

THE IMPACT OF ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA IN 2022

A Report from the Office of the University Economist

November 2023

Dennis Hoffman, Ph.D.

Professor, Department of Economics; Director, L. William Seidman Research Institute;
and Director, Office of the University Economist

Eva Madly, M.S.

Senior Research Economist,
L. William Seidman Research Institute

Center for Competitiveness and Prosperity Research
L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University
Box 874011
Tempe, Arizona 85287-4011

(480) 965-5362

EMAIL: Dennis.Hoffman@asu.edu

ccpr.wpcarey.asu.edu

economist.asu.edu



TABLE OF CONTENTS

| | |
|---|----|
| Summary | 1 |
| Description of Data | 2 |
| Arizona State University Graduates Employed in Arizona in 2022 | 5 |
| Arizona State University Graduates Employed in Arizona, 2012 Through 2022 | 12 |
| Appendix: Arizona State University Graduates From 1990 Through 2022 Employed in Arizona in 2022: Detail by Category of Degree | 14 |

LIST OF TABLES

| | |
|---|----|
| 1. Arizona State University Graduates Employed in Arizona and Covered by the Unemployment Insurance Program in 2022 | 8 |
| 2. Arizona State University Graduates Employed in Arizona in 2022 Compared to Total Employment in Arizona | 11 |
| 3. Summary of Arizona State University Graduates Employed in Arizona, 2012 Through 2022 | 13 |

SUMMARY

Arizona State University (ASU) graduates are employed throughout the world. This paper examines only those graduates employed in Arizona — those contributing to the productivity and prosperity of the state.

Approximately 297,148 ASU graduates were working in Arizona in 2022. More than one-in-four of the state's working individuals who had earned at least a bachelor's degree had graduated from ASU. The aggregate earnings of the ASU graduates were around \$22.4 billion. Based on these earnings, these individuals contributed between \$1.58-and-\$1.77 billion in state and local government taxes, including between \$976 million and \$1.09 billion in state government taxes, depending on the tax rate assumed.

The estimate of the number of ASU graduates working in Arizona in 2022 is based on actual employment and wage data for 199,638 individuals who graduated from ASU between 1990 and 2022 and were covered by the state's unemployment insurance program. Estimates of those who graduated from ASU prior to 1990 and of ASU graduates who were not covered by the unemployment insurance program but were working in Arizona in 2022 were added to the 199,638 figure to reach the total of approximately 297,148.

The estimated number of ASU graduates employed in Arizona increased an average of 3.9 percent per year between 2012 and 2022. Over the decade, the number of employed ASU graduates as a share of the state's total employment increased, from 6.17 percent to 6.93 percent. ASU's share increased in most, but not all, years.

The inflation-adjusted estimated aggregate earnings of ASU graduates employed in Arizona rose an average of 5.0 percent per year between 2012 and 2022. Over the decade, the aggregate earnings of employed ASU graduates as a share of the state's total aggregate earnings climbed, from 8.28 percent to 9.17 percent. ASU's share advanced in most, but not all, years.

The larger increase in real aggregate earnings than employment indicates that real average earnings per worker rose for ASU graduates. The annual average increase between 2012 and 2022 was 1.0 percent. However, the average earnings of ASU graduates did not increase quite as much as the state's overall figure. The average earnings of ASU graduates was 134.3 percent of the total in 2012, but was 132.4 percent in 2022.

The inflation-adjusted estimated amount of tax payments made by ASU grads to state and local governments in Arizona increased between 2012 and 2022 on an annual average basis by 4.7 percent using the lower assumed tax rate and by 4.6 percent using the higher assumed tax rate.

The estimated share of Arizona workers holding at least a bachelor's degree who are a graduate of ASU did not change much during the decade, ranging from 25.6 percent to 26.9 percent. The figure was 25.8 percent in 2022.

DESCRIPTION OF DATA

University Graduates Employed in Arizona

For each year from 2012 through 2022, the Arizona Board of Regents (ABOR) has created a dataset of graduates of Arizona's three public universities who were employed in Arizona during the year. While the ABOR dataset includes the number of "degrees awarded," this number really refers to the number of individuals earning a degree. An individual earning more than one degree is counted only once in this dataset, categorized in the year of the most recent degree. Thus, the dataset's number of "degrees awarded" is less than the official number of degrees awarded.

The ABOR dataset is created by matching Social Security numbers of university graduates to the numbers in the unemployment insurance file maintained by the Arizona Department of Economic Security, which works in conjunction with the U.S. Department of Labor. Reporting from the unemployment insurance file — the Quarterly Census of Employment and Wages (QCEW) — is done quarterly, with annual average figures also produced.

Each quarter, every business that employs workers covered by the state's unemployment insurance program must report (1) employment in each of the three months of the quarter during the pay period that includes the 12th day of the month and (2) total wages paid by the business during the quarter. Federal government civilian workers covered by the comparable federal unemployment insurance program also are included in the reporting.

Various members of the workforce are not included in the QCEW: most agricultural workers on small farms, those self-employed, those in the Armed Forces, and various others. Reporting is by job, not by individual — an individual working more than one covered job will appear in the file more than once.

Since the unemployment insurance records are confidential, ABOR's dataset of graduates employed in Arizona includes only aggregate totals. There are two significant limitations to this dataset. First, the unemployment insurance file does not include a significant number of workers — in 2022, the employment count from the unemployment insurance file was only 72 percent of the total employment in Arizona, as reported by the U.S. Bureau of Economic Analysis (BEA). Second, the dataset of graduates employed in Arizona constructed by the Board of Regents only includes graduates since 1990. Thus, the number of graduates of Arizona's public universities who are working in Arizona is understated significantly. This understatement effectively becomes even larger when the number of *individuals* counted in the Board of Regents dataset is compared to the total number of *jobs* reported in the QCEW.

The dataset constructed by the Board of Regents is subdivided by various characteristics:

- university
- bachelor's degrees versus graduate degrees
- those who attended school as Arizona residents versus nonresidents

The analysis described in this paper uses a dataset specific to Arizona State University (ASU) provided by ASU's Office of the University Provost.

By year of graduation, the following data items are available from the dataset of university graduates employed in Arizona:

- number of graduates
- number employed in Arizona (in any quarter during the year)
- percent of graduates employed in Arizona
- total and median wages of graduates employed in Arizona
- estimated state taxes paid by graduates employed in Arizona
- number employed in Arizona in all four quarters
- total and median wages of those employed in Arizona in all four quarters

The number of graduates is reported by academic year — for example, for 2022, the sum of the number graduating in August 2021, December 2021, and May 2022. The employment data are for calendar year 2022.

While the median wage of those employed in all four quarters is a reasonable measure of the typical annual wage of graduates included in the dataset, use of the median wage is arithmetically quite limited. Thus, the average wage of those employed in any quarter during the year also is calculated, as total wages divided by the total number employed.

Employment

The employment figures reported in the QCEW are based on a census of all covered workers and therefore are highly accurate, but as noted above, a large number of workers are not covered by the unemployment insurance program. Thus, focusing only on those covered by the program significantly understates the contribution of university graduates to the Arizona economy.

Employment estimates are available from several sources, but these estimates are not consistent due to definitional differences (certain categories of workers may be excluded by one source but not by another), differences in the way the data are collected (such as a sample of employers versus a census), and timing differences in when the data are collected. In order to provide a more complete picture of the economic activity in Arizona of ASU graduates, more complete employment estimates from the BEA are used in this report.

Most of the employment estimates, including those of the QCEW and BEA, do not differentiate between a person working full time and one working fewer hours. Employment is categorized by the place of work, not by where the worker lives. For example, an Arizona resident of Bullhead City who works across the Colorado River in Laughlin, Nevada is counted in the Nevada employment figures. Further, most of the employment estimates report the number of jobs, not the number of people employed — an individual working two jobs is counted twice in the employment figures. This is an important distinction when comparing the number of ASU graduates (individuals) employed in Arizona to total employment (number of jobs).

Unlike other employment estimates, the employment data reported from the American Community Survey (ACS) reflects the number of individuals working and workers are classified by place of residence. The ACS is an ongoing survey of households conducted by the U.S. Census Bureau that is the source of a wide variety of socioeconomic data. The main shortcoming of the ACS is that it is based on a relatively small number of households. Sampling error can be a

significant concern. The accuracy of self-reporting, particularly for questions related to wages and income, also is an issue. Various ACS tables provide insight on employment in Arizona. The ACS employment figures are based on an individual's employment status at the time the questionnaire is completed.

Educational Attainment

In order to provide context on the contribution of ASU graduates employed in Arizona, the educational attainment of the Arizona workforce is examined. The ACS is the best source of data on educational attainment at a subnational level. In this report, Arizona's educational attainment is compared to the nation using three ACS tables: attainment for the population age 25 and older, attainment in each of five age groups, and attainment by labor force status among those 25-to-64 years old.

While ACS data for five years often are combined to reduce sampling error, the ACS data from 2022 are used in this analysis in order to be consistent with the Board of Regents dataset. For Arizona, sampling error for a single year of ACS data ranges from insignificant for broad measures to significant for small subsets of the population. Thus, the attainment data for the entire population at least 25 years of age is more reliable than the data for each of five age groups.

The Impact of College Graduates on the Workforce

Educational attainment is strongly correlated to an individual's earnings, with a bachelor's degree in particular causing a boost in earnings. The higher earnings realized over a lifetime of work greatly exceeds the costs of attending college.¹ Society also benefits from an educated populace in various ways, such as the lower crime rates of educated individuals.²

One of the benefits of having highly educated individuals in the workforce is to raise the wages of the entire workforce. Enrico Moretti specified this relationship in his 2004 *Journal of Econometrics* paper, "Estimating the Social Return to Higher Education: Evidence From Longitudinal and Repeated Cross-Sectional Data."³ The spillover of benefits to all workers can be traced to the enhanced worker productivity associated with greater educational attainment. Improved productivity results from the sharing of knowledge and skills across workers and from shifts in the industrial mix to knowledge-based activities. These productivity gains translate into higher output and earnings.⁴

¹ See "Has the Return to Investing in a College Education Declined?," December 2013, and earlier papers at <https://economist.asu.edu/reports>.

² See "Benefits From Improving Educational Attainment in Arizona," August 2012, <https://economist.asu.edu/reports/benefits-from-improving-educational-attainment-in-arizona> and earlier papers at <https://economist.asu.edu/reports>.

³ Accessible from <https://eml.berkeley.edu/~moretti/socret.pdf>.

⁴ See "The Economic Impact of Raising the Educational Attainment of Arizona's Workforce; 2019 Update," July 2019, <https://economist.asu.edu/reports/the-economic-impact-of-raising-the-educational-attainment-of-arizonas-workforce-2019-update>.

ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA IN 2022

Employment

According to the QCEW, annual average Arizona employment in 2022 totaled 3,075,427. The BEA's wage and salary employment estimate was 3,206,670, meaning that 131,243 wage and salary workers were not covered by unemployment insurance. The BEA estimates that the number of proprietors (self-employed, also not included in the QCEW) was 1,080,925, for a total employment figure of 4,287,595.

According to the ACS, an estimated 3,441,676 Arizonans were employed in 2022 in civilian jobs; an additional 24,085 were members of the armed forces. The total of 3,465,761 is 81 percent of the BEA's total number of jobs, suggesting that many workers (1) are employed by more than one business and/or (2) hold a wage and salary job as well as report self-employment income. Other data from the ACS indicates that 20 percent of employed Arizonans worked less than 35 hours per week.

Educational Attainment

Most commonly, educational attainment is expressed for those at least 25 years old. Though the age of 25 is arbitrary, a high proportion of individuals have completed their educations by that age. In 2022, Arizona's educational attainment in this large cohort was inferior to the nation. The share without either a high school diploma or a GED (general education development) certificate was higher in Arizona: 10.8 percent versus 10.4 percent nationally. Relative to the nation, lesser shares of Arizonans had earned a bachelor's degree (20.4-versus-21.6 percent nationally) and a graduate degree (12.5-versus-14.0 percent nationally).

An examination of educational attainment by age group reveals that Arizona was particularly far below the nation among those younger than 35 in 2022. Arizona also was below average among those 35-to-64 years old. In contrast, the educational attainment of those 65 and older was higher in Arizona than nationally. Since few of those age 65 and older are working, the standard statistics on the entire 25-and-older population understate Arizona's educational disadvantage as it applies to the workforce.

Data on educational attainment by labor force status indicate that among those in the workforce, the educational attainment in Arizona of those 25-to-64 years old was below the national figure in 2022. The proportion of those working in a civilian job who had earned at least a bachelor's degree was 37.4 percent in Arizona and 41.8 percent nationally.

Arizona State University Graduates Employed in Arizona

Detailed figures from the dataset of 1990-through-2022 graduates of Arizona State University who were employed in Arizona during 2022 are provided in the appendix. Data are shown by undergraduate versus graduate degree and by residency status while a student.

ABOR's data for graduates in the most recent academic year need to be interpreted carefully. A significant proportion of those graduating in academic year 2022 graduated in May 2022. The employment and wage information for these individuals in calendar year 2022 may reflect part-time employment prior to graduation and/or full-time employment after graduation. In the latter

case, the wage data are for less than a year of full-time employment. For those graduating in academic year 2022, the average wage and median wage is very low and the percentage employed in all four quarters is very low compared to those graduating in prior years.

The following are among the basic conclusions that can be reached using the dataset of ASU graduates from academic years 1990 through 2022:

- The number of individuals earning a degree has increased significantly over time, by 388 percent overall between 1990 and 2022.
- The increase in the number of individuals earning a degree has been higher for graduate students than undergrads, and much higher for those who were classified as nonresidents while attending school than among those classified as residents.
- In 2022, the shares of the total number of graduates were 36.9 percent for resident undergraduates, 30.6 percent for nonresident undergraduates, 10.3 percent for resident graduate students, and 22.2 percent for nonresident graduate students.
- The percentage of graduates employed in Arizona is much higher for residents than nonresidents.
- The share of graduates employed in Arizona decreases significantly with the number of years since graduation, regardless of residency status while students.
- The percentage employed in all four quarters was less than 70 percent among recent graduates but generally was greater than 70 percent among older graduates.
- The average wage and the median wage increase significantly with the number of years elapsed since graduation, though this effect weakens with the number of years elapsed.
- The median wage and the average wage are somewhat higher for those who were classified as nonresidents.
- The average wage exceeds the median wage (for graduates employed in all four quarters, as well as for graduates employed at some point during the year) presumably because of a small number of graduates earning very high wages that boosts the average but not the median. The difference between average and median wages is larger for older graduates.

The number of individuals who graduated from ASU between academic years 1990 and 2022 who worked at jobs in Arizona that were covered by the unemployment insurance program in calendar year 2022 was 199,638. ASU graduates between 1990 and 2022 accounted for 6.5 percent of the QCEW total number employed, but this share is understated since it compares *individuals* with ASU degrees to the *number of jobs*.

The aggregate wages of individuals who graduated from ASU between academic years 1990 and 2022 (\$16.7 billion) accounted for 8.4 percent of the QCEW total. ABOR estimates that “state tax revenue” (really, state and local government tax revenue in Arizona) in 2022 by those who graduated from ASU between 1990 and 2022 — based only on wages earned as part of the unemployment insurance program — was \$1.78 billion: 7.04 percent of aggregate wages.

A summary of the ASU graduates from 1990 through 2022 is provided in the top portion of Table 1. The bottom portion of Table 1 focuses on academic year 2021 graduates.⁵ Table 1 needs

⁵ Graduates from 2021 instead of 2022 are used since the statistics for those graduating in May 2022 are affected by part-time wages earned while a student and less than full-year wages after graduation.

to be interpreted carefully. Student characteristics vary by residency status and by undergraduate and graduate programs. For example, the magnitude of the difference in the average wage between undergraduate and graduate degrees in 2021 reflects not only the wage premium of the graduate degree but also the greater number of years of work experience prior to graduation among those with a graduate degree. The differential in the average wage of those with undergraduate and graduate degrees declines with the number of years of work experience. Among graduates from academic year 2021, the average wage in 2022 of those with a graduate degree was 51 percent higher than those with a bachelor's degree, but the differential for graduates over the entire 1990-to-2022 period was 27 percent. According to the 2022 ACS, all Arizona workers with a graduate degree (including those graduating before 1990) earned 21 percent more than those who had earned a bachelor's degree.

Alternative Estimates of Taxes Paid

ABOR estimates state and local government tax payments based on the following income levels and tax rates:

- Less than \$25,001: 12.6 percent
- \$25,001 to \$75,000: 6.8 percent
- \$75,001 to \$100,000: 7.2 percent
- More than \$100,000: 6.9 percent

The average tax rate of ASU graduates between 1990 and 2022 who worked in Arizona in 2022 was 7.04 percent.

ABOR's tax rates come from the 2007 edition of an annual study of tax burdens produced by the government of the District of Columbia.⁶ The latest study is for 2020. Since the tax rates from this study fluctuate from year to year with changes in methodology, it is preferable to use the median rates over several years. Major tax changes in Arizona for individuals were implemented in 2008 and 2022. Based on the 2009-through-2020 reports, the median combined state and local government tax rates in Arizona are higher than used by ABOR for those with incomes of \$50,000 or more. The median rate at each of four incomes between \$50,000 and \$150,000 is between 8.5-and-8.9 percent. Since the District of Columbia study does not measure every state and local tax — though it includes income taxes, sales taxes, property taxes, and automobile-related taxes — the overall tax rate would be slightly higher.

A study by the Institute on Taxation and Economic Policy (ITEP), which includes all taxes, reports a similar state and local government tax burden in Arizona.⁷ The figure was 8.5 percent for those earning between \$55,000 and \$96,400 during 2018-2020; the average wage of ASU graduates employed in Arizona reported by the ABOR is within this range. However the most recent ITEP report uses 2020 data and does not reflect the changes to individual income taxes

⁶ "Tax Rates and Tax Burdens in the District of Columbia — A Nationwide Comparison," Government of the District of Columbia, https://cfo.dc.gov/sites/default/files/dc/sites/ocfo/publication/attachments/2020%20Tax%20Rates%20and%20Tax%20Burdens_Nationwide%20Comparison.pdf.

⁷ Institute on Taxation & Economic Policy, *Who Pays? A Distributional Analysis of the Tax Systems in All 50 States*, October 2018, <http://www.itep.org/whopays/>.

**TABLE 1
ARIZONA STATE UNIVERSITY GRADUATES**

| | Total | Total Under-grad Degrees | Resident Under-grad Degrees | Non-resident Undergrad Degrees | Total Graduate Degrees | Resident Graduate Degrees | Non-resident Graduate Degrees |
|--|--------------|---------------------------------|------------------------------------|---------------------------------------|-------------------------------|----------------------------------|--------------------------------------|
| Graduates From 1990 Through 2022: | | | | | | | |
| Number Graduating From Arizona State University Employed in Arizona and Covered by the Unemployment Insurance Program in 2022: | 464,270 | 325,314 | 233,626 | 91,688 | 138,956 | 72,057 | 66,899 |
| Number | 199,638 | 151,627 | 136,884 | 14,743 | 48,011 | 38,944 | 9,067 |
| Share of Graduates (Percent) | 43 | 47 | 59 | 16 | 35 | 54 | 14 |
| Aggregate Wages (Dollars, Millions) | 16,730 | 11,932 | 10,795 | 1,137 | 4,797 | 3,930 | 868 |
| Average Wage (Dollars) | 83,801 | 78,696 | 78,863 | 77,145 | 99,923 | 100,912 | 95,677 |
| Estimated State and Local Government Tax Payments (Dollars, Millions) | 1,178 | 842 | 762 | 81 | 336 | 275 | 61 |
| Graduates From 2021: | | | | | | | |
| Number Graduating From Arizona State University Employed in Arizona and Covered by the Unemployment Insurance Program in 2022: | 30,327 | 20,548 | 11,393 | 9,155 | 9,779 | 3,206 | 6,573 |
| Number | 13,858 | 10,377 | 8,883 | 1,494 | 3,481 | 2,481 | 1,000 |
| Share of Graduates (Percent) | 46 | 51 | 78 | 16 | 36 | 77 | 15 |
| Aggregate Wages (Dollars, Millions) | 720 | 478 | 410 | 68 | 242 | 176 | 67 |
| Average Wage (Dollars) | 51,977 | 46,049 | 46,147 | 45,470 | 69,647 | 70,873 | 66,606 |
| Estimated State and Local Government Tax Payments (Dollars, Millions) | 52 | 35 | 30 | 5 | 17 | 12 | 5 |

Source: Arizona Board of Regents from Arizona State University, Office of the University Provost.

that were implemented in Arizona⁸ in 2022. These changes have resulted in a decrease in average income taxes paid by individuals of roughly 0.6 percent; hence an adjusted tax rate of 7.9 percent was used for 2022. Using this tax rate and the aggregate wage figures from the ABOR dataset, Arizona state and local government taxes paid on QCEW wages by those who graduated from ASU between 1990 and 2022 was approximately \$1.32 billion in 2022, compared to ABOR's estimate of \$1.18 billion.

In order to estimate the amount of taxes paid just to state government, U.S. Census Bureau data were used. In fiscal year 2021, state tax collections accounted for 61.8 percent of combined state and local government tax collections in Arizona.⁹ Applying this percentage to the estimates of state and local government taxes paid on QCEW wages by those who graduated from ASU between 1990 and 2022, the result is \$976 million based on ABOR's estimate of state and local government taxes and \$1.09 billion based on the 7.9 percent state and local government tax rate.

Extending the Analysis to Include Those Who Graduated From ASU Before 1990

In order to provide an estimate of the number of individuals who graduated from ASU before 1990 and who were working in Arizona in 2022, actual data on the number of degrees awarded by ASU before 1990 were collected, with the earliest data from 1971. The official graduation data from ASU count number of degrees — individuals with more than one ASU degree are counted more than once. These data are not consistent with the figures used in the Arizona Board of Regents dataset, which counts individuals, not number of degrees. Thus, in order to estimate the number of individuals who had earned a degree from ASU before 1990, the historical graduation data for the years before 1990 were adjusted, using the ratio from the 1990-through-1999 period of the number of graduates counted in the Board of Regents database to the official count of degrees granted. The ratio was 88.6 percent for those with an undergraduate degree, 91.2 percent for those with a graduate degree, and 89.3 percent for all graduates.

In order to estimate the number of ASU graduates from before 1990 who were working in Arizona in 2022 and counted in the unemployment insurance program, a “backward projection” was made of the percentage of ASU graduates who were employed in Arizona in 2022. The percentage drops with the number of years since graduation; the rate of decline is rapid among recent grads but is lower and relatively stable among earlier graduates. The average annual decrease of 1.38 percentage points between 1990 and 1999 was used for the pre-1990 period. Using the adjusted graduation figures and the estimated percentage of graduates employed in Arizona, the number of employed ASU graduates was calculated by year for the pre-1990 period.

The average wage for graduates in the pre-1990 period was backward projected in the same manner as the percentage employed. The average wage rises significantly by the number of years since graduation for relatively recent graduates. Among earlier graduates, the increase in the average wage by year is lower and more stable. The annual average increase from the 1990-through-1999 period was 0.11 percent; this figure was applied to the pre-1990 period.

⁸ https://www.azleg.gov/legtext/55leg/1R/summary/S.1828APPROP_ASENACTED.DOCX.htm

⁹ U.S. Department of Commerce, Census Bureau, State and Local Government Finance, <https://www.census.gov/programs-surveys/gov-finances.html>

Using these backward projections, the number of individuals who graduated from ASU through academic year 2022 who worked at jobs in Arizona that were covered by the unemployment insurance program in 2022 is estimated to be 213,140 — 6.7 percent higher than the number of those who graduated from 1990 through 2022. Due to the high average wage of individuals who graduated prior to 1990, the differential in the aggregate wage of the entire set of ASU graduates relative to the 1990-to-2022 group was greater at 9.1 percent.

This methodology does not directly address the increasing share of retirees among older ASU graduates. While the percentage of ASU graduates working in Arizona declines with the number of years since graduation over the 1990-to-2022 period, this decrease presumably occurs mostly due to out-migration. Few ASU graduates since 1990 — most of whom were less than 55 years old in 2022 — are likely to have retired. In contrast, retirement becomes increasingly likely among those who graduated during the 1970s. Thus, the estimates of the numbers employed in Arizona of graduates from this time period may be overstated. However, the methodology estimates that less than 1 percent of 1971 and 1972 graduates are employed in Arizona in 2022. Any overstatement of graduates from the 1970s working in Arizona is partially offset by the exclusion of graduates from before 1971, a few of whom likely were still part of the workforce in 2022. Further, it seems unlikely that the rate of out-migration from Arizona for job-related reasons would be as high among those approaching retirement age as among those who are younger. Thus, the estimated number of older ASU graduates working in Arizona is believed to be reasonable.

Those who have graduated from ASU accounted for 6.9 percent of the QCEW number of jobs in Arizona in 2022, but again this share is understated since it compares *individuals* with ASU degrees to the *number of jobs*. The aggregate wage of individuals who have graduated from ASU accounted for 9.2 percent of the QCEW total. The 2022 average wage of \$85,675 of those who have graduated from ASU was 32.4 percent higher than the average of the rest of the QCEW file (a group that includes those without a bachelor's degree and those who earned a degree from another institution). Based on the 7.04 percent tax rate and estimated QCEW wages, ASU graduates paid \$1.29 billion in state and local government taxes in 2022, of which \$794 million was paid to state government. Using the 7.9 percent tax rate, state and local government taxes paid amounted to \$1.44 billion, of which \$891 million was paid to state government.

Estimates from the ACS for 2022 indicate that 1,020,699 Arizona residents between the ages of 25 and 64 who had received at least a bachelor's degree were employed in civilian jobs. Based on various data from the ACS, the estimated total number of people working in civilian jobs in Arizona in 2022 who have earned a bachelor's or higher degree is 1,153,726. The estimated number of ASU graduates employed in the state and covered by the unemployment insurance program accounts for 18.5 percent of the estimated number of civilian workers with at least a bachelor's degree.

Extending the Analysis to Include ASU Graduates Employed in Arizona but Not Covered by the Unemployment Insurance Program

In order to estimate the number of ASU graduates working in Arizona in wage and salary jobs not covered by unemployment insurance or as proprietors (self-employed), the ASU shares of the QCEW total (6.93 percent of employment and 9.17 percent of wages) were applied to the BEA's

total employment figure. The result is a total of 297,148 ASU graduates working in Arizona in 2022 (see Table 2). This figure is understated because the 6.93 percent figure is based on individuals with ASU degrees and the number of QCEW jobs.

The estimate of 297,148 ASU graduates working in Arizona accounts for 25.8 percent of the estimated number of employed Arizonans with at least a bachelor’s degree in 2022. Thus, more than one-in-four working individuals in Arizona who had earned at least a bachelor’s degree had graduated from ASU. The aggregate earnings of the ASU graduates were around \$22.4 billion. Based on the 7.04 percent tax rate and \$22.4 billion in earnings, ASU graduates paid \$1.58 billion in state and local government taxes in 2022, of which \$976 million was paid to state government. Using the 7.9 percent tax rate, state and local government taxes paid amounted to \$1.77 billion, of which \$1.09 billion was paid to state government.

The Impacts of ASU Graduates on the Workforce

The estimates of 297,148 ASU graduates working in Arizona, earning \$22.4 billion, and paying between \$1.58 and \$1.77 billion in state and local government taxes do not provide a complete accounting of the impacts of ASU graduates on the Arizona economy. College graduates in the workforce boost the productivity of all workers, which results in an increase in wages for all workers. This is discussed in the May 2019 University Economist Paper, “The Economic Impact of Raising the Educational Attainment of Arizona’s Workforce: 2019 Update,” <https://economist.asu.edu/reports/the-economic-impact-of-raising-the-educational-attainment-of-arizonas-workforce-2019-update>.

**TABLE 2
ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA IN 2022
COMPARED TO TOTAL EMPLOYMENT IN ARIZONA**

| | Employment | Aggregate Earnings* | Average Earnings |
|--|-------------------|----------------------------|-------------------------|
| Employment in Arizona: | | | |
| QCEW Wage and Salary | 3,075,427 | \$199,081 | \$64,733 |
| Other Wage and Salary From BEA | 131,243 | 12,051 | 91,822 |
| Total Wage and Salary From BEA | 3,206,670 | 211,132 | 65,841 |
| Proprietors From BEA | 1,080,925 | 33,435 | 30,932 |
| Total From BEA | 4,287,595 | 244,567 | 57,041 |
| ASU Graduates Employed in Arizona: | | | |
| QCEW Wage and Salary, 1990 Through 2022 | 199,638 | 16,730 | 83,801 |
| Estimate From Before 1990 | 13,502 | 1,531 | 113,386 |
| Total QCEW Wage and Salary | 213,140 | 18,261 | 85,675 |
| Other Wage and Salary Plus Proprietors | 84,008 | 4,172 | 49,665 |
| Total | 297,148 | 22,433 | 75,494 |
| ASU Share of Total Employment in Arizona | 6.93% | 9.17% | 132.35% |

* In millions. Consists of wages and salaries and proprietors’ income.

Sources: U.S. Department of Labor, Bureau of Labor Statistics (QCEW: Quarterly Census of Employment and Wages); U.S. Department of Commerce, Bureau of Economic Analysis (BEA); and Arizona Board of Regents from Arizona State University, Office of the University Provost.

**ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA,
2012 THROUGH 2022**

The estimated number of ASU graduates employed in Arizona increased an average of 3.9 percent per year between 2012 and 2022, with the annual percent change ranging from 2.2 percent to 6.3 percent. The annual rate of change depends on numerous factors, including overall economic growth. Over the decade, the number of employed ASU graduates as a share of the state's total employment increased, from 6.17 percent to 6.93 percent. ASU's share increased in most, but not all, years (see Table 3).

The inflation-adjusted estimated aggregate earnings of ASU graduates employed in Arizona rose an average of 5.0 percent per year between 2012 and 2022, with the annual percent change ranging widely from -0.3 percent (in 2021) to 7.8 percent (in 2022). Over the decade, the aggregate earnings of employed ASU graduates as a share of the state's total aggregate earnings climbed, from 8.28 percent to 9.17 percent. ASU's share increased in most, but not all, years.

The larger increase in real aggregate earnings than employment indicates that real average earnings per worker rose for ASU graduates. The annual average increase between 2012 and 2022 was 1.0 percent, with the annual range from -6.2 percent to 4.3 percent. However, the average earnings of ASU graduates did not increase quite as much as the state's overall figure. The average earnings of ASU graduates was 134.3 percent of the total in 2012, but was 132.4 percent in 2022.

The inflation-adjusted estimated amount of tax payments made by ASU grads to state and local governments in Arizona increased between 2012 and 2022 on an annual average basis by 4.7 percent using the lower assumed tax rate and by 4.6 percent using the higher assumed tax rate.

The estimated share of Arizona workers holding at least a bachelor's degree who are a graduate of ASU did not change much during the decade, ranging from 25.6 percent to 26.9 percent. The figure was 25.8 percent in 2022.

TABLE 3
SUMMARY OF ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA, 2012 THROUGH 2022

| | Employment | | Aggregate Earnings | | Average Earnings | | Tax Payments Estimated Range for State and Local Governments in Millions of 2022 Dollars | | Share of Workforce With a University Degree |
|------|------------|-------------------|--------------------------------|-------------------|------------------|-------------------|--|---------|---|
| | Number | Share of Total | Millions of 2022 Dollars | Share of Total | 2022 Dollars | Share of Total | | | |
| 2012 | 203,372 | 6.17% | \$13,836 | 8.28% | \$68,033 | 134.3% | \$995 | \$1,135 | 25.6% |
| 2013 | 211,576 | 6.27 | 14,672 | 8.55 | 69,346 | 136.4 | 1,052 | 1,203 | 26.4 |
| 2014 | 219,106 | 6.35 | 15,301 | 8.71 | 69,832 | 137.2 | 1,095 | 1,255 | 26.9 |
| 2015 | 223,985 | 6.31 | 15,915 | 8.68 | 71,053 | 137.6 | 1,137 | 1,305 | 26.9 |
| 2016 | 231,010 | 6.34 | 16,522 | 8.70 | 71,522 | 137.2 | 1,180 | 1,355 | 25.9 |
| 2017 | 238,834 | 6.41 | 17,636 | 8.82 | 73,841 | 137.6 | 1,256 | 1,499 | 25.6 |
| 2018 | 249,691 | 6.47 | 18,364 | 8.94 | 73,547 | 138.2 | 1,303 | 1,561 | 25.6 |
| 2019 | 259,883 | 6.55 | 19,493 | 9.03 | 75,006 | 137.9 | 1,381 | 1,657 | 25.7 |
| 2020 | 266,716 | 6.97 | 20,862 | 9.23 | 78,219 | 132.5 | 1,476 | 1,773 | 26.4 |
| 2021 | 283,429 | 6.99 | 20,803 | 8.85 | 73,398 | 126.7 | 1,470 | 1,768 | 25.8 |
| 2022 | 297,148 | 6.93 | 22,433 | 9.17 | 75,494 | 132.4 | 1,580 | 1,772 | 25.8 |

Note: The upper range of the tax payment is based on an 8.2 percent tax rate from 2012 through 2016, an 8.5 percent rate in 2017 through 2021, and a 7.9 percent rate in 2022.

Source: Calculated by authors.

APPENDIX
ARIZONA STATE UNIVERSITY GRADUATES FROM 1990 THROUGH 2022 EMPLOYED IN ARIZONA IN 2022:
DETAIL BY CATEGORY OF DEGREE

Source: Arizona Board of Regents, from Arizona State University, Office of the University Provost.

ALL DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------|-------------------------|----------------------------|-----------------------------|-----------------------------|--------------|---|--|---------------------------------------|
| 1990 | 6,750 | 1,757 | 26.0% | \$200.6 | \$114,147 | \$14.0 | 1,417 | 80.6% |
| 1991 | 7,127 | 2,079 | 29.2 | 248.7 | 119,615 | 17.4 | 1,749 | 84.1 |
| 1992 | 7,094 | 2,164 | 30.5 | 236.9 | 109,491 | 16.6 | 1,828 | 84.5 |
| 1993 | 7,644 | 2,360 | 30.9 | 263.1 | 111,479 | 18.4 | 1,995 | 84.5 |
| 1994 | 7,749 | 2,523 | 32.6 | 285.0 | 112,949 | 20.0 | 2,108 | 83.6 |
| 1995 | 8,084 | 2,798 | 34.6 | 322.2 | 115,164 | 22.6 | 2,343 | 83.7 |
| 1996 | 8,033 | 2,945 | 36.7 | 337.5 | 114,614 | 23.6 | 2,498 | 84.8 |
| 1997 | 8,541 | 3,184 | 37.3 | 359.9 | 113,037 | 25.2 | 2,683 | 84.3 |
| 1998 | 9,104 | 3,463 | 38.0 | 383.0 | 110,610 | 26.8 | 2,953 | 85.3 |
| 1999 | 9,205 | 3,432 | 37.3 | 389.5 | 113,491 | 27.2 | 2,942 | 85.7 |
| 2000 | 9,618 | 3,842 | 39.9 | 443.2 | 115,364 | 31.0 | 3,259 | 84.8 |
| 2001 | 9,346 | 3,731 | 39.9 | 431.9 | 115,755 | 30.2 | 3,200 | 85.8 |
| 2002 | 9,860 | 4,125 | 41.8 | 473.5 | 114,779 | 33.1 | 3,543 | 85.9 |
| 2003 | 10,449 | 4,383 | 41.9 | 497.4 | 113,485 | 34.7 | 3,782 | 86.3 |
| 2004 | 11,032 | 4,774 | 43.3 | 512.5 | 107,352 | 35.8 | 4,081 | 85.5 |
| 2005 | 11,274 | 4,941 | 43.8 | 536.7 | 108,616 | 37.5 | 4,258 | 86.2 |
| 2006 | 11,609 | 5,155 | 44.4 | 546.2 | 105,960 | 38.2 | 4,422 | 85.8 |
| 2007 | 11,980 | 5,398 | 45.1 | 557.0 | 103,194 | 39.0 | 4,619 | 85.6 |
| 2008 | 12,649 | 5,616 | 44.4 | 590.0 | 105,056 | 41.2 | 4,806 | 85.6 |
| 2009 | 13,633 | 5,893 | 43.2 | 588.1 | 99,799 | 41.1 | 4,942 | 83.9 |
| 2010 | 14,315 | 6,608 | 46.2 | 637.2 | 96,422 | 44.6 | 5,589 | 84.6 |
| 2011 | 14,742 | 6,840 | 46.4 | 637.9 | 93,267 | 44.6 | 5,813 | 85.0 |
| 2012 | 15,390 | 7,295 | 47.4 | 639.8 | 87,699 | 44.8 | 6,104 | 83.7 |
| 2013 | 16,147 | 7,624 | 47.2 | 650.5 | 85,316 | 45.6 | 6,412 | 84.1 |
| 2014 | 16,972 | 7,918 | 46.7 | 649.1 | 81,972 | 45.6 | 6,620 | 83.6 |
| 2015 | 18,194 | 8,367 | 46.0 | 652.7 | 78,013 | 45.8 | 6,999 | 83.7 |
| 2016 | 19,127 | 8,550 | 44.7 | 639.8 | 74,834 | 45.0 | 6,984 | 81.7 |
| 2017 | 20,557 | 9,134 | 44.4 | 649.5 | 71,104 | 45.7 | 7,458 | 81.7 |
| 2018 | 23,066 | 9,920 | 43.0 | 675.7 | 68,116 | 47.7 | 8,103 | 81.7 |
| 2019 | 24,720 | 10,829 | 43.8 | 672.0 | 62,051 | 47.7 | 8,626 | 79.7 |
| 2020 | 27,017 | 12,201 | 45.2 | 703.5 | 57,661 | 50.2 | 9,642 | 79.0 |
| 2021 | 30,327 | 13,858 | 45.7 | 720.3 | 51,977 | 51.8 | 10,684 | 77.1 |
| 2022 | 32,915 | 15,931 | 48.4 | 599.0 | 37,601 | 45.6 | 9,658 | 60.6 |
| TOTAL | 464,270 | 199,638 | 43.0 | 16,729.9 | 83,801 | 1,178.1 | 162,120 | 81.2 |

ALL UNDERGRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------|-------------------------|----------------------------|-----------------------------|-----------------------------|--------------|---|--|---------------------------------------|
| 1990 | 5,024 | 1,458 | 29.0% | \$163.3 | \$111,993 | \$11.4 | 1,189 | 81.6% |
| 1991 | 5,269 | 1,717 | 32.6 | 208.5 | 121,426 | 14.6 | 1,465 | 85.3 |
| 1992 | 5,336 | 1,792 | 33.6 | 194.5 | 108,527 | 13.6 | 1,530 | 85.4 |
| 1993 | 5,637 | 1,902 | 33.7 | 211.4 | 111,155 | 14.8 | 1,623 | 85.3 |
| 1994 | 5,611 | 2,038 | 36.3 | 227.7 | 111,732 | 15.9 | 1,715 | 84.2 |
| 1995 | 5,725 | 2,221 | 38.8 | 245.6 | 110,582 | 17.2 | 1,883 | 84.8 |
| 1996 | 5,770 | 2,272 | 39.4 | 245.5 | 108,058 | 17.2 | 1,953 | 86.0 |
| 1997 | 6,075 | 2,473 | 40.7 | 272.4 | 110,131 | 19.1 | 2,102 | 85.0 |
| 1998 | 6,568 | 2,694 | 41.0 | 288.0 | 106,914 | 20.1 | 2,332 | 86.6 |
| 1999 | 6,576 | 2,620 | 39.8 | 281.4 | 107,418 | 19.7 | 2,283 | 87.1 |
| 2000 | 6,993 | 2,984 | 42.7 | 326.0 | 109,260 | 22.8 | 2,567 | 86.0 |
| 2001 | 6,795 | 2,927 | 43.1 | 315.7 | 107,860 | 22.1 | 2,531 | 86.5 |
| 2002 | 7,082 | 3,171 | 44.8 | 345.5 | 108,961 | 24.2 | 2,741 | 86.4 |
| 2003 | 7,481 | 3,334 | 44.6 | 358.7 | 107,595 | 25.1 | 2,898 | 86.9 |
| 2004 | 7,907 | 3,675 | 46.5 | 371.8 | 101,181 | 26.0 | 3,155 | 85.9 |
| 2005 | 8,423 | 3,883 | 46.1 | 398.3 | 102,565 | 27.8 | 3,367 | 86.7 |
| 2006 | 8,634 | 4,069 | 47.1 | 409.0 | 100,523 | 28.6 | 3,513 | 86.3 |
| 2007 | 8,797 | 4,215 | 47.9 | 409.1 | 97,068 | 28.7 | 3,622 | 85.9 |
| 2008 | 9,205 | 4,248 | 46.1 | 420.2 | 98,918 | 29.4 | 3,642 | 85.7 |
| 2009 | 9,528 | 4,316 | 45.3 | 398.3 | 92,292 | 27.9 | 3,641 | 84.4 |
| 2010 | 10,065 | 4,880 | 48.5 | 442.7 | 90,710 | 31.0 | 4,130 | 84.6 |
| 2011 | 10,290 | 5,040 | 49.0 | 442.0 | 87,707 | 31.0 | 4,294 | 85.2 |
| 2012 | 10,923 | 5,493 | 50.3 | 452.2 | 82,328 | 31.7 | 4,603 | 83.8 |
| 2013 | 11,455 | 5,745 | 50.2 | 451.2 | 78,541 | 31.7 | 4,854 | 84.5 |
| 2014 | 11,916 | 6,029 | 50.6 | 458.1 | 75,980 | 32.2 | 5,022 | 83.3 |
| 2015 | 12,360 | 6,288 | 50.9 | 451.3 | 71,768 | 31.8 | 5,264 | 83.7 |
| 2016 | 12,744 | 6,372 | 50.0 | 441.4 | 69,268 | 31.1 | 5,204 | 81.7 |
| 2017 | 13,964 | 6,816 | 48.8 | 449.3 | 65,912 | 31.7 | 5,574 | 81.8 |
| 2018 | 15,520 | 7,382 | 47.6 | 455.8 | 61,743 | 32.3 | 6,011 | 81.4 |
| 2019 | 16,787 | 8,078 | 48.1 | 455.6 | 56,399 | 32.4 | 6,438 | 79.7 |
| 2020 | 18,084 | 9,125 | 50.5 | 470.9 | 51,606 | 33.8 | 7,219 | 79.1 |
| 2021 | 20,548 | 10,377 | 50.5 | 477.9 | 46,049 | 34.7 | 7,972 | 76.8 |
| 2022 | 22,222 | 11,993 | 54.0 | 393.1 | 32,778 | 30.7 | 7,259 | 60.5 |
| TOTAL | 325,314 | 151,627 | 46.6 | 11,932.5 | 78,696 | 842.1 | 123,596 | 81.5 |

RESIDENT UNDERGRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------------|-------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------|---|--|--|
| 1990 | 4,110 | 1,361 | 33.1% | \$153.5 | \$112,807 | \$10.7 | 1,107 | 81.3% |
| 1991 | 4,275 | 1,601 | 37.5 | 192.9 | 120,493 | 13.5 | 1,368 | 85.4 |
| 1992 | 4,336 | 1,684 | 38.8 | 179.7 | 106,726 | 12.6 | 1,437 | 85.3 |
| 1993 | 4,488 | 1,756 | 39.1 | 194.1 | 110,551 | 13.6 | 1,505 | 85.7 |
| 1994 | 4,527 | 1,882 | 41.6 | 205.6 | 109,241 | 14.4 | 1,595 | 84.8 |
| 1995 | 4,723 | 2,088 | 44.2 | 227.1 | 108,754 | 15.9 | 1,772 | 84.9 |
| 1996 | 4,831 | 2,149 | 44.5 | 231.5 | 107,706 | 16.2 | 1,845 | 85.9 |
| 1997 | 4,950 | 2,297 | 46.4 | 248.0 | 107,958 | 17.3 | 1,946 | 84.7 |
| 1998 | 5,126 | 2,494 | 48.7 | 264.1 | 105,884 | 18.5 | 2,150 | 86.2 |
| 1999 | 5,108 | 2,388 | 46.8 | 254.0 | 106,354 | 17.8 | 2,093 | 87.6 |
| 2000 | 5,377 | 2,705 | 50.3 | 291.9 | 107,916 | 20.4 | 2,324 | 85.9 |
| 2001 | 5,257 | 2,686 | 51.1 | 284.6 | 105,962 | 19.9 | 2,318 | 86.3 |
| 2002 | 5,652 | 2,932 | 51.9 | 317.2 | 108,181 | 22.2 | 2,544 | 86.8 |
| 2003 | 5,970 | 3,059 | 51.2 | 326.7 | 106,784 | 22.8 | 2,664 | 87.1 |
| 2004 | 6,344 | 3,416 | 53.8 | 339.5 | 99,385 | 23.8 | 2,942 | 86.1 |
| 2005 | 6,706 | 3,611 | 53.8 | 363.9 | 100,779 | 25.4 | 3,138 | 86.9 |
| 2006 | 6,949 | 3,802 | 54.7 | 377.3 | 99,243 | 26.4 | 3,291 | 86.6 |
| 2007 | 7,065 | 3,927 | 55.6 | 370.9 | 94,438 | 26.0 | 3,373 | 85.9 |
| 2008 | 7,321 | 3,981 | 54.4 | 391.6 | 98,373 | 27.4 | 3,428 | 86.1 |
| 2009 | 7,488 | 4,020 | 53.7 | 366.1 | 91,072 | 25.7 | 3,392 | 84.4 |
| 2010 | 8,033 | 4,560 | 56.8 | 410.4 | 90,000 | 28.8 | 3,875 | 85.0 |
| 2011 | 8,210 | 4,704 | 57.3 | 407.5 | 86,618 | 28.6 | 4,016 | 85.4 |
| 2012 | 8,713 | 5,111 | 58.7 | 416.1 | 81,420 | 29.2 | 4,296 | 84.1 |
| 2013 | 9,035 | 5,351 | 59.2 | 418.4 | 78,191 | 29.4 | 4,531 | 84.7 |
| 2014 | 8,993 | 5,567 | 61.9 | 419.4 | 75,338 | 29.5 | 4,661 | 83.7 |
| 2015 | 9,084 | 5,729 | 63.1 | 408.6 | 71,327 | 28.8 | 4,810 | 84.0 |
| 2016 | 9,051 | 5,840 | 64.5 | 402.0 | 68,828 | 28.3 | 4,779 | 81.8 |
| 2017 | 8,952 | 6,125 | 68.4 | 400.6 | 65,397 | 28.3 | 5,029 | 82.1 |
| 2018 | 9,203 | 6,430 | 69.9 | 393.9 | 61,253 | 27.9 | 5,292 | 82.3 |
| 2019 | 9,646 | 6,878 | 71.3 | 386.2 | 56,148 | 27.5 | 5,532 | 80.4 |
| 2020 | 10,553 | 7,900 | 74.9 | 406.0 | 51,392 | 29.1 | 6,331 | 80.1 |
| 2021 | 11,393 | 8,883 | 78.0 | 409.9 | 46,147 | 29.7 | 6,941 | 78.1 |
| 2022 | 12,157 | 9,967 | 82.0 | 336.1 | 33,717 | 26.1 | 6,366 | 63.9 |
| TOTAL | 233,626 | 136,884 | 58.6 | 10,795.1 | 78,863 | 761.5 | 112,691 | 82.3 |

NONRESIDENT UNDERGRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------------|-------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------|---|--|--|
| 1990 | 914 | 97 | 10.6% | \$9.8 | \$100,576 | \$0.7 | 82 | 84.5% |
| 1991 | 994 | 116 | 11.7 | 15.6 | 134,303 | 1.1 | 97 | 83.6 |
| 1992 | 1,000 | 108 | 10.8 | 14.8 | 136,614 | 1.0 | 93 | 86.1 |
| 1993 | 1,149 | 146 | 12.7 | 17.3 | 118,410 | 1.2 | 118 | 80.8 |
| 1994 | 1,084 | 156 | 14.4 | 22.1 | 141,778 | 1.5 | 120 | 76.9 |
| 1995 | 1,002 | 133 | 13.3 | 18.5 | 139,286 | 1.3 | 111 | 83.5 |
| 1996 | 939 | 123 | 13.1 | 14.0 | 114,217 | 1.0 | 108 | 87.8 |
| 1997 | 1,125 | 176 | 15.6 | 24.4 | 138,493 | 1.7 | 156 | 88.6 |
| 1998 | 1,442 | 200 | 13.9 | 24.0 | 119,753 | 1.7 | 182 | 91.0 |
| 1999 | 1,468 | 232 | 15.8 | 27.5 | 118,373 | 1.9 | 190 | 81.9 |
| 2000 | 1,616 | 279 | 17.3 | 34.1 | 122,287 | 2.4 | 243 | 87.1 |
| 2001 | 1,538 | 241 | 15.7 | 31.1 | 129,006 | 2.2 | 213 | 88.4 |
| 2002 | 1,430 | 239 | 16.7 | 28.3 | 118,532 | 2.0 | 197 | 82.4 |
| 2003 | 1,511 | 275 | 18.2 | 32.1 | 116,612 | 2.2 | 234 | 85.1 |
| 2004 | 1,563 | 259 | 16.6 | 32.3 | 124,860 | 2.2 | 213 | 82.2 |
| 2005 | 1,717 | 272 | 15.8 | 34.3 | 126,268 | 2.4 | 229 | 84.2 |
| 2006 | 1,685 | 267 | 15.8 | 31.7 | 118,746 | 2.2 | 222 | 83.1 |
| 2007 | 1,732 | 288 | 16.6 | 38.3 | 132,920 | 2.7 | 249 | 86.5 |
| 2008 | 1,884 | 267 | 14.2 | 28.6 | 107,037 | 2.0 | 214 | 80.1 |
| 2009 | 2,040 | 296 | 14.5 | 32.2 | 108,858 | 2.2 | 249 | 84.1 |
| 2010 | 2,032 | 320 | 15.7 | 32.3 | 100,818 | 2.3 | 255 | 79.7 |
| 2011 | 2,080 | 336 | 16.2 | 34.6 | 102,949 | 2.4 | 278 | 82.7 |
| 2012 | 2,210 | 382 | 17.3 | 36.1 | 94,473 | 2.5 | 307 | 80.4 |
| 2013 | 2,420 | 394 | 16.3 | 32.8 | 83,303 | 2.3 | 323 | 82.0 |
| 2014 | 2,923 | 462 | 15.8 | 38.7 | 83,711 | 2.7 | 361 | 78.1 |
| 2015 | 3,276 | 559 | 17.1 | 42.6 | 76,288 | 3.0 | 454 | 81.2 |
| 2016 | 3,693 | 532 | 14.4 | 39.4 | 74,094 | 2.8 | 425 | 79.9 |
| 2017 | 5,012 | 691 | 13.8 | 48.7 | 70,479 | 3.4 | 545 | 78.9 |
| 2018 | 6,317 | 952 | 15.1 | 61.9 | 65,049 | 4.4 | 719 | 75.5 |
| 2019 | 7,141 | 1,200 | 16.8 | 69.4 | 57,838 | 4.9 | 906 | 75.5 |
| 2020 | 7,531 | 1,225 | 16.3 | 64.9 | 52,986 | 4.7 | 888 | 72.5 |
| 2021 | 9,155 | 1,494 | 16.3 | 67.9 | 45,470 | 5.0 | 1,031 | 69.0 |
| 2022 | 10,065 | 2,026 | 20.1 | 57.0 | 28,158 | 4.6 | 893 | 44.1 |
| TOTAL | 91,688 | 14,743 | 16.1 | 1,137.4 | 77,145 | 80.6 | 10,905 | 74.0 |

ALL GRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------------|-------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------|---|--|--|
| 1990 | 1,726 | 299 | 17.3% | \$37.3 | \$124,650 | \$2.6 | 228 | 76.3% |
| 1991 | 1,858 | 362 | 19.5 | 40.2 | 111,027 | 2.8 | 284 | 78.5 |
| 1992 | 1,758 | 372 | 21.2 | 42.5 | 114,137 | 3.0 | 298 | 80.1 |
| 1993 | 2,007 | 458 | 22.8 | 51.7 | 112,827 | 3.6 | 372 | 81.2 |
| 1994 | 2,138 | 485 | 22.7 | 57.3 | 118,063 | 4.0 | 393 | 81.0 |
| 1995 | 2,359 | 577 | 24.5 | 76.6 | 132,802 | 5.4 | 460 | 79.7 |
| 1996 | 2,263 | 673 | 29.7 | 92.0 | 136,747 | 6.4 | 545 | 81.0 |
| 1997 | 2,466 | 711 | 28.8 | 87.6 | 123,146 | 6.1 | 581 | 81.7 |
| 1998 | 2,536 | 769 | 30.3 | 95.0 | 123,558 | 6.6 | 621 | 80.8 |
| 1999 | 2,629 | 812 | 30.9 | 108.1 | 133,086 | 7.5 | 659 | 81.2 |
| 2000 | 2,625 | 858 | 32.7 | 117.2 | 136,592 | 8.2 | 692 | 80.7 |
| 2001 | 2,551 | 804 | 31.5 | 116.2 | 144,499 | 8.1 | 669 | 83.2 |
| 2002 | 2,778 | 954 | 34.3 | 127.9 | 134,118 | 8.9 | 802 | 84.1 |
| 2003 | 2,968 | 1,049 | 35.3 | 138.7 | 132,207 | 9.7 | 884 | 84.3 |
| 2004 | 3,125 | 1,099 | 35.2 | 140.7 | 127,987 | 9.8 | 926 | 84.3 |
| 2005 | 2,851 | 1,058 | 37.1 | 138.4 | 130,824 | 9.7 | 891 | 84.2 |
| 2006 | 2,975 | 1,086 | 36.5 | 137.2 | 126,331 | 9.6 | 909 | 83.7 |
| 2007 | 3,183 | 1,183 | 37.2 | 147.9 | 125,022 | 10.3 | 997 | 84.3 |
| 2008 | 3,444 | 1,368 | 39.7 | 169.8 | 124,119 | 11.8 | 1,164 | 85.1 |
| 2009 | 4,105 | 1,577 | 38.4 | 189.8 | 120,344 | 13.2 | 1,301 | 82.5 |
| 2010 | 4,250 | 1,728 | 40.7 | 194.5 | 112,556 | 13.6 | 1,459 | 84.4 |
| 2011 | 4,452 | 1,800 | 40.4 | 195.9 | 108,834 | 13.7 | 1,519 | 84.4 |
| 2012 | 4,467 | 1,802 | 40.3 | 187.5 | 104,073 | 13.1 | 1,501 | 83.3 |
| 2013 | 4,692 | 1,879 | 40.0 | 199.2 | 106,031 | 13.9 | 1,558 | 82.9 |
| 2014 | 5,056 | 1,889 | 37.4 | 191.0 | 101,098 | 13.3 | 1,598 | 84.6 |
| 2015 | 5,834 | 2,079 | 35.6 | 201.5 | 96,902 | 14.1 | 1,735 | 83.5 |
| 2016 | 6,383 | 2,178 | 34.1 | 198.5 | 91,119 | 13.9 | 1,780 | 81.7 |
| 2017 | 6,593 | 2,318 | 35.2 | 200.2 | 86,370 | 14.0 | 1,884 | 81.3 |
| 2018 | 7,546 | 2,538 | 33.6 | 219.9 | 86,653 | 15.4 | 2,092 | 82.4 |
| 2019 | 7,933 | 2,751 | 34.7 | 216.4 | 78,647 | 15.2 | 2,188 | 79.5 |
| 2020 | 8,933 | 3,076 | 34.4 | 232.6 | 75,622 | 16.3 | 2,423 | 78.8 |
| 2021 | 9,779 | 3,481 | 35.6 | 242.4 | 69,647 | 17.1 | 2,712 | 77.9 |
| 2022 | 10,693 | 3,938 | 36.8 | 205.9 | 52,289 | 14.9 | 2,399 | 60.9 |
| TOTAL | 138,956 | 48,011 | 34.6 | 4,797.4 | 99,923 | 336.0 | 38,524 | 80.2 |

RESIDENT GRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------------|-------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------|---|--|--|
| 1990 | 1,112 | 248 | 22.3% | \$30.7 | \$123,641 | \$2.2 | 190 | 76.6% |
| 1991 | 1,332 | 307 | 23.0 | 36.3 | 118,256 | 2.5 | 246 | 80.1 |
| 1992 | 1,247 | 338 | 27.1 | 38.8 | 114,785 | 2.7 | 270 | 79.9 |
| 1993 | 1,416 | 422 | 29.8 | 47.2 | 111,964 | 3.3 | 343 | 81.3 |
| 1994 | 1,546 | 452 | 29.2 | 53.4 | 118,038 | 3.7 | 367 | 81.2 |
| 1995 | 1,712 | 530 | 31.0 | 69.3 | 130,828 | 4.9 | 423 | 79.8 |
| 1996 | 1,623 | 607 | 37.4 | 81.3 | 133,957 | 5.7 | 491 | 80.9 |
| 1997 | 1,713 | 613 | 35.8 | 73.0 | 119,120 | 5.1 | 499 | 81.4 |
| 1998 | 1,770 | 665 | 37.6 | 80.8 | 121,526 | 5.7 | 534 | 80.3 |
| 1999 | 1,838 | 727 | 39.6 | 96.3 | 132,502 | 6.7 | 593 | 81.6 |
| 2000 | 1,772 | 730 | 41.2 | 101.8 | 139,412 | 7.1 | 590 | 80.8 |
| 2001 | 1,696 | 695 | 41.0 | 102.8 | 147,968 | 7.2 | 587 | 84.5 |
| 2002 | 1,969 | 859 | 43.6 | 115.9 | 134,952 | 8.1 | 722 | 84.1 |
| 2003 | 2,042 | 928 | 45.4 | 122.0 | 131,501 | 8.5 | 790 | 85.1 |
| 2004 | 2,005 | 933 | 46.5 | 115.1 | 123,378 | 8.0 | 789 | 84.6 |
| 2005 | 1,974 | 930 | 47.1 | 119.6 | 128,584 | 8.3 | 797 | 85.7 |
| 2006 | 1,887 | 943 | 50.0 | 118.4 | 125,523 | 8.3 | 801 | 84.9 |
| 2007 | 2,037 | 1,031 | 50.6 | 122.1 | 118,414 | 8.5 | 873 | 84.7 |
| 2008 | 2,311 | 1,216 | 52.6 | 148.2 | 121,869 | 10.3 | 1,038 | 85.4 |
| 2009 | 2,432 | 1,342 | 55.2 | 156.3 | 116,501 | 10.9 | 1,120 | 83.5 |
| 2010 | 2,668 | 1,491 | 55.9 | 164.1 | 110,055 | 11.5 | 1,265 | 84.8 |
| 2011 | 2,730 | 1,546 | 56.6 | 164.0 | 106,104 | 11.4 | 1,316 | 85.1 |
| 2012 | 2,597 | 1,511 | 58.2 | 151.6 | 100,360 | 10.6 | 1,267 | 83.9 |
| 2013 | 2,647 | 1,578 | 59.6 | 160.1 | 101,454 | 11.2 | 1,315 | 83.3 |
| 2014 | 2,611 | 1,568 | 60.1 | 155.7 | 99,297 | 10.9 | 1,350 | 86.1 |
| 2015 | 2,657 | 1,667 | 62.7 | 156.9 | 94,123 | 11.0 | 1,401 | 84.0 |
| 2016 | 2,702 | 1,730 | 64.0 | 156.3 | 90,336 | 11.0 | 1,450 | 83.8 |
| 2017 | 2,685 | 1,836 | 68.4 | 158.3 | 86,216 | 11.1 | 1,527 | 83.2 |
| 2018 | 2,835 | 1,956 | 69.0 | 170.8 | 87,329 | 12.0 | 1,663 | 85.0 |
| 2019 | 2,919 | 2,066 | 70.8 | 162.7 | 78,728 | 11.4 | 1,691 | 81.8 |
| 2020 | 2,964 | 2,193 | 74.0 | 167.6 | 76,443 | 11.8 | 1,802 | 82.2 |
| 2021 | 3,206 | 2,481 | 77.4 | 175.8 | 70,873 | 12.4 | 2,013 | 81.1 |
| 2022 | 3,402 | 2,805 | 82.5 | 156.5 | 55,794 | 11.2 | 1,902 | 67.8 |
| TOTAL | 72,057 | 38,944 | 54.0 | 3,929.9 | 100,912 | 275.1 | 32,025 | 82.2 |

NONRESIDENT GRADUATE DEGREES: 2022

| Academic Year of Graduation | Number Earning a Degree | Number Employed in Arizona | Percent Employed in Arizona | Aggregate Wages in Millions | Average Wage | State & Local Government Tax Payments in Millions | Number Employed During All Four Quarters | Percent Employed in All Four Quarters |
|-----------------------------------|-------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------|---|--|--|
| 1990 | 614 | 51 | 8.3% | \$6.6 | \$129,557 | \$0.5 | 38 | 74.5% |
| 1991 | 526 | 55 | 10.5 | 3.9 | 70,678 | 0.3 | 38 | 69.1 |
| 1992 | 511 | 34 | 6.7 | 3.7 | 107,691 | 0.3 | 28 | 82.4 |
| 1993 | 591 | 36 | 6.1 | 4.4 | 122,945 | 0.3 | 29 | 80.6 |
| 1994 | 592 | 33 | 5.6 | 3.9 | 118,410 | 0.3 | 26 | 78.8 |
| 1995 | 647 | 47 | 7.3 | 7.3 | 155,058 | 0.5 | 37 | 78.7 |
| 1996 | 640 | 66 | 10.3 | 10.7 | 162,406 | 0.7 | 54 | 81.8 |
| 1997 | 753 | 98 | 13.0 | 14.5 | 148,330 | 1.0 | 82 | 83.7 |
| 1998 | 766 | 104 | 13.6 | 14.2 | 136,555 | 1.0 | 87 | 83.7 |
| 1999 | 791 | 85 | 10.7 | 11.7 | 138,076 | 0.8 | 66 | 77.6 |
| 2000 | 853 | 128 | 15.0 | 15.4 | 120,510 | 1.1 | 102 | 79.7 |
| 2001 | 855 | 109 | 12.7 | 13.3 | 122,383 | 0.9 | 82 | 75.2 |
| 2002 | 809 | 95 | 11.7 | 12.0 | 126,572 | 0.8 | 80 | 84.2 |
| 2003 | 926 | 121 | 13.1 | 16.7 | 137,621 | 1.2 | 94 | 77.7 |
| 2004 | 1,120 | 166 | 14.8 | 25.5 | 153,891 | 1.8 | 137 | 82.5 |
| 2005 | 877 | 128 | 14.6 | 18.8 | 147,096 | 1.3 | 94 | 73.4 |
| 2006 | 1,088 | 143 | 13.1 | 18.8 | 131,657 | 1.3 | 108 | 75.5 |
| 2007 | 1,146 | 152 | 13.3 | 25.8 | 169,848 | 1.8 | 124 | 81.6 |
| 2008 | 1,133 | 152 | 13.4 | 21.6 | 142,117 | 1.5 | 126 | 82.9 |
| 2009 | 1,673 | 235 | 14.0 | 33.4 | 142,289 | 2.3 | 181 | 77.0 |
| 2010 | 1,582 | 237 | 15.0 | 30.4 | 128,295 | 2.1 | 194 | 81.9 |
| 2011 | 1,722 | 254 | 14.8 | 31.9 | 125,449 | 2.2 | 203 | 79.9 |
| 2012 | 1,870 | 291 | 15.6 | 35.9 | 123,353 | 2.5 | 234 | 80.4 |
| 2013 | 2,045 | 301 | 14.7 | 39.1 | 130,028 | 2.7 | 243 | 80.7 |
| 2014 | 2,445 | 321 | 13.1 | 35.3 | 109,894 | 2.5 | 248 | 77.3 |
| 2015 | 3,177 | 412 | 13.0 | 44.6 | 108,148 | 3.1 | 334 | 81.1 |
| 2016 | 3,681 | 448 | 12.2 | 42.2 | 94,146 | 3.0 | 330 | 73.7 |
| 2017 | 3,908 | 482 | 12.3 | 41.9 | 86,957 | 2.9 | 357 | 74.1 |
| 2018 | 4,711 | 582 | 12.4 | 49.1 | 84,381 | 3.5 | 429 | 73.7 |
| 2019 | 5,014 | 685 | 13.7 | 53.7 | 78,405 | 3.8 | 497 | 72.6 |
| 2020 | 5,969 | 883 | 14.8 | 65.0 | 73,583 | 4.6 | 621 | 70.3 |
| 2021 | 6,573 | 1,000 | 15.2 | 66.6 | 66,606 | 4.7 | 699 | 69.9 |
| 2022 | 7,291 | 1,133 | 15.5 | 49.4 | 43,612 | 3.6 | 497 | 43.9 |
| TOTAL | 66,899 | 9,067 | 13.6 | 867.5 | 95,677 | 60.9 | 6,499 | 71.7 |