

# **THE IMPACT ON ARIZONA'S ECONOMY FROM THE ACCELERATION IN THE NUMBER OF INDIVIDUALS EARNING DEGREES FROM ARIZONA STATE UNIVERSITY AFTER ACADEMIC YEAR 2003**

**A Report from the Office of the University Economist**

**June 2020**

**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](mailto:Dennis.Hoffman@asu.edu)

[wpcarey.asu.edu/research/competitiveness-prosperity-research](http://wpcarey.asu.edu/research/competitiveness-prosperity-research)  
[economist.asu.edu](http://economist.asu.edu)



The number of individuals receiving a degree — undergraduate and graduate degrees combined — from Arizona State University (ASU) generally has increased annually for decades, but the rate of increase has accelerated since academic year 2003. (An academic year includes those graduating in August and December of the prior year, and those graduating in May.)

This short report estimates the impact on the Arizona economy of this acceleration in the number of individuals earning degrees from ASU by comparing the actual economic impact of ASU graduates working in Arizona to the impact in three hypothetical scenarios, each of which assume that the rate of growth in the number of individuals graduating from ASU after academic year 2003 was less than the actual number:

- **Scenario A:** Assumes no growth in the number of individuals earning degrees from ASU after academic year 2003.
- **Scenario B:** Assumes that the number of individuals earning degrees from ASU after academic year 2003 increased at the average annual rate for national public institutions between academic years 1990 and 2003: 1.9 percent for bachelor’s degrees and 2.5 percent for graduate degrees.
- **Scenario C:** Assumes that the number of individuals earning degrees from ASU after academic year 2003 increased at the annual average rate for ASU between academic years 1990 and 2003: 3.2 percent for bachelor’s degrees and 4.4 percent for graduate degrees.

The lesser number of individuals earning degrees from ASU in each of the three scenarios are compared to the actual number in Table 1. If the number of individuals earning degrees from ASU had been less than the actual number, the number of ASU graduates working in Arizona also would have been lower. Assuming a decrease in the number working in the state similar in magnitude to the decrease in the number earning a degree, the impact on the Arizona workforce is shown in Table 1.

**TABLE 1**  
**NUMBER OF INDIVIDUALS EARNING A DEGREE FROM ARIZONA STATE UNIVERSITY FROM ACADEMIC YEARS 2004 THROUGH 2018 AND THE NUMBER OF THESE INDIVIDUALS WORKING IN ARIZONA IN 2018: COMPARISON OF THE ACTUAL FIGURES TO THOSE IN EACH OF THREE SCENARIOS**

	<b>Actual</b>	<b>Scenarios</b>		
		<b>A</b>	<b>B</b>	<b>C</b>
Number of Individuals Earning a Degree	237,241	149,728	185,959	210,204
Percentage of Actual Number		63.1	78.4	88.6
Number of Graduates Working in Arizona in 2018	118,399	73,621	92,087	104,165
Percentage of Actual Number		62.2	77.8	88.0

Note: See text above for a description of the scenarios.

Sources: Arizona State University, Office of the University Provost (number of individuals earning a degree); *The Impact of Arizona State University Graduates Employed in Arizona in 2018*, February 2020, <https://economist.asu.edu/arizona-universities> (number of graduates working in Arizona); figures for scenarios calculated by authors.

## Simulations: Calculating Economic Impacts by Scenario

### Approach 1: Wages and Employment of ASU Graduates Employed in Arizona

This approach is based on the methodology described in the Office of the University Economist’s January 2020 report “*The Impact of Arizona State University Graduates Employed in Arizona in 2018*”, available at <https://economist.asu.edu/arizona-universities>.

The metrics it examines are employment, wages, and state and local tax contributions of ASU graduates who were employed in Arizona in 2018. The tax contributions are expressed as a range based on the assumed tax rate. All ASU graduates working in the state in 2018 — not just those graduating from academic years 2004 through 2018 — are included.

This approach uses a dataset specific to Arizona State University provided by the Arizona Board of Regents (ABOR) which contains aggregated numbers of graduates of Arizona’s three public universities who were employed in Arizona during the year. The ABOR dataset is created by matching the Social Security numbers of ASU graduates with the Social Security numbers of individuals employed in Arizona, which come from unemployment insurance system administered by the Arizona Department of Economic Security.

Table 2 compares the estimated actual employment, wages, and tax payments of ASU graduates to the estimated figures in each of the three scenarios. In scenario A, employment, wages, and tax payments are 82.1 percent of the actual figure. The proportion is 89.5 percent in scenario B and 94.3 percent in scenario C. These proportions are higher than those in Table 1 since Table 2 includes all ASU graduates, not just those graduating from academic years 2004 through 2018.

**TABLE 2**  
**ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA IN 2018:**  
**COMPARISON OF ACTUAL EMPLOYMENT, WAGES, AND TAX PAYMENTS TO**  
**THOSE IN EACH OF THREE SCENARIOS**

Metrics	Actual	Scenarios		
		A	B	C
Employment	249,691	204,913	223,380	235,457
Share of Arizona Employment	6.5%	4.9%	5.5%	6.0%
Share of Arizona Workforce with a University Degree	25.6%	21.0%	22.9%	24.2%
Aggregate Wages	\$15,923	\$13,067	\$14,245	\$15,015
State and Local Taxes:				
Low Estimate	\$1,130	\$928	\$1,011	\$1,066
High Estimate	\$1,353	\$1,111	\$1,211	\$1,276

Notes: Dollar figures are shown in millions of 2018 dollars. See page 1 for description of scenarios.

Sources: *The Impact of Arizona State University Graduates Employed in Arizona in 2018*, February 2020, <https://economist.asu.edu/arizona-universities> (actual figures); figures for scenarios calculated by authors.

## Approach 2: Moretti Effects of ASU Graduates Employed in Arizona

This approach is based on the methodology described in the Office of the University Economist's July 2019 report *The Economic Impact of Raising the Educational Attainment of Arizona's Workforce; 2019 Update*, available at <https://economist.asu.edu/p3/education>.

This analysis is based on the assumption that a more educated workforce leads to increases in productivity among all workers in a region due to 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 for all workers within the region, as quantified by Enrico Moretti.<sup>1</sup> The economic impact created by increases in educational attainment in part is due to the "direct" effect of the higher wages realized by individuals who complete a bachelor's degree. A secondary benefit results from the "spillover" effects of increasing the percentage of workers with university degrees. The more educated workforce leads to increases in productivity among all workers, which in turn results in wage increases for all workers.

Table 3 compares the estimated actual direct and spillover effects of all ASU graduates to the estimated figures in each of the three scenarios.<sup>2</sup> As in the first approach, the proportions of the actual figures are 82.1 percent in scenario A, 89.5 percent in scenario B, and 94.3 percent in scenario C.

**TABLE 3**  
**ARIZONA STATE UNIVERSITY GRADUATES EMPLOYED IN ARIZONA IN 2018:**  
**COMPARISON OF ACTUAL INCOME EFFECTS TO THOSE IN EACH OF THREE**  
**SCENARIOS**

Metrics	Actual	Scenarios		
		A	B	C
Direct Earnings	\$15,923	\$13,067	\$14,245	\$15,015
Spillover Earnings	9,941	8,158	8,893	9,374
Total	25,864	21,226	23,138	24,389

Notes: Dollar figures are shown in millions of 2018 dollars. See page 1 for description of scenarios.

Sources: *The Economic Impact of Raising the Educational Attainment of Arizona's Workforce; 2019 Update*, July 2019, <https://economist.asu.edu/p3/education> (actual figures); figures for scenarios calculated by authors.

---

<sup>1</sup> Enrico Moretti, "Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data," *Journal of Econometrics*, 2004 (accessible from <http://economist.asu.edu/p3/education>).

<sup>2</sup> The Arizona economy likely would have experienced negative effects had ASU produced fewer graduates, but employers would have responded by hiring the needed college graduates from institutions other than ASU.