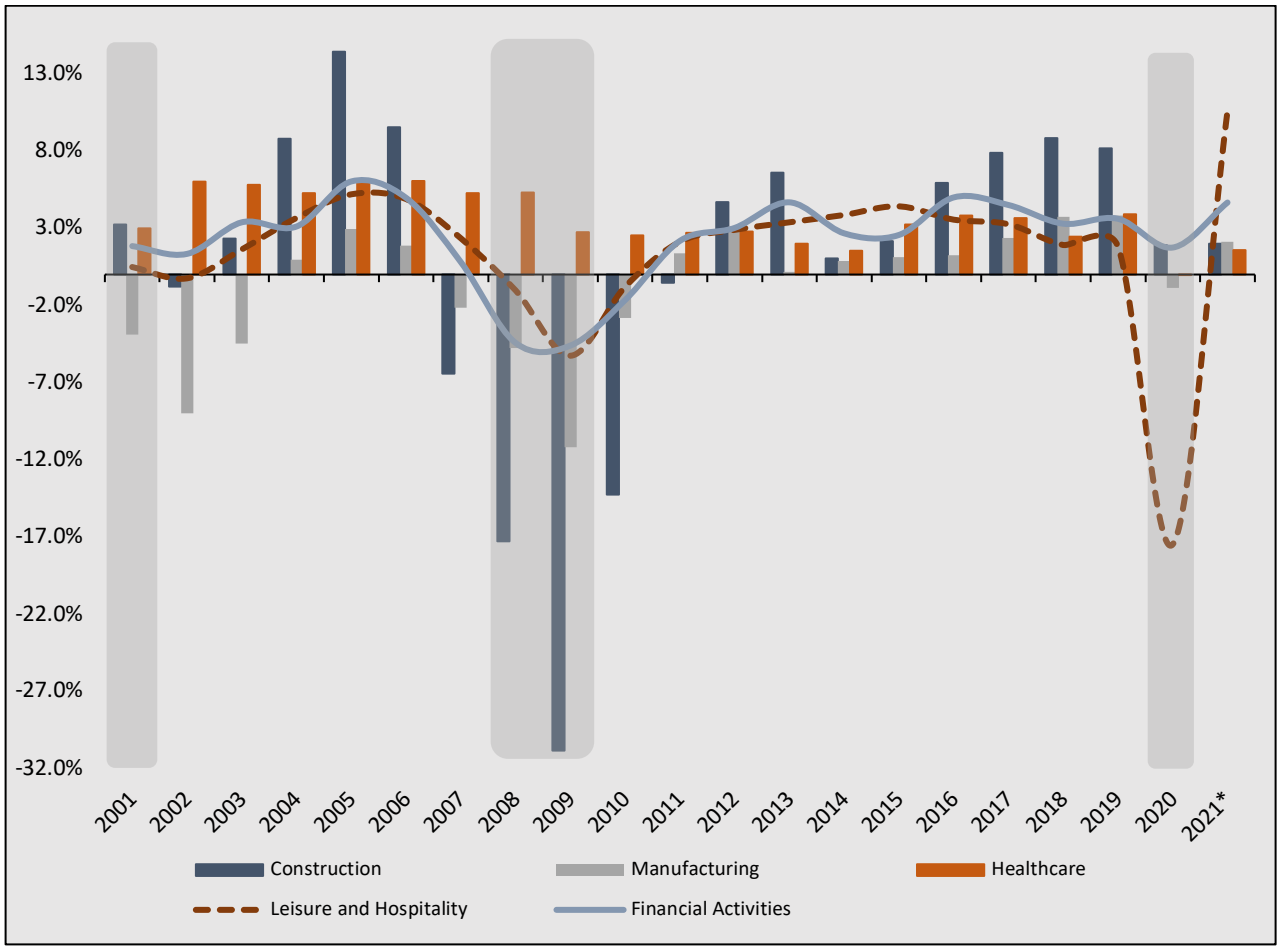
In 2009, the construction industry in Arizona lost 30.8% of its workforce, the largest decline of any of Arizona's major industries. Employment in the manufacturing industry declined by 11.2%. However, employment in the healthcare industry increased by 2.7% over the same time period.

In the expansion cycle that followed the Great Recession, the manufacturing industry recovered the jobs that were lost during the recession in 31 months. The professional and business services industry did so in 7 months, and the construction industry returned to pre-recession employment after 76 months. Overall, Arizona recovered all the jobs lost during the recession 79 months following the recession.

The leisure and hospitality industry was the most impacted during the Covid-19 recession and experienced a decline in employment of 17.5% in 2020. In contrast, employment in the construction and financial activities industries experienced a 1.9% and 1.7% increase, respectively.

Figure 14 provides a visual representation of the annualized employment change for select industries over the periods of economic expansions and recessions.

Figure 14: Annual Change in Arizona Employment by Select Industry



Note: Gray bars represent recession periods. *Through 2021
Source: Arizona Office of Economic Opportunity

Table 3 displays the employment change as well as an analysis of the recovery of the major industries in Arizona during the periods of economic expansion and contraction. As of November 2021, Arizona has recovered 101.5% of the jobs that were lost during the most recent recession. Several industries have returned to pre-recession employment levels. The transportation and warehousing did so in 4 months, the fastest recovery of any of the major industries.

The arts, entertainment and recreation, and accommodation and food services industries experienced the largest declines in employment from February 2020 to April 2020 and are lagging in terms of employment recovery, despite Arizona as a whole recovering 101.5% of the jobs lost. The lagging employment recovery in certain industries is partly due to broader workforce supply issues across the nation, but is also due to individuals shifting careers from less stable occupations to more resilient ones.

Table 3: Employment Change and Recovery by Industry in Arizona During Recession Periods									
	Recession Mar. to Nov. 2001			Recession Dec. 2007 to June 2009			Recession Feb. 2020 to April 2020		
Industry	Employment Change	Recovery Time	Recovery Ratio	Employment Change	Recovery Time	Recovery Ratio	Employment Change	Recovery Time*	Recovery Ratio*
Nat. Resources & Mining	-3.1%	52	10.7	-15.9%	1	1.1	-7.8%	17	2.00
Construction	-1.8%	2	12.5	-39.3%	76	0.6	-3.7%	-	0.76
Manufacturing	-7.2%	-	-0.9	-14.5%	31	1.0	-4.0%	19	1.14
Wholesale Trade	-3.4%	6	4.5	-10.1%	-	0.2	-5.0%	15	1.74
Retail Trade	-0.2%	1	109.5	-11.0%	-	0.9	-11.5%	10	1.20
Transp. & Warehousing	-2.6%	5	6.5	-6.6%	7	7.4	-2.7%	4	9.97
Information	-1.1%	2	-20.0	-5.3%	29	4.7	-13.7%	-	0.23
Financial Activities	1.5%	1	11.8	-6.6%	12	5.3	-2.0%	15	1.17
Prof. & Business Svcs.	-5.7%	1	4.9	-14.8%	7	1.8	-8.4%	17	1.09
Educational Services	8.4%	1	6.6	8.3%	1	6.3	-17.9%	14	1.13
Healthcare	2.5%	1	17.0	4.2%	1	9.1	-8.4%	17	1.10
Arts, Entertain. & Rec.	1.0%	23	22.0	-8.9%	2	4.4	-51.4%	-	0.79
Accomm. & Food Svcs.	-2.2%	3	9.6	-7.0%	9	4.0	-42.1%	-	0.88
Other Services	0.5%	1	40.5	-7.1%	-	0.1	-21.5%	-	0.91
Arizona Total	-1.2%	2	15.9	-9.5%	17	2.2	-11.1%	18	1.01

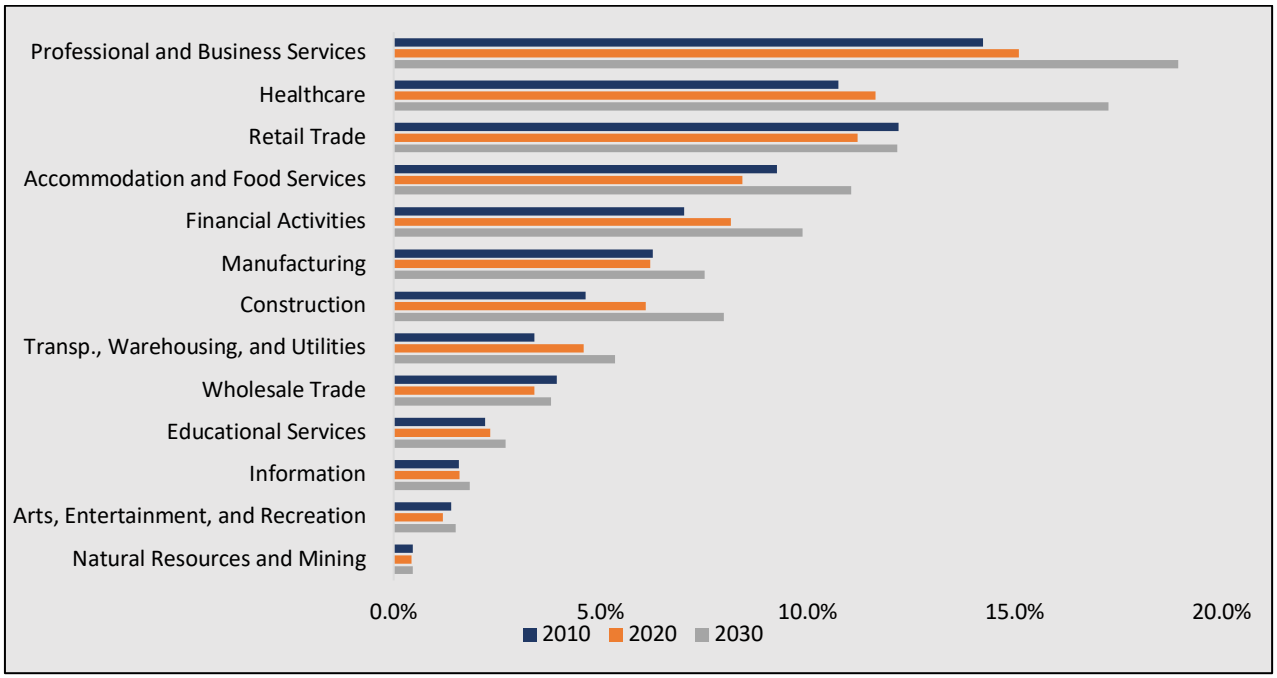
Note: The recovery time measures how quickly the industry recovered the jobs that were lost during the recession period, and the recovery ratio measures how many jobs were recovered during the expansion for each job lost during the recession period. *Through November 2021
Source: Arizona Office of Economic Opportunity; Rounds Consulting Group, Inc.

For example, Figure 15 displays the share of total employment for each of Arizona's major industries in 2010, 2020, and the projected employment share in 2030. Arizona has reduced the share of total employment in industries that are not resilient. This also indicates that the share of employment in high-wage industries has been increasing since 2010 and is expected to continue to increase over the next 10 years.

The industries whose share is declining include the accommodation and food services, which share of total employment decreased from 9.3% in 2010 to 8.4% in 2020; the arts, entertainment and recreation industry whose share decreased from 1.4% to 1.2%, and the retail trade industry, which decreased from 12.2% to 11.2%.

Over the next 10 years, the OEO estimates a continued shift in workforce demand. The healthcare, transportation and warehousing, financial activities, and business and professional services industries will each increase the share of the Arizona workforce that is employed in those industries compared to 2020.

Figure 15: Arizona Employment Composition in 2010, 2020, and 2030



Source: Arizona Office of Economic Opportunity; Rounds Consulting Group, Inc.

As the workforce needs in Arizona continue to shift over the next decade and beyond, policymakers, educational and business leaders as well as community stakeholders need to consider which industries should be targets for workforce development efforts and additional resources. These target industries should be those that are both resilient to economic downturns and have strong projected growth.

Figure 16 displays the major industries in Arizona according to the resilience during the last recession, as measured by employment change relative to the statewide performance, and the projected demand of each industry over the next decade. The vertical dotted line on the chart represents the statewide average change in employment during the most recent recession. The horizontal dotted line represents the projected statewide average rate of growth over the next decade.

If an industry performed better than the statewide average during the most recent recession, it will appear to the right of the vertical dotted line. Conversely, if it performed worse than the average, it appears on the left. The industries that are projected to have higher growth than the statewide average appear above the horizontal dotted line, those that are projected to have weaker growth than the state appear below the dotted line.

The industries that performed better during the most recent recession and are expected to have more growth than the statewide average over the next 10 years are depicted in **blue**. These industries have shown to be resilient in Arizona during economic downturns. This resiliency will contribute to the strong demand in Arizona over the next decade.

For instance, over the previous recession period, employment in the healthcare industry declined 8.4%, a smaller decline than the statewide average of 11.1%. The industry is also expected to grow at a greater rate over the next 10 years than the state, with employment growing by 48.3%, compared to the state average of 23.8%.

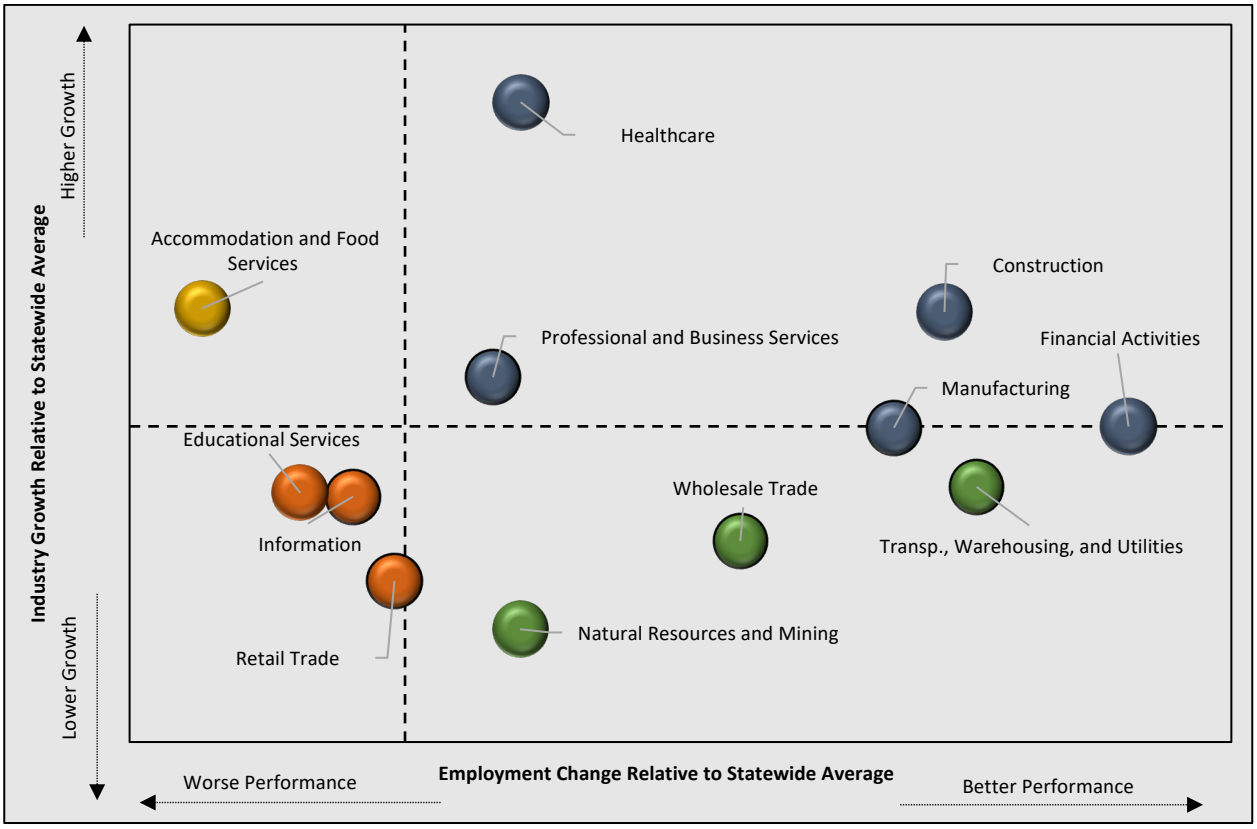
Those in **green** are industries that performed better than the state during the most recent recession, indicating that they are resilient, but these industries are not expected to grow as much as the statewide average. However, changing industry trends and other circumstances can affect the demand of these industries. A more detailed analysis may be needed in order to determine the potential impact the green industries may have on the Arizona economy going forward.

The industries in **yellow** were not as resilient as the state during the most recent recession but are expected to experience more growth than the state average. The accommodation and food services industry was in this category. It should be noted that this industry makes up a large part of Arizona's tourism industry and is an important part of the Arizona economy.

The industries in **orange** reflect those that were not as resilient as the statewide average during the most recent recession as well as those that are not projected to grow as much as the statewide average over the next 10 years.

For the purposes of this report, those industries in **blue** are identified as the target industries (i.e., healthcare, professional and business services, construction, financial activities, and manufacturing). A more detailed analysis of the occupational demand and workforce requirements is conducted in subsequent sections to help to inform policy decisions and clarify the role that educational attainment will have on Arizona's economic growth throughout the next decade and beyond.

Figure 16: Employment Change and Projected Growth in Arizona by Industry



Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics; Rounds Consulting Group, Inc.

Workforce Requirements for Select Target Industries

The target industries for continued development are identified as those depicted in blue from Figure 16 (i.e., the healthcare, professional and business services, construction, financial activities, and manufacturing industries). The workforce demand, characteristics and educational requirements are profiled below.

Each profile will provide insight into the number of jobs that are expected to be demanded annually in these industries, the educational requirements necessary to enter the jobs, as well as the characteristics of the occupations that are projected to experience the most growth in each industry over the next 10 years.

Regarding the overall employment base, projections from the state estimate that employment in Arizona is expected to grow by 2.2% per year on average over the next 10 years. This exceeds the national average for employment growth, which is estimated to grow at an average of 0.7% per year over the next 10 years.

While Arizona has strong employment, realizing this level of growth is not a certainty. This baseline projection (i.e., 2.2% average annual growth) should be considered the benchmark, and Arizona will need to continue to enhance workforce development, beginning with enhancing educational attainment, if the state is going to meet these values.

Figure 17 displays Arizona's projected employment growth over the next 10 years. This projection can be considered the benchmark projection for the Arizona economy. However, reaching this level of growth is not a certainty. Without continued workforce development efforts and investments in education, Arizona can fall short of this projection. Ensuring a sufficient qualified workforce is a key risk of not realizing the projected growth.

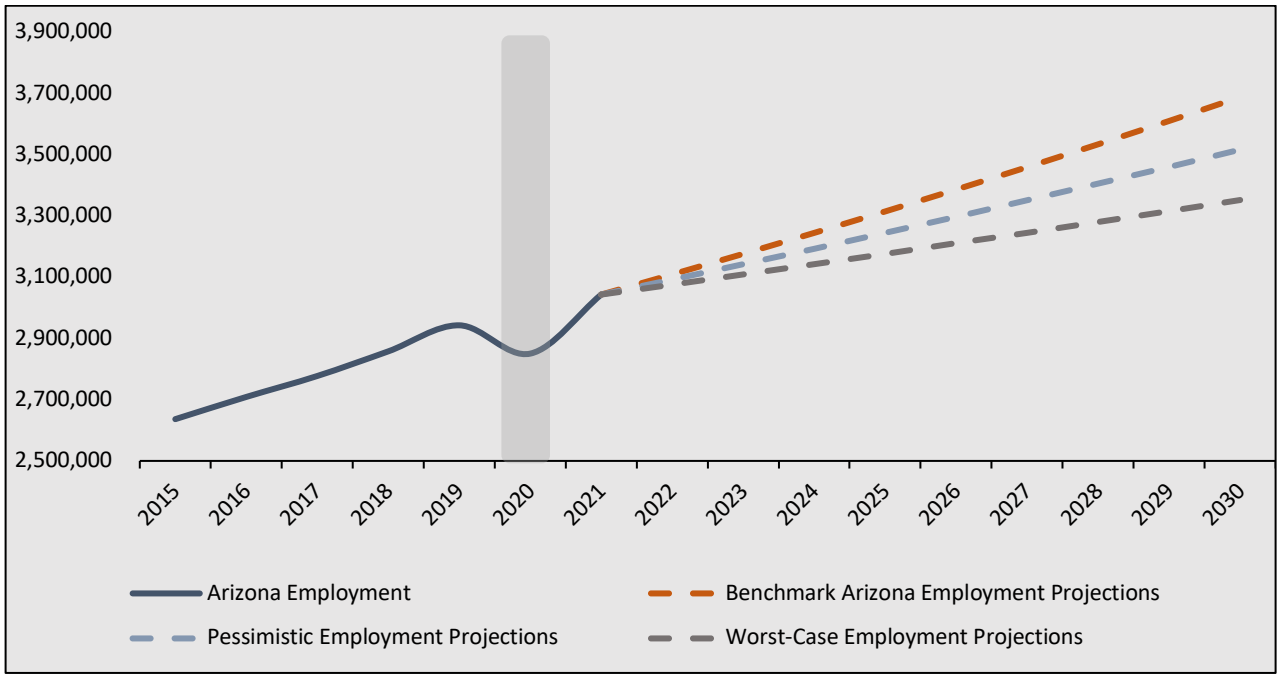
Note: To illustrate the impact of not reaching the benchmark projection, a pessimistic and worst-case growth scenario was included. Each scenario represents a loss of significant economic activity for the Arizona economy. The pessimistic scenario supposes that employment slows by 25% of the benchmark level. The worst-case scenario supposes that employment slows by 50.0%.

For context on how these scenarios impact the economy, consider the following. If employment growth slows by 25% and only grows at 1.6% per year on average instead of the benchmark projection of 2.2%, in 10 years there will be approximately 182,000 fewer jobs than the benchmark projection. These jobs represent a loss of $17.6B in economic output and $950.8M in state and local tax revenues that will not be collected each year.

The worst-case employment projection depicts a scenario in which Arizona employment grows at 1.1% per year on average over the next 10 years. Under this scenario, there would be approximately 355,500 fewer jobs, $34.4B in lost economic output and $1.9B in lost annual tax revenues, compared to the benchmark scenario.

It is important that policymakers and educational leaders understand that even with strong growth expectations, it will take a continued effort to meet those expectations, and there are significant economic consequences to not meeting the benchmark projection.

Figure 17: Arizona Benchmark, Pessimistic and Worst-Case Employment Projections



Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Additional Detail - Healthcare Industry

A strong healthcare industry promotes both the economic and physical health of the state and should be considered a focus for workforce development due to its resiliency against employment declines and strong projected growth.

The healthcare industry performed well compared to Arizona during the most recent recession period. Employment in the healthcare industry declined 8.4%; however, as of November 2021, the industry has recovered 110.0% of the jobs that were lost. This indicates a relatively strong level of resilience compared to the state.

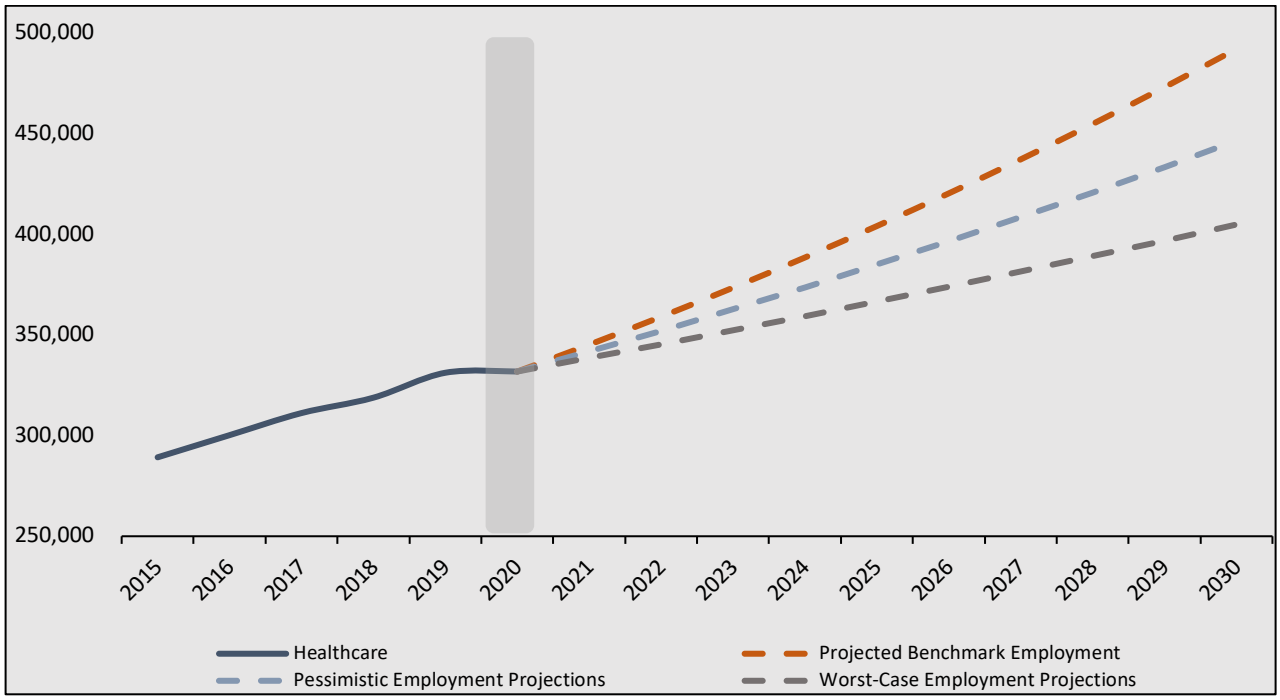
Additionally, the industry is expected to significantly outpace the state in employment growth over the next 10 years. The OEO estimates that employment in the healthcare industry will grow by 48.3% over the next 10 years and employ nearly 492,100 people in Arizona.

Figure 18 displays the benchmark employment projection for the healthcare industry, which estimates that industry employment will grow at an average rate of 4.0% per year over the next 10 years. It also illustrates two growth scenarios in which employment growth underperforms the benchmark rate by 25.0%, and by 50.0%.

If Arizona is unable to meet the projected employment demand and the projected growth rate (i.e., the pessimistic scenario), leading to employment growth of 3.0% per year on average, there will be 45,500 fewer healthcare jobs compared to the benchmark projections. These jobs represent $3.4B in lost annual economic activity and $234.7M in annual state and local tax revenues that would not be collected.

Under the worst-case scenario, employment in the healthcare industry grows at only 2.0% per year on average. This would be 87,200 fewer healthcare jobs, $6.5B in lost economic activity and $449.9M in annual tax revenues not collected. This demonstrates the need to continue efforts for workforce development in the healthcare industry.

Figure 18: Arizona Healthcare Employment Projections



Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

The recession in 2020 demonstrated how critical a stable healthcare workforce is and also revealed an industry trend that is likely to impact future workforce needs. Workforce shortages throughout the industry have forced workers to take on new responsibilities regarding patient care.

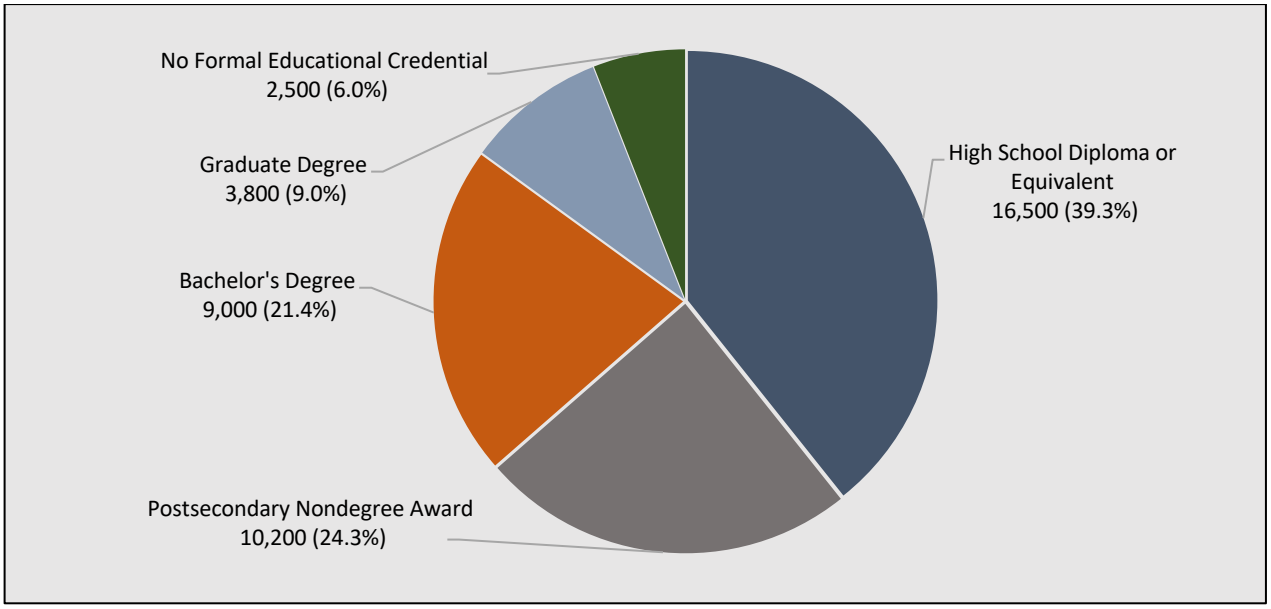
As demand for healthcare services has increased, a shift in responsibilities within the workforce has occurred. For example, patient care responsibilities at healthcare facilities are increasingly being handled by support staff, with the physicians assuming a more managerial and supervisory role.[18] This trend presents an opportunity for workforce expansion.

Relative to the other target industries, the healthcare industry will demand a workforce that requires a higher level of education. For example, in the base projection, 9,000 annual healthcare jobs open in Arizona that require a bachelor's degree and 3,800 jobs require a graduate degree. This represents approximately 30.4% of the 42,000 total available healthcare job openings.

Approximately 16,500 (39.3%) of the jobs will require a high school diploma, 2,500 (6.0%) jobs will require no education, and 10,200 (24.3%) jobs will require a postsecondary award (Figure 19).

[18] The Brookings Institute: Engelberg Center for Health Care Reform. (https://www.brookings.edu/wp-content/uploads/2016/06/FINAL-Hitachi-Toolkit-32014-1.pdf)

Figure 19: Annual Arizona Job Openings in the Healthcare Industry by Education Needed



Note: Arizona job openings are created by people exiting the labor force, transferring to another occupation, and from overall growth.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

As previously discussed, healthcare support and technical occupations are carrying an increasing amount of patient care responsibility. These include nursing assistants, physician assistants, and medical assistants, among others. This additional work is commanding higher wages and these above average wages are driving high demand for these jobs.

This is likely to be beneficial for the industry in the long run as these jobs have a lower educational requirement relative to the jobs that previously carried the responsibility for patient care (i.e., physicians, registered nurses, nurse practitioners, etc.) but pay a higher wage than the statewide median.

Table 4: Healthcare Industry Occupations in High Demand

Occupation Title	2020 Arizona Employment	10-Year Growth Rate	Median Wage*	Educational Attainment Needed for Entry
Physician Assistants	2,500	57.6%	$116,000	Master's degree
Occupational Therapy Assistants	1,100	57.6%	$67,600	Associate degree
Nurse Practitioners	4,800	54.5%	$115,900	Master's degree
Respiratory Therapists	3,400	51.9%	$60,200	Associate degree
Mental Health Counselors	6,200	47.8%	$46,500	Bachelor's degree
Arizona Total	2,835,100	17.6%	$40,300	-

*Represents the median wage earned in Arizona for each occupation in 2020.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Additional Detail - Construction Industry

While the construction industry performed poorly during the Great Recession, strong population and employment growth during the expansion period that followed has supported the industry during the most recent recession.

Employment in the construction industry declined just 3.7% during the most recent recession. Growth in the construction industry is expected to outpace that of Arizona's total employment over the next 10 years.

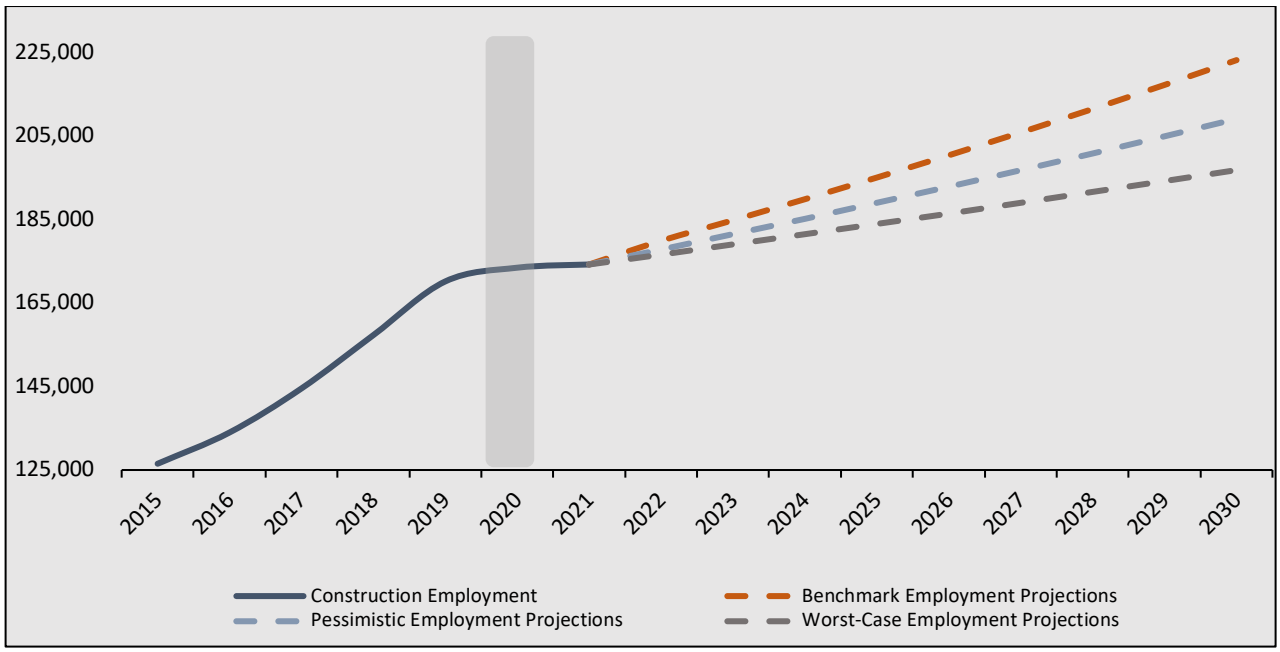
Construction employment in Arizona is projected to grow on average 2.7% per year and employ nearly 227,000 individuals in 10 years. This compares to the projected statewide average employment growth rate of 2.2% per year over the same time period.

Figure 20 illustrates the construction industry's projected employment and two different growth scenarios. A scenario in which employment growth underperforms the benchmark rate by 25.0% (i.e., an average rate of 2.0% per year), and by 50.0% (i.e., an average rate of 1.4% per year).

If Arizona is unable to meet the projected employment demand and employment growth slows to 2.0% per year on average (i.e., the pessimistic scenario), there will be 14,600 fewer construction jobs compared to the benchmark projections. The opportunity cost of these fewer jobs equals $2.3B in lost economic activity and $83.2M in lost state and local tax revenues each year.

Under the worst-case scenario, employment in the construction industry increases 1.4% per year on average. This equates to 28,400 fewer construction jobs, representing a loss of $4.5B in economic activity and $161.8M in tax revenues annually, compared to the benchmark projections.

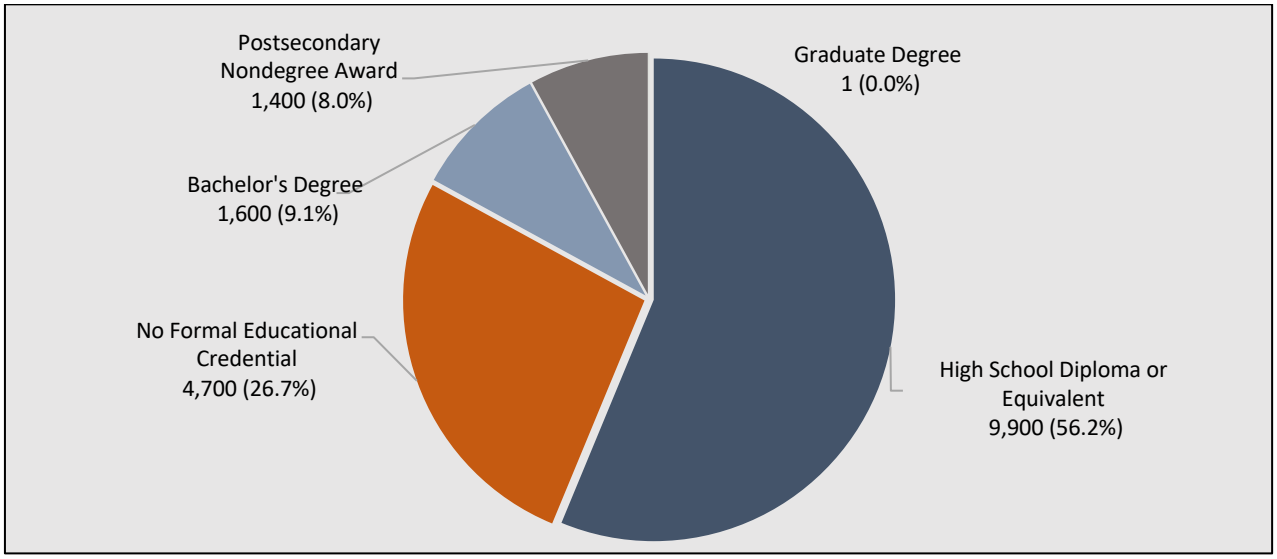
Figure 20: Arizona Construction Industry Employment Projections



Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

In total, there will be 17,600 construction job openings each year over the next 10 years. Approximately 26.7% (i.e., 4,700 job openings) will require no formal education credentials, 56.2% (i.e., 9,900 job openings) will require a high school diploma, and 8.0% (i.e., 1,400 job openings) will require a postsecondary award.

Figure 21: Annual Arizona Jobs Openings in the Construction Industry by Education Needed



Note: Arizona job openings are created by people exiting the labor force, transferring to another occupation, and from overall growth.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

The following table displays the construction occupations with the highest projected rate of growth. The solar industry is driving the demand for solar panel installers. These jobs are expected to grow by 65.5% over the next 10 years. These jobs earn a median wage of $48,312 and require a high school diploma for entry.

Industrial truck drivers and tractor operators will also be in high demand. Employment in these jobs is expected to grow by 48.8% over the next 10 years and does not require any formal educational credential for entry. However, the median wage for these jobs is lower than the statewide median wage level.

Table 5: Construction Industry Occupations in High Demand

Occupation Title	2020 Arizona Employment	10-Year Growth Rate	Median Wage*	Educational Attainment Needed for Entry
Solar Photovoltaic Installers	190	65.5%	$48,312	High school diploma or equivalent
Industrial Truck/Tractor Operators	10,910	48.8%	$36,818	No formal educational credential
Plumber Apprentice	970	32.5%	$33,284	High school diploma or equivalent
Carpenter Apprentice	480	29.2%	$36,007	No formal educational credential
HVAC/Refrigeration Mechanics & Installers	10,000	28.3%	$46,437	Postsecondary nondegree award
Arizona Total	2,835,110	17.6%	$40,257	-

*Represents the median wage earned in Arizona for each occupation in 2020.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Additional Detail - Professional and Business Services Industry

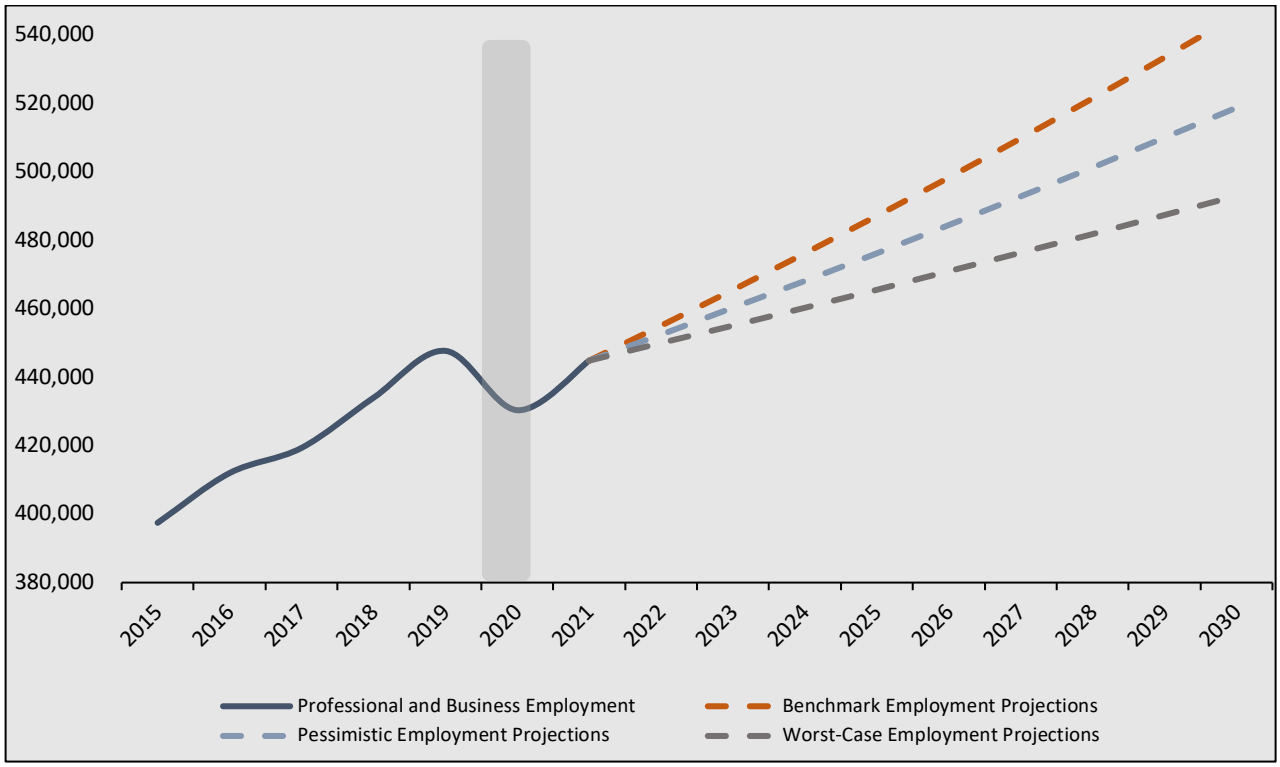
The professional and business services industry performed well relative to overall employment in Arizona during the most recent recession. Professional and business services employment declined by 8.4%, compared to an 11.1% decline in overall employment. The industry has recovered 1.09 jobs for each job lost during the most recent recession, while total employment has recovered 1.01 jobs for each job recovered in Arizona as of November 2021.

The industry is expected to grow by 25.5% over the next 10 years, or 2.3% per year on average, and employ nearly 540,100 people. This compares to the overall employment growth in Arizona of 2.2% per year, on average. Figure 22 displays the benchmark employment projection (i.e., an average growth rate of 2.2% per year) for the professional and business services industry as well as two growth scenarios in which employment growth underperforms the benchmark rate by 25.0%, (i.e., an average growth rate of 1.7% per year) and by 50.0% (i.e., an average growth rate of 1.1% per year).

If Arizona is unable to meet the projected employment demand and employment grows at 1.7% per year on average (i.e., the pessimistic scenario), there will be 29,600 fewer professional and business services jobs compared to the benchmark projections. The loss of these jobs equals a loss of $3.3B in economic activity and $178.0M in tax revenues.

Under the worst-case scenario, employment in the professional and business services industry grows at 1.1% per year on average. This would be 57,700 fewer jobs than the benchmark projections, representing $6.3B in lost economic activity and $347.0M in lost state and local tax revenues.

Figure 22: Arizona Professional and Business Services Industry Employment Projections

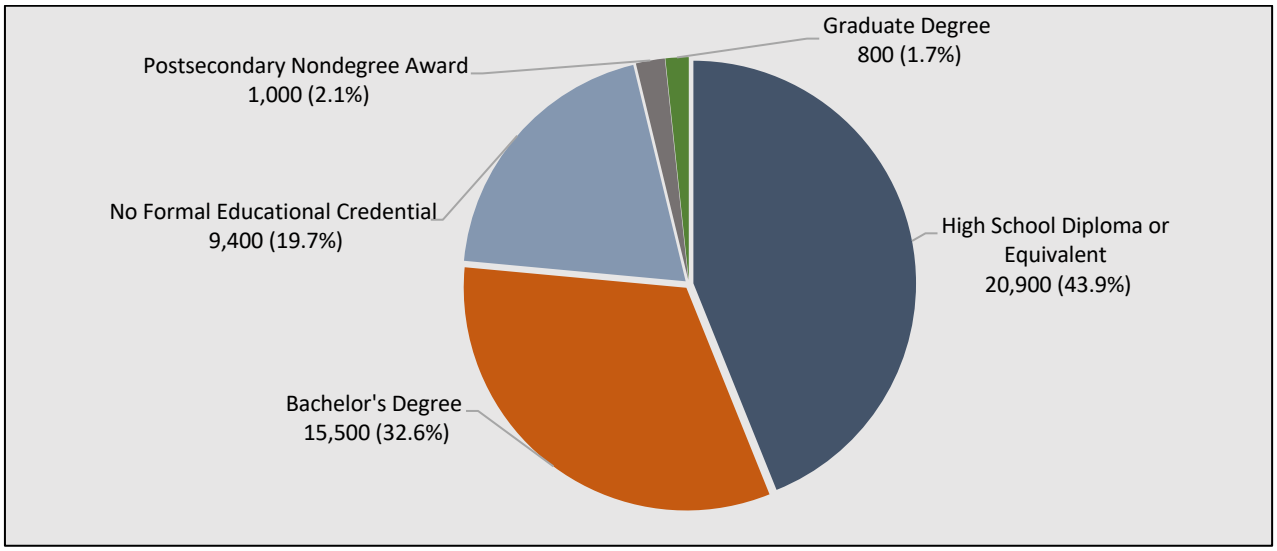


Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

A bachelor's degree will be required for entry to approximately 15,500, or 32.6% of the jobs that will be available annually, and a graduate degree will be necessary for a projected 800 (1.7%) annual job openings.

Jobs demanded in the professional and business services industry further include 9,400 job openings annually that do not require a formal education certificate representing 19.7% of the 47,600 total openings, and 20,900 (43.9%) jobs that require a high school diploma.

Figure 23: Annual Arizona Job Openings in the Prof. and Business Services Industry by Education Needed



Note: Arizona job openings are created by people exiting the labor force, transferring to another occupation, and from overall growth.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

Table 6 displays the occupations in the professional and business services industry that will be in the highest demand over the next decade. Understanding the industry needs will help guide development efforts. The demand for veterinarians in Arizona is strong, with projected employment growing by 38.4% over the next 10 years. These jobs earned a median wage of $99,600 in 2020. Paralegals and legal assistants are expected to grow by 29.0% over the next 10 years. These jobs require an associate degree for entry and earned a median wage of $51,600, above the statewide median of $40,300 in 2020.

Table 6: Professional and Business Services Industry Occupations in High Demand

Occupation Title	2020 Arizona Employment	10-Year Growth Rate	Median Wage*	Educational Attainment Needed for Entry
Veterinarians	1,400	38.4%	$99,600	Doctoral or professional degree
Paralegals and Legal Assistants	7,500	29.0%	$51,600	Associate degree
Computer Network Architects	4,000	23.3%	$107,900	Bachelor's degree
Environmental Engineers	1,300	18.8%	$89,000	Bachelor's degree
Computer Programmers	2,400	17.2%	$89,700	Bachelor's degree
Arizona Total	2,835,100	17.6%	$40,300	-

*Represents the median wage earned in Arizona for each occupation in 2020.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Additional Detail - Financial Activities

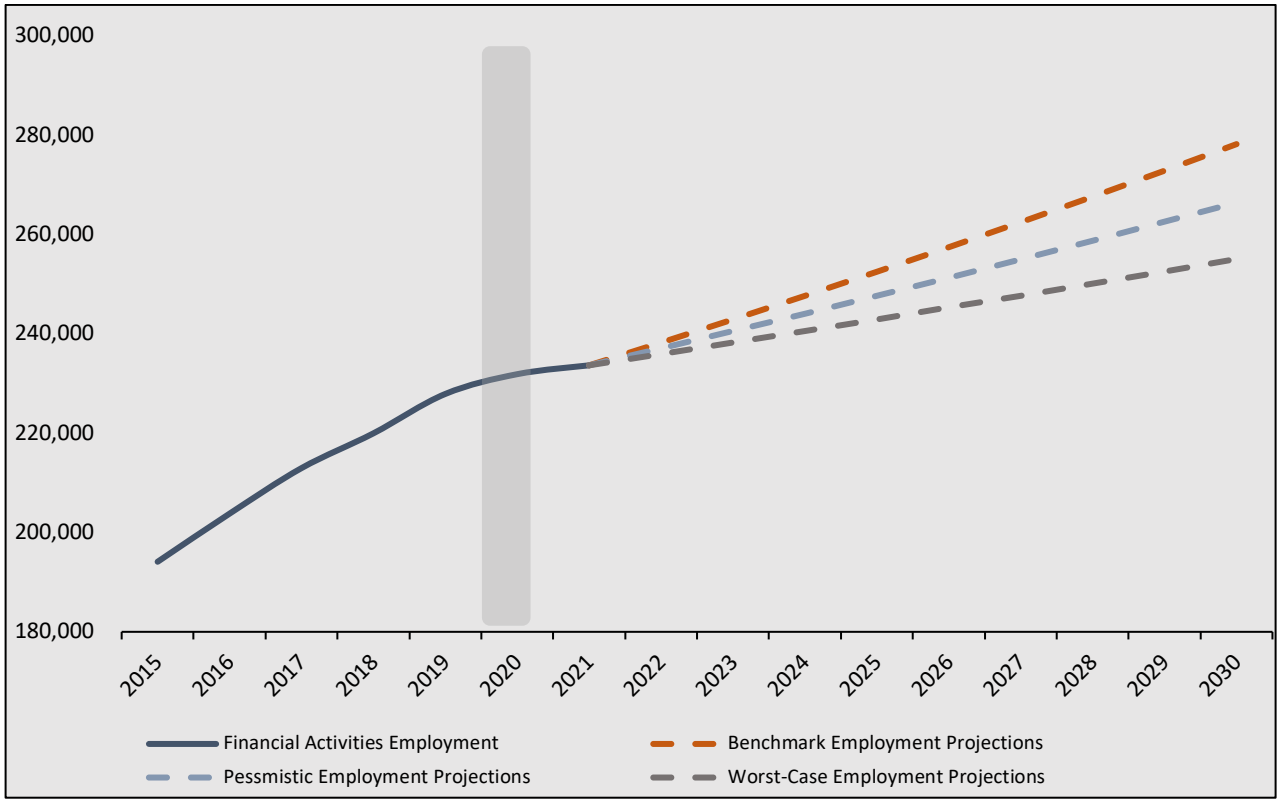
The financial activities industry experienced a 2.0% decline in employment during the most recent recession and approximately 1.17% of the jobs have been recovered, as of December 2021. Financial activities employment in Arizona is expected to grow by 21.4% to 282,000 jobs over the next 10 years, outpacing total employment growth statewide.

Figure 24 displays the baseline employment projection for the financial activities industry, which estimates that industry employment will grow at an average rate of 2.0% per year over the next 10 years. It also shows two growth scenarios in which employment growth underperforms the benchmark rate by 25.0%, an average rate of 1.5% per year, and by 50.0%, an average rate of 1.0% per year.

If Arizona is unable to meet the projected employment demand and employment grows at 1.5% per year on average, there will be 13,200 fewer financial activities jobs compared to the benchmark projections. The opportunity cost of the fewer jobs equals a loss of $2.7B in economic activity and a loss of $90.5M in tax revenues.

Under the worst-case scenario, employment in the financial activities industry grows at 1.0% per year on average. This would be 25,900 fewer jobs than the benchmark, representing a loss of $5.2B in economic activity and $177.6M in state and local tax revenues each year.

Figure 24: Arizona Financial Activities Employment Projections

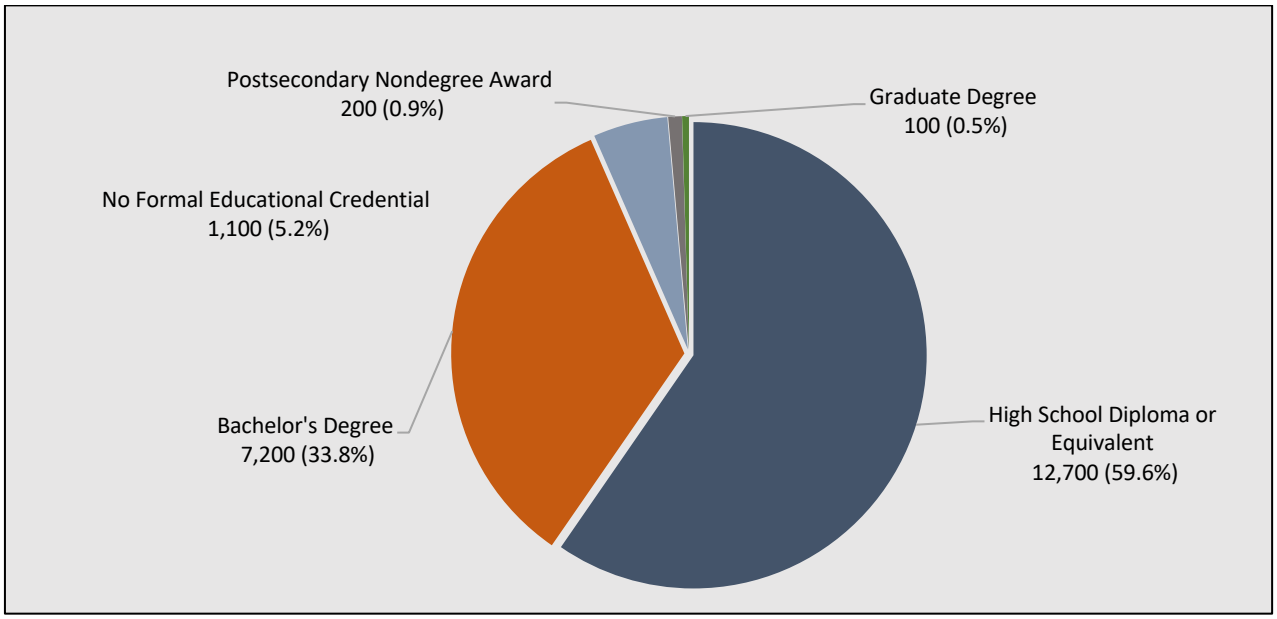


Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Over the next 10 years, there will be an average of 21,300 job openings per year in the financial activities industry. Of the total workforce demanded, 34.3% will require at least a bachelor's degree for entry (i.e., 33.8% will require a bachelor's degree and 0.5% will require a graduate degree).

This compares to the 12,700 (59.6%) jobs that will require a high school diploma, 1,100 (5.2%) annual jobs that require less than a high school diploma, and 200 (0.9%) jobs that require a postsecondary award (Figure 25).

Figure 25: Annual Arizona Job Openings in the Financial Activities Industry by Education Needed



Note: Arizona job openings are created by people exiting the labor force, transferring to another occupation, and from overall growth.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

Table 7 summarizes the occupations in the financial activities industry with the highest projected rates of growth. Employment for actuaries and financial managers is expected to grow by 35.1% and 33.2%, respectively. In 2020, actuaries in Arizona earned a median wage of $101,000, while financial managers earned a median wage of $117,000. This is compared to the Arizona median wage earned in 2020 of $40,300.

Table 7: Financial Activities Industry Occupations in High Demand

Occupation Title	2020 Arizona Employment	10-Year Growth Rate in Arizona	Median Wage*	Educational Attainment Needed for Entry
Actuaries	140	35.1%	$101,000	Bachelor's degree
Financial managers	12,300	33.2%	$117,000	Bachelor's degree
Insurance sales agents	7,700	32.1%	$51,000	High school diploma or equivalent
Loan officers	6,700	28.4%	$43,900	High school diploma or equivalent
Insurance appraisers	1,300	26.8%	$60,800	Postsecondary nondegree award
Arizona Total	2,835,100	17.6%	$40,300	-

*Represents the median wage earned in Arizona for each occupation in 2020.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Additional Detail - Manufacturing Industry

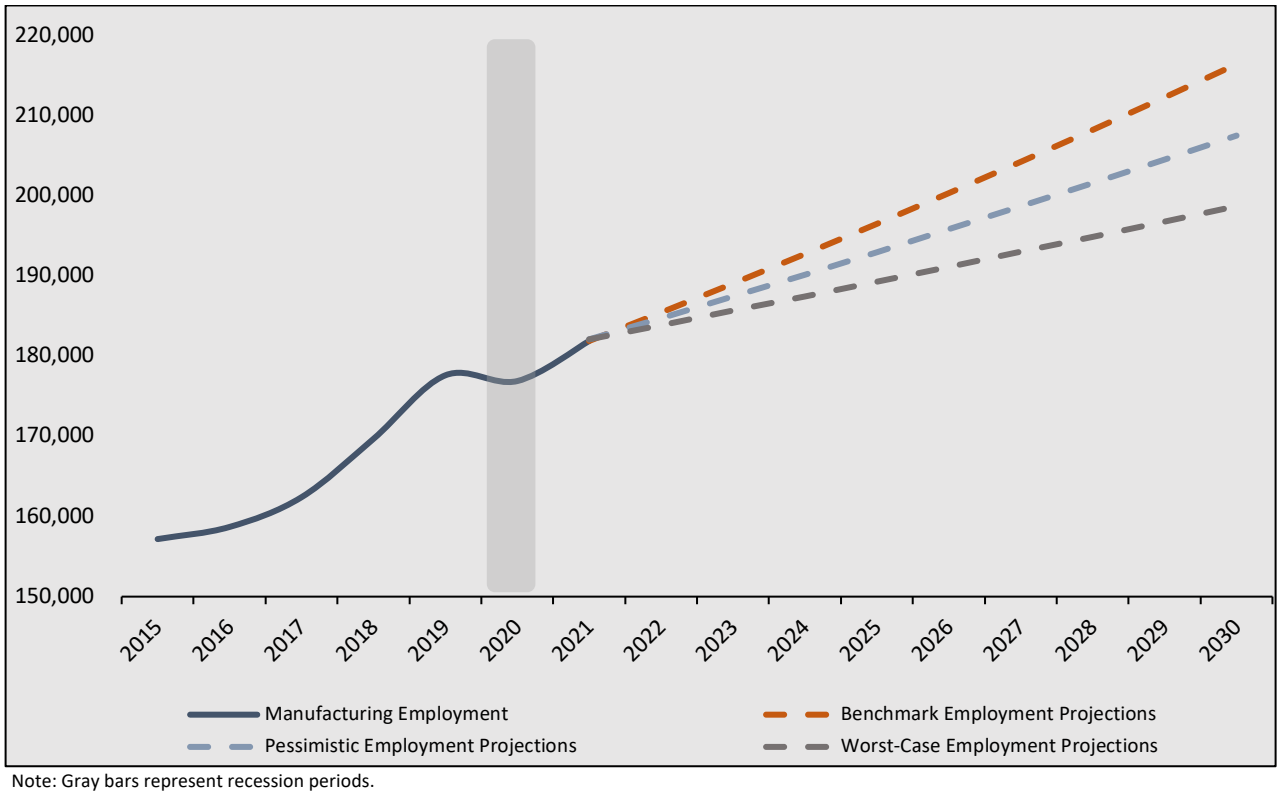
The manufacturing industry had a strong performance compared to the overall Arizona economy during the most recent recession. Manufacturing employment in Arizona declined 4.0% compared to an 11.1% decline in overall employment in Arizona. Since then, manufacturing employment has recovered 1.14 jobs for each job lost. This is a slightly higher recovery ratio than employment in Arizona as a whole, which has recovered 1.01 jobs for each job lost as of December 2021.

Figure 26 displays the benchmark employment projection for the manufacturing industry, which estimates that industry employment will grow at an average rate of 1.9% per year over the next 10 years. The chart also displays two growth scenarios in which employment growth underperforms the benchmark rate by 25.0% (i.e., the pessimistic scenario) and by 50.0% (i.e., the worst-case scenario).

If Arizona is unable to meet the projected employment demand and manufacturing employment grows at 1.4% per year on average (i.e., the pessimistic scenario), there will be 8,900 fewer jobs compared to the benchmark projections. These jobs represent a loss of $2.9B in economic activity and $71.7M in state and local tax revenues that would not be collected, compared to the benchmark projections.

Under the worst-case scenario, employment in the manufacturing industry grows at 1.0% per year on average. This would be 17,700 fewer jobs, equaling a loss of $5.9B in economic activity and $142.1M in tax revenues annually.

Figure 26: Arizona Manufacturing Employment Projections



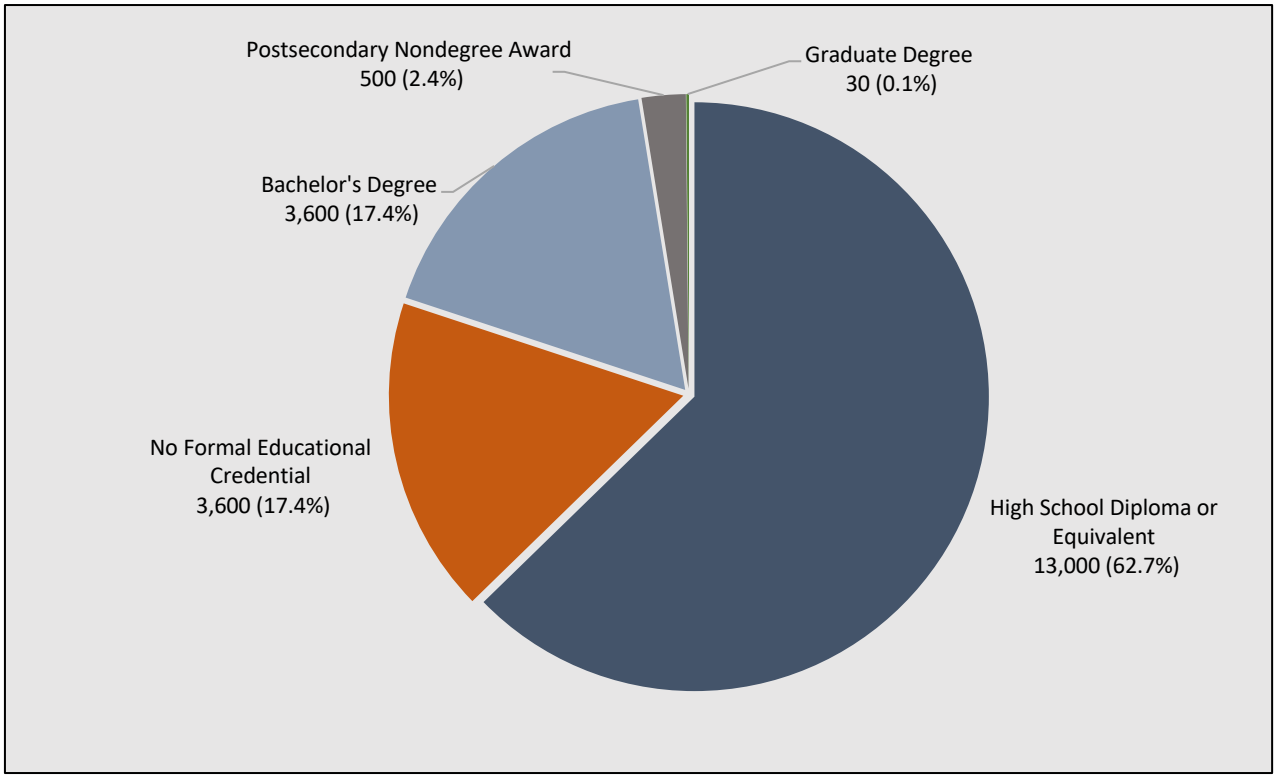
Note: Gray bars represent recession periods.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

However, this is likely a conservative growth estimate. The most recent recession in 2020 exposed weaknesses in the national manufacturing industry. One such weakness was the size and complexity of the industry's supply-chain ecosystem. To correct these weaknesses, an industry-wide shift towards localized production is likely.[19]

This shift will impact the Arizona economy by encouraging firms to strengthen local and regional operations, enhancing employment growth beyond current projections. These changes and industry trends will create opportunities to enhance Arizona's competitive position related to attracting additional manufacturing businesses and advancing economic growth.

The workforce demanded by the Arizona manufacturing industry annually includes 3,600 jobs (i.e., 17.4%) that require a bachelor's degree, 13,000 jobs (i.e., 62.7%) that require a high school diploma, 3,600 jobs (i.e., 17.4%) that have no formal education requirement, 500 jobs (i.e., 2.4%) that require a postsecondary certification, and 30 jobs (0.1%) that require a graduate degree.

Figure 27: Annual Arizona Job Openings in the Manufacturing Industry by Education Needed



Note: Arizona job openings are created by people exiting the labor force, transferring to another occupation, and from overall growth.
Source: U.S. Bureau of Labor Statistics; Arizona Office of Economic Opportunity

While much of the projected job openings in the manufacturing industry do not require higher education, the jobs with the highest projected growth earn median wages that are higher than the Arizona median wage. This makes them a target for workforce development and enhancement.

Employment for computer-controlled tool programmers is projected to grow by 27.0% over the next 10 years. In 2020, those in this occupation earned a median wage of $62,200, compared to the statewide median wage of

[19] Deloitte 2021 Manufacturing Industry Outlook (https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-2021-manufacturing-industry-outlook.pdf)

$40,300. Jobs for industrial machinery mechanics are projected to grow by 22.6%. Those in this occupation earned a median wage of $55,500 in 2020 in Arizona.

Table 8 displays the 2020 employment level, the growth rate, median wage and minimum educational requirement for entry for select jobs that are projected to experience the most growth over the next 10 years.

Table 8: Manufacturing Industry Occupations in High Demand

Occupation Title	2020 Arizona Employment	10-Year Growth Rate	Median Wage	Educational Attainment Needed for Entry
Computer controlled tool programmers	300	27.0%	$62,200	Postsecondary nondegree award
Industrial machinery mechanics	4,000	22.6%	$55,500	High school diploma or equivalent
Industrial engineering technicians	1,400	21.2%	$61,300	Associate degree
Millwrights	300	17.0%	$72,500	High school diploma or equivalent
Industrial engineers	6,400	14.7%	$96,000	Bachelor's degree
Arizona Total	2,835,100	17.6%	$40,300	-

*Represents the median wage earned in Arizona for each occupation in 2020.
Source: Arizona Office of Economic Opportunity; U.S. Bureau of Labor Statistics

Conclusion

First and foremost, Arizona has yet to reach its full potential and opportunities for further economic enhancement exist. A review of Arizona's economic performance over the last two decades reveals that the business cycle in the state has typically outperformed the rest of the U.S. during times of economic expansion and contraction.

Arizona's economy grew more than the national average during economic expansions and declined less during times of recession. This has been true for growth in population, employment, gross state product, and personal income. This relative overall stability has been the case during every recession over the last 50 years, with the exception of the Great Recession of 2008, when the economic decline was more severe in Arizona than in most other states.

Despite this resiliency, Arizona continues to lag behind the National Economy in quality economic measures and its future growth is at risk due to educational attainment levels that do not meet economic demands. Improving educational output has a clear and measurable ROI for state and local governments.

The key to making workforce enhancement a reality is the development of a coordinated effort among the universities, business organizations, economic development offices, and state and local policymakers.

This call to action is based on both quantitative and qualitative analyses and includes a review of how to best provide taxpayers with a positive ROI.

Since the flow of students in technical schools and higher education institutions is dependent on the flow of students from K-12, additional positive ROI programs in high school will be required. With focused efforts and investment in workforce development – including postsecondary education – Arizona will be well-positioned to attract competitive industries with high relative pay and opportunity for advancement. As documented by this study, Arizona would reap a sizable economic return on its investment.

Summary of Key Statistical Findings:

- ***The creation of higher wage jobs leads to more economic stability***. During the most recent recession, the number of jobs in Arizona that required less than a high school diploma declined by 21.8%. This compares to the 11.4% decline in jobs that require at least a high school diploma, and the 0.2% decline in jobs that require at least a bachelor's degree.

- ***Arizona is underproducing bachelor's degrees.*** State leaders will need to support workforce initiatives at the universities, community colleges, and technical schools. Arizona will have an estimated 68,000 annual job openings that require at least a bachelor's degree from 2020-2030.[20] Under current conditions, there will be an annual shortage of 26,300 bachelor's degrees.

[20] U.S. Bureau of Labor Statistics; Rounds Consulting Group

- ***Arizona is underperforming in terms of quality growth.*** The demand for bachelor's degrees will increase significantly if Arizona is able to match the U.S. in terms of per capita GSP. This would require 165,300 new base sector jobs earning in excess of $140,500 per year. A portion of the "multiplier" jobs would also require a bachelor's degree. In this scenario, Arizona would need 215,600 additional bachelor's degrees in order to reach the national level of per capita GSP.[21]

- ***The fiscal impact of not improving is significant.*** The increase in productivity related to enhanced GSP and employment counts would generate $4.0B in new tax revenues for the state and local governments each year, far exceeding investment costs related to policy implementation.

[21] U.S. Bureau of Economic Analysis; Rounds Consulting Group, Inc.

Appendix A - Case Studies

Developing a vibrant, successful economy does not happen by chance and requires a collaborative business plan to ensure a state is competitive and has the workforce necessary for the future.

Arizona's largest metropolitan area, the Greater Phoenix Metro Area (Phoenix MSA), is a national leader in several measures of economic growth, including population and employment growth. However, when compared to competitor metro areas, the Phoenix MSA has not been as resilient during periods of economic recessions and is lagging in measures of quality economic growth.

Since the Great Recession, PCPI and per capita GDP as a percent of the U.S. level in the Phoenix MSA have stagnated, whereas the Austin and Salt Lake MSAs have experienced upward trends in each of these metrics. The upward trends of the competitor metro areas can be attributed, in part, to favorable tax policies that have attracted a significant amount of capital investment for business development as well as the availability of a talented and educated workforce.

However, these policies alone do not account for the growth and relative position of the Austin and Salt Lake City MSAs in measures of economic quality, compared to the Phoenix MSA. Similar to the ABOR New Economy Initiative, each area has successfully implemented an education or workforce initiative that has driven high rates of educational attainment and training in high-growth and resilient industries. As a result, both of these metro areas have higher wages than the Phoenix MSA.

A review of economic resiliency and performance of the Phoenix-Mesa-Chandler Metropolitan Area (Phoenix MSA) against the Salt Lake City Metropolitan Area (Salt Lake MSA) and the Austin-Round Rock Metropolitan Area (Austin MSA) demonstrates that the Phoenix MSA has performed well during periods of economic contraction and expansion when compared to competitor metro areas. However, related to measures of quality, Phoenix MSA's economy lags behind.

Case Studies – Phoenix MSA Compared to Select Competing Metro Areas

After a small decline in employment following the 2001 recession, the Phoenix MSA experienced the most employment growth relative to its competing metro areas. However, as discussed previously, this growth was not supported by a sound economic foundation.

As a result, employment declined 7.8% from 2008-2009 during the Great Recession. This was greater than the decline in the Salt Lake MSA, which experienced a decline of 4.8%. The Austin MSA performed the strongest during the Great Recession, declining just 2.1% from 2008-2009.

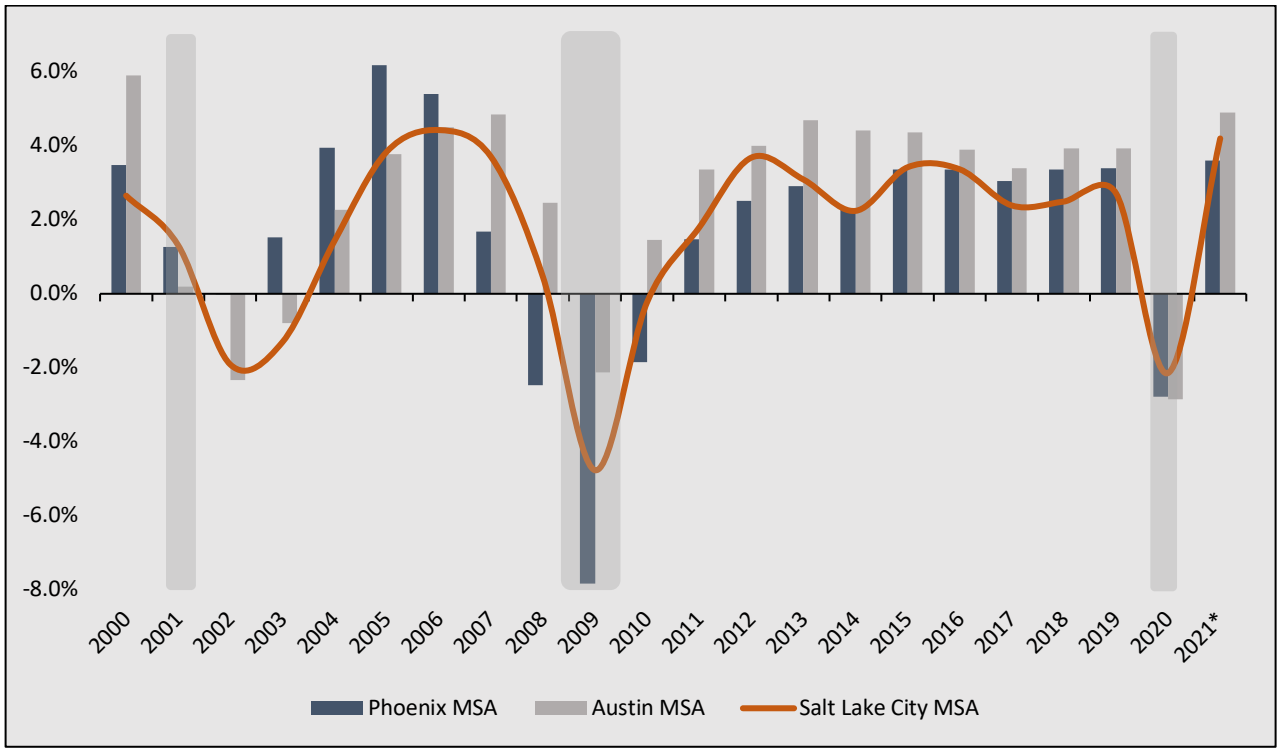
From 2010 to 2020, the Austin MSA experienced the highest employment growth of the 3 areas, followed by the Salt Lake MSA. While the Phoenix MSA lagged behind the other two metro areas in employment growth, there was a higher focus on enhancing the state's economic foundation during this period.

This effort was beneficial as the Phoenix MSA performed well relative to the other metros during the most recent recession. Employment declined 2.8% in the Phoenix MSA compared to 2.9% in the Austin MSA and 2.1% in the Salt Lake MSA.

As of November 2021, employment in the Phoenix MSA had grown 3.6% since 2020. This was the lowest among the metro areas. The Salt Lake MSA grew 4.2% and Austin MSA grew 4.9% during the same time period.

Overall, employment growth from 2000 to 2020 in the Phoenix MSA grew at an average annual rate of 1.5% compared to 2.3% and 1.5% in the Austin MSA and Salt Lake MSA, respectively.

Figure 28: Annual Employment Change by Metro Area

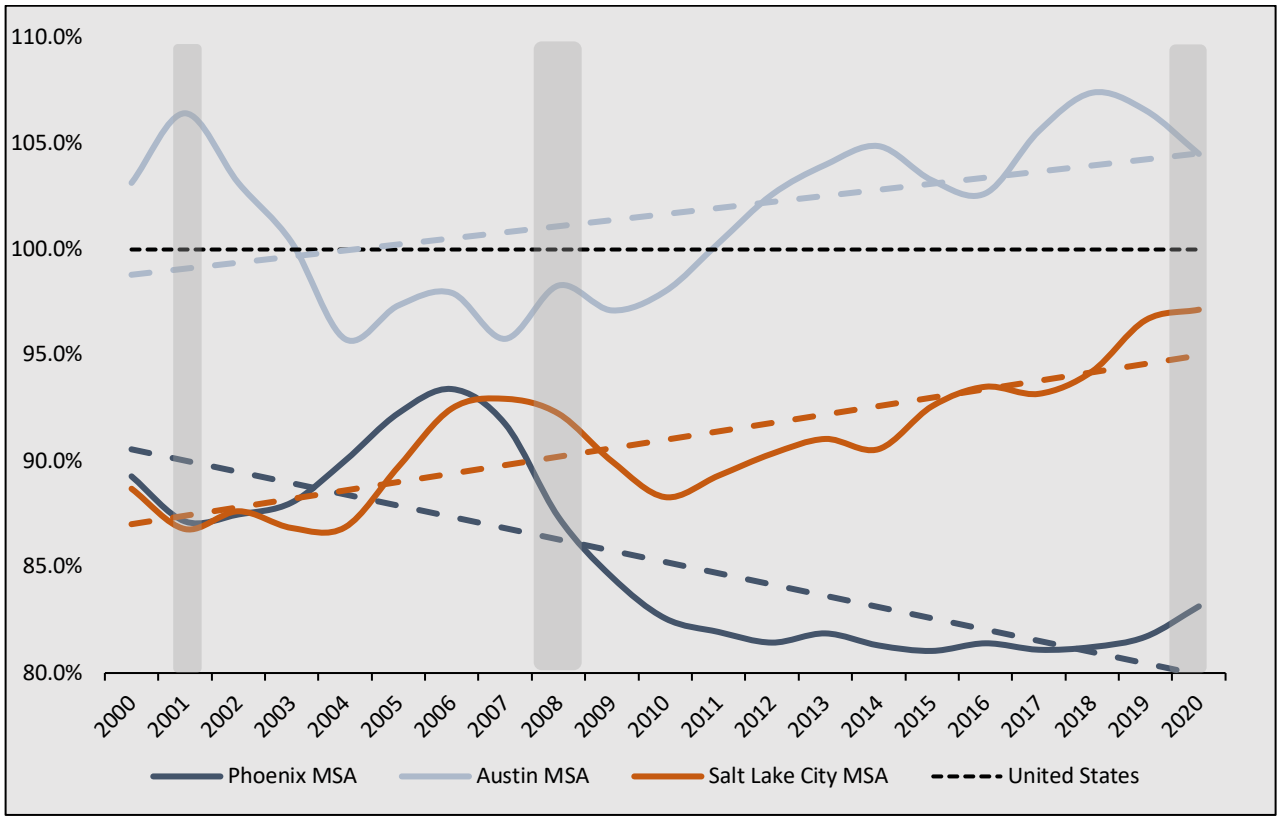


Note: Gray bars represent recession periods. *As of November 2021.
Source: U.S. Bureau of Labor Statistics

Quality economic growth is growth that enhances the quality of life for residents. A commonly used indicator to assess the current economic health among residents is the per capita personal income (PCPI) as a percent of the national level. If the performance of PCPI as a percent of the U.S. is increasing over time, it is an indication that the region's economy is performing well. If the trend is flat or declining, this is an indication that the economy is lagging.

The trend of PCPI in the Phoenix MSA has been declining since the Great Recession. This compares to an increasing trend for the Austin and Salt Lake MSAs.

Figure 29: PCPI as a Percent of the U.S. by Metro Area

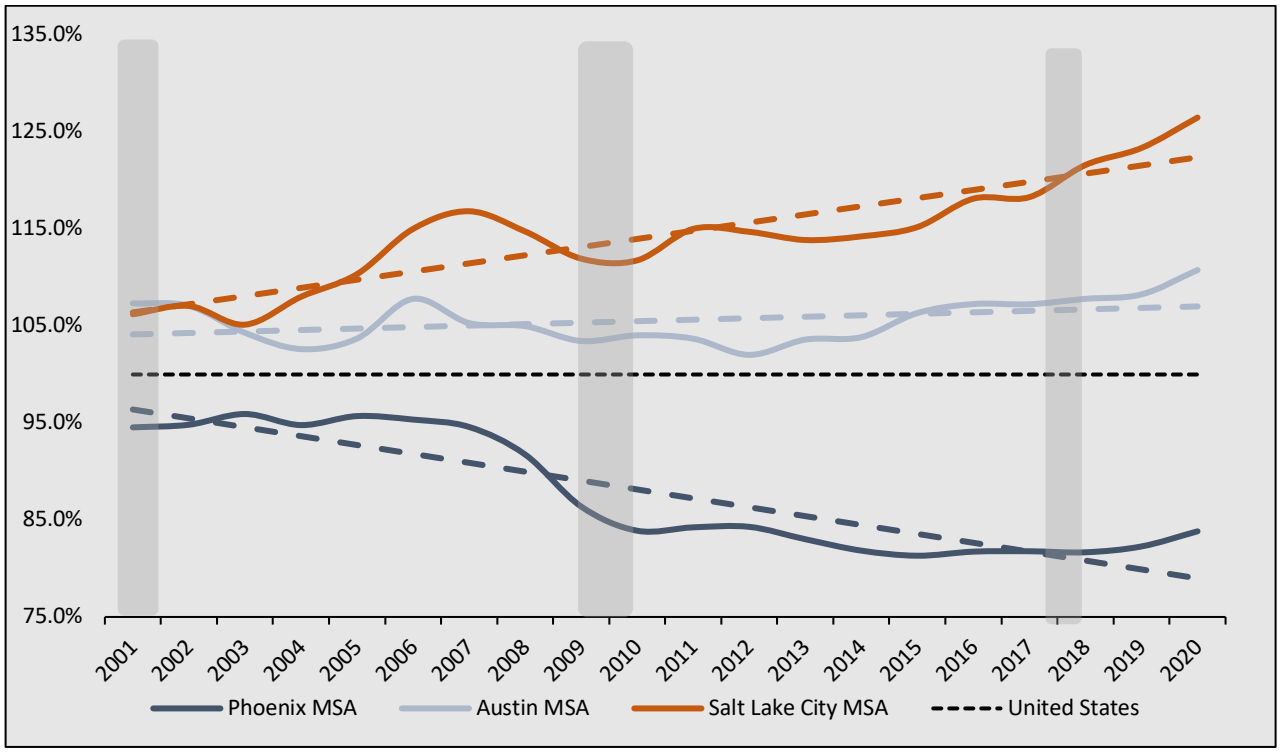


Note: Gray bars represent recession periods. PCPI is adjusted for cost of living.
Source: U.S. Bureau of Economic Analysis; Rounds Consulting Group, Inc.

In 2020, the per capita GSP in the Phoenix MSA was 83.8% of the U.S. level. This was well below the Austin MSA and Salt Lake MSA, which each reported a per capita GSP at 126.5% and 110.8% of the U.S. level, respectively.

Of greater significance, is how the Phoenix MSA has performed over time. Since the Great Recession, per capita GSP as a percent of the U.S. in the Phoenix MSA has been trending downward from 2001-2019. Per capita GSP has remained stable in the Austin MSA and has increased in the Salt Lake MSA over the same time period.

Figure 30: Per Capita Gross State Product as a Percent of the U.S. by Metro Area

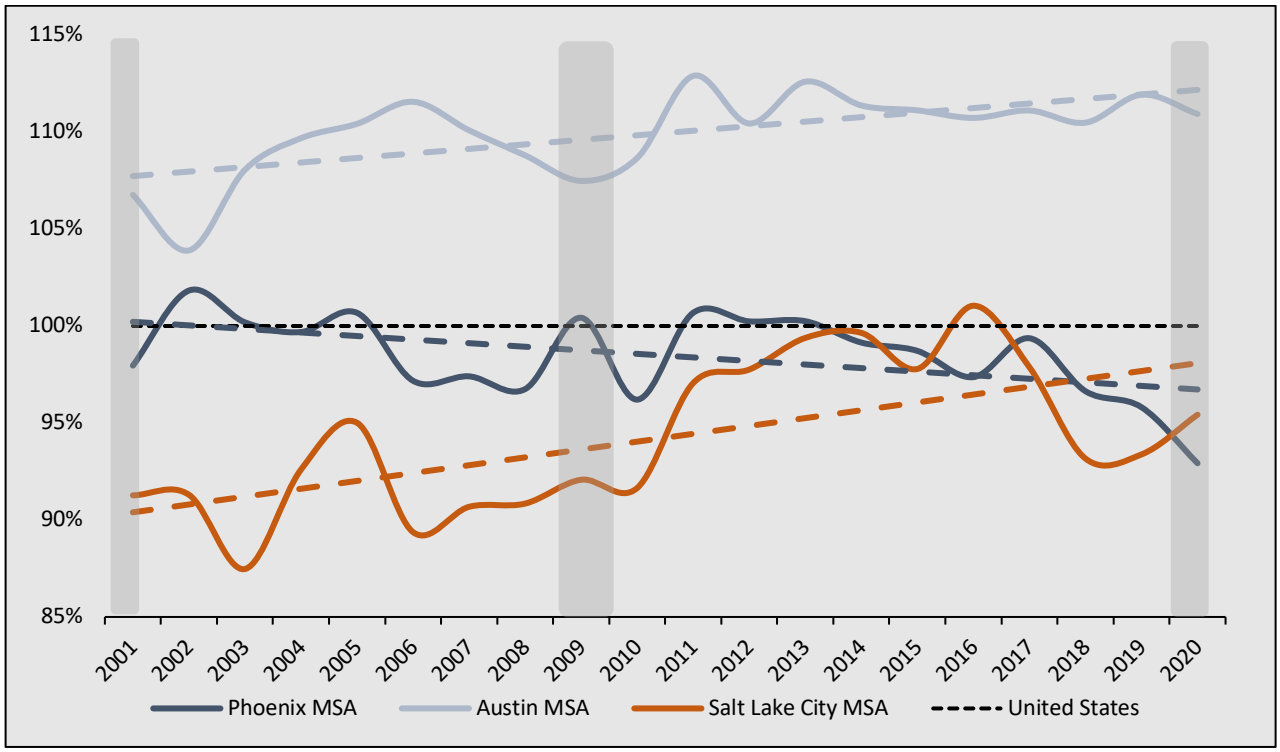


Note: Gray bars represent recession periods.
Source: U.S. Bureau Economic Analysis; Rounds Consulting Group, Inc.

An analysis of average wages provides additional context as to how despite a growing employment base, from 2001-2020 wage levels in the Phoenix MSA have declined relative to the U.S. level, when adjusted for cost of living. This is in contrast to the average wage levels in the Austin and Salt Lake MSAs, which have been trending upwards relative to the U.S. level over the same time period.

Additionally, of note is that the average wage level as a percent of the U.S. was lower at the beginning of the analysis period in the Salt Lake MSA relative to the Phoenix MSA. In 2001, the average wage level in the Phoenix MSA was 98.0% of the U.S. level. This compared to the Salt Lake MSA level which was 91.3% of the U.S. level.

Figure 31: Average Wages as a Percent of the U.S. by Metro Area



Note: Gray bars represent recession periods. Average wages are adjusted for cost of living.
Source: U.S. Bureau of Economic Analysis; Rounds Consulting Group, Inc.

There needs to be a continued effort from policymakers and educational leaders to implement policies and programs that support an upward trend in quality metrics such as PCPI and per capita GSP in the Phoenix MSA and throughout the state.

Conducting comparative analyses can be a helpful exercise in order to identify best practices and key policies that were implemented in competitor metros that helped drive the positive economic growth in those areas.

The Austin MSA

In recent years, the Austin MSA has secured commitments from several industry leading companies to locate or expand to the area. These include Samsung, Oracle, Google, and Tesla, among others.[22] These businesses will create tens of thousands of high-wage jobs in the region and continue to drive quality economic growth.

This review examines the policies, programs and initiatives that have facilitated this growth in the Austin MSA, and how to achieve similar results in the Phoenix MSA.

As previously discussed, both the Phoenix MSA and the Austin MSA have experienced significant population and employment growth over the last decade. From 2001-2020 the population in the Austin MSA has grown at an average annual rate of 3.2%. This compares to the population of the Phoenix MSA, which has grown by 2.3% per year, on average over the same time period. For perspective, the population growth among all metro areas nationwide grew by 0.9% per year, on average.

[22] Austin Chamber (https://www.austinchamber.com/economic-development/business-climate/relocations-expansions#block-2)

Despite the economic base in both metro areas exceeding the national level, the performance of the Austin MSA in measures of economic quality (i.e., PCPI, per capita GSP, and average wages) has exceeded that of the Phoenix MSA.

While there are many factors that contribute to this difference in performance over time, improving educational attainment has been critical in driving quality growth in the Austin MSA. According to the latest data from the U.S. Census Bureau, 44.8% of those living in the Austin MSA had a bachelor's degree or higher as of 2019. This compared to 31.5% of those living in the Phoenix MSA[23].

A higher level of educational attainment leads to a higher quality workforce in the Austin MSA. The availability of a quality and dynamic workforce, in turn, drives business recruitment efforts that supply high-wage jobs in high-growth industries. These jobs and the subsequent increase in economic activity fuel the growth in measures of economic quality.

Community leaders and stakeholders in the Austin MSA have focused on increasing the quality of the workforce by enhancing educational attainment through targeted initiatives such as the Student Futures Project and the Direct-to-College Achievement Program (DTC70).

The Student Futures Project is a research partnership between the Ray Marshall Center, Greater Austin Chamber of Commerce, Skillpoint Alliance, and various school districts throughout the Austin MSA. The program is designed to provide insight as to what students are doing after graduating from high school and why they are making those decisions. This information can be critical in determining the most common barriers to enrollment in post-secondary education (i.e., a two-year or four-year college or trade school).

Since 2005, tens of thousands of high school seniors have participated in the program and the information gathered has helped educational leaders and policymakers identify two focus areas that have proven to improve graduation rates. These areas are completing the Texas Common Application and submitting a FAFSA application.

In order to address these target areas, the Austin MSA implemented the DTC70 program. The goal of this initiative is to enroll 70.0% of graduating high school seniors in higher education immediately following graduation. This is achieved by directly helping graduating students overcome barriers and obstacles to enrollment.[24]

The DTC70 initiative has been successful in increasing enrollments and is particularly beneficial for low-income students. Since 2010, direct college enrollment from students in central Texas (i.e., enrolling in higher education directly following high school graduation) increased 32.2%. Low-income students that participate in the DTC70 programs are more than three times as likely to complete a higher education program within 6-years than low-income students that do not participate in the program.[25]

In addition to the DTC70 program, the Austin MSA has implemented the Direct-to-Work 30 (DTW30) program. The DTW30 program specifically targets those that are not seeking direct enrollment in higher education to provide opportunities to gain a training and certification for high demand skills, followed by direct placement into the workforce in a high growth industry.

[23] U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates
[24] Austin Chamber of Commerce (https://www.austinchamber.com/education-talent/k-12-initiatives/direct-to-college)
[25] University of Texas at Austin, Ray Marshall Center, Student Futures/Chamber DTC70 Partner multi-year postsecondary enrollment outcomes 2006-2019.

The Salt Lake MSA

Examining the economic growth of the Salt Lake MSA provides insight into how strategic education and workforce initiatives can successfully enhance quality economic growth over time.

Since 2001, the population in the Salt Lake MSA has grown at an average rate of 1.5% per year. This compares to the population in the Phoenix MSA which grew at an average annual rate of 2.3%. Employment in the Salt Lake MSA grew by 1.8% per year over the previous two decades while employment grew by 1.9% annually.

Despite their economic bases growing at a similar rate, the Salt Lake MSA has outperformed the Phoenix MSA in measures of economic quality. For each of the metrics discussed previously, the Salt Lake MSA is trending in an upward direction when compared to the U.S., over time. This indicates that PCPI, per capita GSP, and average wage levels are growing at a greater rate than the national average.

The economic performance in the Salt Lake MSA can be attributed to the successful implementation of the *Envision Utah* initiative. Envision Utah is a non-profit organization formed in 1997 that connects community, government, and business leaders with residents to engage in collaborative decision making regarding the future of the region.

This effort engaged over 400 experts and 50,000 residents to identify the elements that are most important for achieving quality growth. These elements establish a clear framework to provide context to strategic planning efforts and guide policy decisions.

The Envision Utah initiative has helped educational attainment in the Salt Lake MSA exceed that of the Phoenix MSA as well as the U.S., as of 2020. The U.S. Census Bureau estimates that 35.0% of those that are 25 years or older living in the Salt Lake MSA have a bachelor's degree or higher. This compares to 31.5% in the Phoenix MSA and 32.1% nationwide.[26]

In addition to educational attainment, the Envision Utah initiative has also focused efforts on identifying and preserving regional assets that are important for a high quality of life. It was determined that the outdoor recreation and tourism industries were integral parts of life.

While these industries are not significant drivers of economic resilience, they do provide numerous indirect benefits. One of these benefits is maintaining a high retention rate for university graduates in the Salt Lake MSA.

For example, in 2020, 73.7% of undergraduate students that graduated from the University of Utah in the previous year were employed in Utah.[27] This compares to 53.0% of undergraduate students that graduated from Arizona State University in the previous year that are employed in Arizona.[28]

Furthermore, as of 2020, 69.1% of those that graduated from the University of Utah with a bachelor's degree in a STEM field within the last year remained in Utah for employment.[29] This compares to 46.0% of those that graduated from Arizona State University with a degree in a STEM field within the last year that were employed in Arizona (2020).[30]

[26] U.S. Census Bureau, American Community Survey 2015-2019 5-year estimates
[27] The University of Utah Alumni Career Outcomes (https://careers.utah.edu/where-are-they-now/)
[28] Arizona Board of Regents, 2020 Alumni Wages Report (https://www.azregents.edu/reports-0)
[29] The University of Utah Alumni Career Outcomes (https://careers.utah.edu/where-are-they-now/)
[30] Arizona Board of Regents, 2020 Alumni Wages Report (https://www.azregents.edu/reports-0)

As a result, the Salt Lake MSA has a large supply of highly educated workers who have a preference to remain in the region. The presence of this workforce encourages businesses in high-growth industries to locate and expand in the Salt Lake MSA and the surrounding region. The increase in business activity supports the growth of high-wage jobs which advances the performance in measures of economic quality.

Appendix B - Job Multiplier Example

An economic impact model was developed to demonstrate how employment growth in one industry impacts employment growth in other industries. The job impact estimates by industry are based on 1,000 new high wage manufacturing jobs.

These 1,000 manufacturing jobs generate an additional 2,434 jobs throughout Arizona, for a total of 3,434 jobs. This means the example manufacturing industry has a job multiplier of 2.43 – meaning that for every 1 manufacturing job created, another 2.43 jobs are created.

The following table illustrates the industry breakdown of the secondary 2,434 jobs created from the 1,000 manufacturing jobs in Arizona.

Table 9: Job Impact by Industry	
Industry	Jobs
Primary Job Impact	1,000
Manufacturing	1,000
Secondary Job Impact	2,434
Agriculture, forestry, fishing and hunting	109
Mining, quarrying, and oil and gas extraction	38
Utilities	5
Construction	22
Manufacturing	436
Wholesale trade	18
Retail trade	362
Transportation and warehousing	157
Information	102
Finance and insurance	88
Real estate and rental and leasing	28
Professional, scientific, and technical services	35
Management of companies and enterprises	21
Administrative and support and waste management and remediation services	101
Educational services	49
Health care and social assistance	378
Arts, entertainment, and recreation	140
Accommodation and food services	89
Other services	227
Public administration	28
Total Job Impact	3,434
Job Multiplier	2.43

Source: IMPLAN; Rounds Consulting Group, Inc.

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