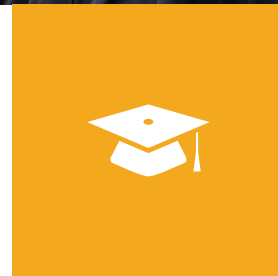


BILLIONS TO GAIN

The Economic Benefits of Investing in a More Educated Arizona

MARCH 2023



About Helios Education Foundation

Helios Education Foundation exists to support postsecondary attainment for low-income and under-represented communities in Arizona and Florida. Driven by our fundamental beliefs of Community, Equity, Investment, and Partnership, Helios has invested more than \$300 million in partnerships and initiatives focused on improving education outcomes in the two states we serve.

We take a multi-pronged approach—working across four domains, including performance-based community investments, systemic public policy efforts, research and data, and impact-driven communications—that together support the significant changes required to foster equitable progress across the education continuum.

About Education Forward Arizona

Education Forward Arizona advocates for and acts on education improvements that advance the quality of life for all Arizonans. Education Forward Arizona represents the willingness of people from all parts of the state—those of different races and ethnicities; those from rural, suburban, and urban areas; and those from business, education, philanthropic, nonprofit and other sectors—to work differently, collaboratively and more effectively to create better education opportunities, from early learning through postsecondary attainment.



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This report is based on research and analysis, commissioned by Helios Education Foundation and Education Forward Arizona, conducted by Clive R. Belfield (Department of Economics Queens College, City University of New York and Center for Benefit-Cost Studies in Education, University of Pennsylvania). Upon request, Dr. Belfield's study is available in its entirety from Helios Education Foundation.





EXECUTIVE SUMMARY

Investing to Increase Postsecondary Enrollment and Completion Can Lead to Billions in Gains for Arizona

Introduction

The economic benefits of postsecondary education—for individuals, communities, and Arizona—are undeniable. Arizonans who enroll in college can expect significant gains, including increased lifetime earnings and more economic opportunities. Those who complete college stand to gain even more, especially if they earn a bachelor’s degree.

At the same time, these benefits for individuals contribute to enormous economic gains for communities and the state. Increasing the postsecondary enrollment rate in Arizona by 20 percent, for example, would lead to gains—including lifetime earnings, improved health, reduced crime and welfare spending, and increased workforce productivity—that exceed \$5 billion per cohort.

The value of cultivating a more educated Arizona is not news to economists, industry and community leaders, the education field, or policymakers. It is among the main reasons that, in 2015, Arizona established the Achieve60AZ attainment goal with the intent of ensuring that 60 percent of adults ages 25-64 in the state hold a postsecondary credential (certificate or degree) by 2030.

Nearly eight years later, we are still a long way from reaching our collective goal. As the latest data tracked by the [Arizona Education Progress Meter](#) show, the postsecondary attainment rate was just over 46 percent in 2020.




Approximately 25 percent of high school graduates in Arizona who are eligible do not go to community college or a four-year university. Many fewer—just one in ten—earn advanced degrees. What is more, postsecondary attainment patterns are stratified along all too familiar racial and socioeconomic lines. Consequently, communities, municipalities, and regions, and Arizona as a whole, are all missing out on the extraordinary aggregate benefits that result from having a more educated populace.

All told, the billions in economic gains that come from expanding postsecondary enrollment and completion—not to mention the thousands of individuals empowered with greater economic opportunity and prosperity—more than justify the investments required of the state to ensure that more students graduate high school and go on to pursue a postsecondary education.



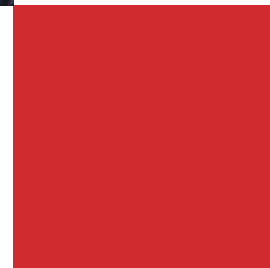
About *Billions to Gain*

To demonstrate how much Arizona—and individual Arizonans—would economically benefit from increased rates of college-going, the analysis detailed in *Billions to Gain* uses state-specific and national data to model a range of statewide scenarios and their corresponding economic consequences. Using a single cohort of 68,690 high school graduates from Arizona’s public schools (the “class of 2022”), the analysis models all the monetary flows attributable to each educational status—*specifically, high school graduate, some college, associate degree, bachelor’s degree, or advanced degree*—over an individual’s working life. It looks at the benefits of college enrollment and completion from three distinct perspectives:

-  **For individual Arizonans**, the benefits of postsecondary attainment are expressed primarily in terms of higher lifetime earnings and increased economic opportunities.
-  **The social perspective** shows how college enrollment and completion are good for communities and the state of Arizona as a whole (such as through higher earnings, improved health, and reductions in crime).
-  **The fiscal perspective** models the beneficial tax consequences at the federal and state/local levels.

Finally, and importantly, the analysis accounts for the predicted impact of the pandemic on life-course trajectories. The pandemic has affected earnings and health status for future cohorts in various ways; these effects are expected to be more adverse for individuals with less education.

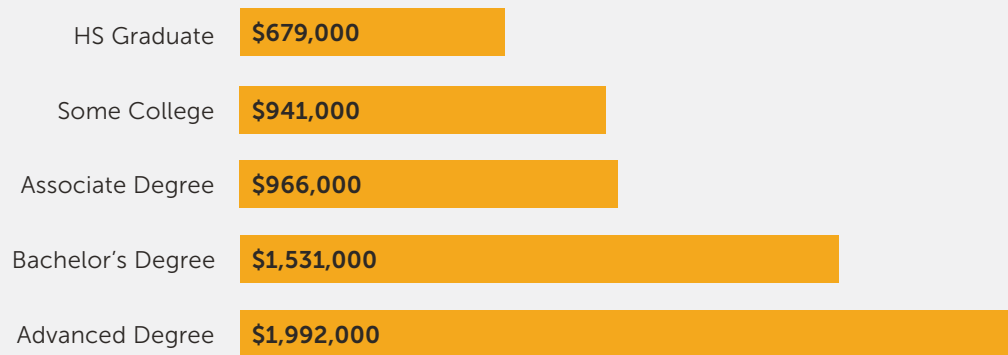
For a more detailed description of the research and analysis methodology, please refer to the full report.



Postsecondary Education Confers Life-Changing Benefits to Individual Arizonans

The earnings premium associated with a college education can be life-changing for individuals and their families. On average, lifetime earnings for individuals with bachelor's degrees are nearly three times greater than for individuals whose education stops after high school graduation. Even individuals who enroll in college but do not earn a degree stand to gain significantly compared to high school graduates without any postsecondary education.

Lifetime Earnings, by Highest Education Level



Present values at age 18; discount rate 3.5%. 2022 dollars.

Postsecondary education almost certainly *causes* higher earnings. Moreover, long-term labor market trends indicate that high-skill, college-educated workers are much better positioned to prosper in the future across all sectors and regions of Arizona's economy. Individuals with less education have comparatively fewer opportunities, and it is clear that the pandemic has highlighted and intensified this disparity.

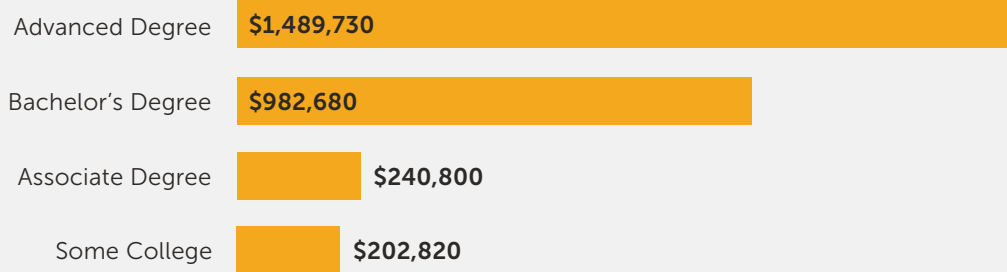


The Aggregate Social Gains Associated with Postsecondary Education Are Substantial

On average, an Arizonan with a bachelor's degree contributes \$982,680 more in lifetime social gains (i.e., gains related to earnings, health, welfare, and workforce productivity) than a high school graduate with no college education. Consequently, increasing college enrollment and completion rates statewide can lead to substantial economic gains.

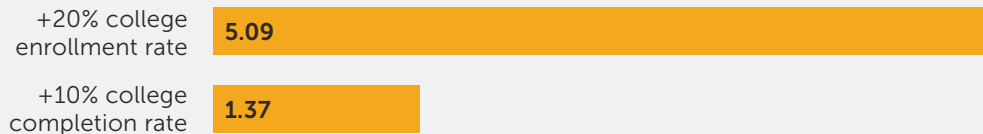
A 20 percent increase in enrollment would generate \$5.09 billion in social gains per cohort. A 10 percent increase in completion would generate \$1.37 billion per cohort.

Lifetime Social Gains Per College-Educated Individual, Compared to High School Graduate



Present values at age 18; discount rate 3.5%. 2022 dollars.

Social Gains Per Cohort From Increasing College Enrollment and Completion (\$ billions)



Present values at age 18; discount rate 3.5%. 2022 dollars.

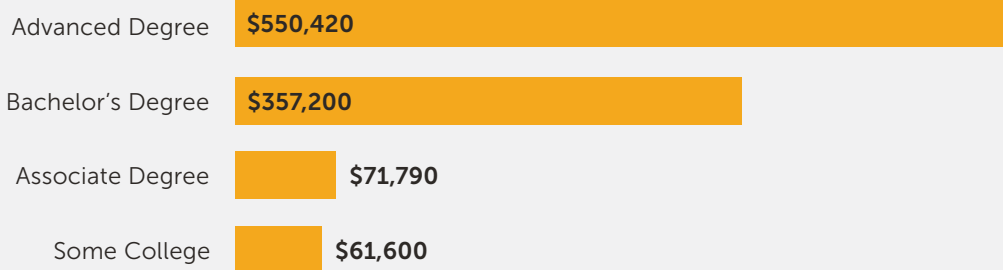
EXECUTIVE SUMMARY

The Aggregate Fiscal Gains from Postsecondary Education Are Also Significant

The fiscal gains associated with college enrollment and completion in Arizona are smaller than the social gains. Nonetheless, they are significant and range from \$61,600 to \$550,420 per college-educated person (depending on the level of attainment).

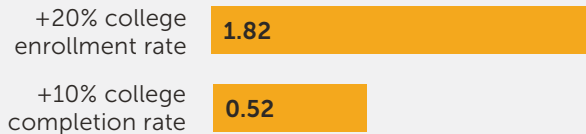
Accordingly, the fiscal gains from increasing college enrollment by 20 percent would be equivalent to 15 percent of Arizona’s 2022 General Fund budget and more than double what the state allocated for its public universities (\$0.9 billion) in that budget.¹

Lifetime Fiscal Gains Per College-Educated Individual, Compared to High School Graduate



Present values at age 18; discount rate 3.5%. 2022 dollars.

Fiscal Gains Per Cohort From Increasing College Enrollment and Completion (\$ billions)



Present values at age 18; discount rate 3.5%. 2022 dollars.

¹azospb.gov/2022-budget.html and azeconcenter.org/state-budget-101



Exceptional Gains from Increasing College-Going Among Underrepresented Groups

Regardless of their race or ethnicity, all students benefit from postsecondary education. In turn, Arizona benefits in the form of social and fiscal gains. However, college enrollment and completion rates are racially stratified across Arizona. Non-white students are much less likely to enroll in college—and much less likely to complete a four-year degree if they do enroll—compared to white students. The gap separating white and Hispanic/Latino students is especially wide; the enrollment rate for Latino students is 8–10 percentage points lower, and the degree completion rate is less than half of what it is for white students.

If all students in Arizona enrolled at equal rates, there would be significant aggregate economic gains. The largest impact would be in social gains, which would amount to an estimated \$574 million per cohort.

There would be even bigger economic gains if Arizona achieved parity in college completion rates by race (that is, if all students completed college at rates equivalent to those of white students). **Completion parity would lead to \$7.35 billion in lifetime earnings gains, with fiscal gains of \$3.30 billion and social gains of \$8.69 billion.**

Summary Recommendations

A broad commitment to ensuring that all students in Arizona have access to the educational supports, services, and opportunities that make postsecondary education possible (as well as realistic and achievable) should be central to any investments and initiatives that the state undertakes to increase postsecondary attainment. With this principle in mind, the state can consider the following investment areas:



Bolstering college readiness efforts and strengthening the linkages between the K-12 and postsecondary education systems, such as through expanded access to dual enrollment and promotion of student-centered pathways.



Reducing non-academic barriers to college-going and college completion through, to name a few among many examples, expanding access to school counselors and guidance services and greater support for community-based organizations that help students navigate the college-going experience.



Making college more affordable for all students. Cost is the most significant barrier most students face, and state efforts to mitigate that barrier could include a state-sponsored need-based grant aid program and increased state subsidies for postsecondary institutions.



Facilitating development of programs and initiatives, including public-private partnerships, that incentivize more students to pursue college degrees in high-value sectors.

These recommendations are discussed in greater detail in the full report.



FULL REPORT

A More Educated Arizona Is a More
Dynamic and Prosperous Arizona

Introduction

If Arizona can increase college-going rates, then it will significantly accelerate economic growth in our state. By one measure, increasing college enrollment by 20 percent would lead to gains equivalent to 15 percent of Arizona's General Fund budget.

But this is a big if.

The economic value of college participation and attainment is not news to economists, industry and community leaders, the education field, or policymakers in Arizona. It is among the main reasons that, in September 2016, Arizona established the Achieve60AZ attainment goal to ensure that 60 percent of adults ages 25 to 64 in the state hold a postsecondary degree or certificate by 2030.

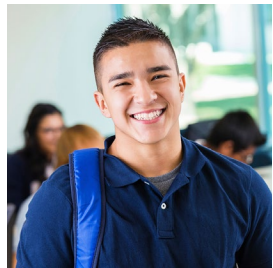
Six years later we remain a long way from reaching that collective goal. The latest data tracked by the [Arizona Education Progress Meter](#) show that the postsecondary attainment rate was just over 46 percent in 2019. Attainment in Arizona also continues to vary significantly by race and ethnicity. In 2019, for example, attainment among white Arizonans was 55 percent. This is 27 percentage points higher than for Latino Arizonans. Low-income students, while not a specific focus of this report, also enroll in and complete college at lower rates.

On top of that, the pandemic has negatively impacted postsecondary readiness and attainment in consequential ways. The statewide economic losses related to diminished college readiness are projected to be as high as \$137,660 per high school graduate and \$9.46 billion per cohort.



Increasing college enrollment by 20 percent would lead to fiscal gains equivalent to 15 percent of Arizona’s General Fund budget; this is more than double the allocation for the state’s universities in 2022.

New estimates of the economic benefits of attainment show widening disparities among high school graduates and college graduates. Long-term labor market trends—including skills upgrading, occupational changes, and automation—are causing life trajectories to diverge. High-skill workers are prospering while opportunities for low-skill workers appear stagnant, a disparity that is evident across the many regions and the sectors of Arizona’s economy.




About this Report


To demonstrate how much Arizona—and individual Arizonans—would economically benefit from increased rates of college-going, this report uses Arizona-specific and national data to model a range of statewide scenarios—such as increasing college completion by 10 percent statewide—and the corresponding economic consequences.


The analysis is modeled over a lifetime (it includes census age bands up to age 64) and accounts for all the monetary flows attributable to each educational status—*specifically, high school graduate, some college, associate degree, bachelor's degree, or advanced degree*—over an individual's working life.²

Evidence is drawn from Arizona-specific data sources (or national data) to populate the model, which uses the most recent social science research on education gradients with respect to earnings, health, crime, and other social consequences. Additionally, separate analyses are performed for select localities and occupations.

The benefits of increased postsecondary enrollment and attainment are both personal and public. Individuals benefit, in a personal sense, from earning a college certificate or degree. At the same time, the benefits to individuals add up to large-scale benefits for the state. Accordingly, the gains associated with postsecondary education can be understood from three distinct perspectives.

 **Individual:** At the individual or personal level, the benefits of postsecondary attainment are expressed primarily in terms of higher lifetime earnings, as well as impact benefits, such as increased labor force participation and job security.

 **Social:** The social analysis shows how college enrollment and completion are good for communities and the state of Arizona as a whole. From this vantage, the analysis looks at increases in gross earnings and health status, as well as reductions in crime and other social consequences influenced by increased postsecondary attainment.

 **Fiscal:** The fiscal perspective models the beneficial tax consequences at the federal and state/local levels—in terms of higher revenues and lower public expenditures, such as on health and crime—related to increased enrollment and completion.

This analysis uses a single cohort of 68,690 high school graduates from Arizona's public schools (the "class of 2022") for its model. Each year, there is a new graduating cohort; the amounts reported are lump sums recurring for each cohort. Note that the large number of Arizona students who attend private schools are not included in this model cohort, which derives from data on public schools. Such students eventually contribute to (or detract from, as the case may be) the state's overall attainment rate and the related economic impact. All told, the more students who earn a college certificate or degree, regardless of where they went to high school, the better it is for Arizona in terms of economic gains.

Finally, and importantly, the analysis accounts for the predicted impact of the pandemic on life-course trajectories. The pandemic has affected earnings and health status for future cohorts in various ways; these effects are expected to be more adverse for individuals with less education. The economic burdens from pandemic-related learning losses are discussed in more detail on page 34.

²This model builds on prior research. Similar economic models have been widely applied using national data and for states and population subgroups. See for example Belfield and Levin (2007); Trostel (2010); Heckman and Mosso (2014); Vining and Weimer (2019); for direct evidence for Arizona, see Belfield and Rumberger (2015).



Why College Enrollment and Attainment Drive Economic Gains: Key Factors Considered in the Model



Lifetime Earnings: College-going is associated with enhanced outcomes relative to a high school diploma alone. Earning a degree leads to even better outcomes. These enhanced outcomes include higher earnings per hour, more fringe benefits, increased labor force participation and employment, greater job security, and better working conditions.



Taxes: Differences in lifetime tax payments per education level are substantial, and individuals with college degrees contribute significantly more. The earnings premium for college-educated persons directly translates into additional local, state, and federal tax contributions; the latter are important because they are spent in Arizona.



Health: Individuals with more college education are significantly healthier than high school graduates. Research studies identify strong independent effects of college education on lifetime health status. Statewide, having a higher proportion of more college-educated persons should lower aggregate health expenditures and lead to substantial social and fiscal gains.



Crime: College-educated individuals are less likely to engage in criminal activity. Less than five percent of the U.S. prison population has ever enrolled in college. Increased postsecondary attainment rates would reduce Arizona's crime rate, offset spending on the criminal justice system and corrections, and provide social and fiscal benefits.



Externalities, Welfare, Education, and Deadweight Loss: To fully account for the economic impact of increased postsecondary education, four additional consequences (which have social and fiscal impacts) must be considered. These include:

- Positive economic effects (more regional investment, more innovation, greater workforce productivity)
- Reduced welfare spending (few high school graduates and very few college-educated persons receive welfare)
- Costs related to providing postsecondary education (public subsidies, which have social and fiscal impacts)
- Changes to the Marginal Excess Tax Burden (METB), which is the economic distortion or dead weight loss from imposing taxes. Increased education reduces the METB, conveying a social benefit for Arizona

For additional methodological information and tabulations across these factors, please see the appendix.

The PK-12 Influence on College Enrollment and Attainment

KEY TAKEAWAYS

- 1

Arizona’s low high school graduation rate means that too many Arizona students are ineligible for college.
- 2

At several crucial points in the PK-12 pipeline, students in Arizona are struggling. This makes success in the later grades that much more difficult to achieve.
- 3

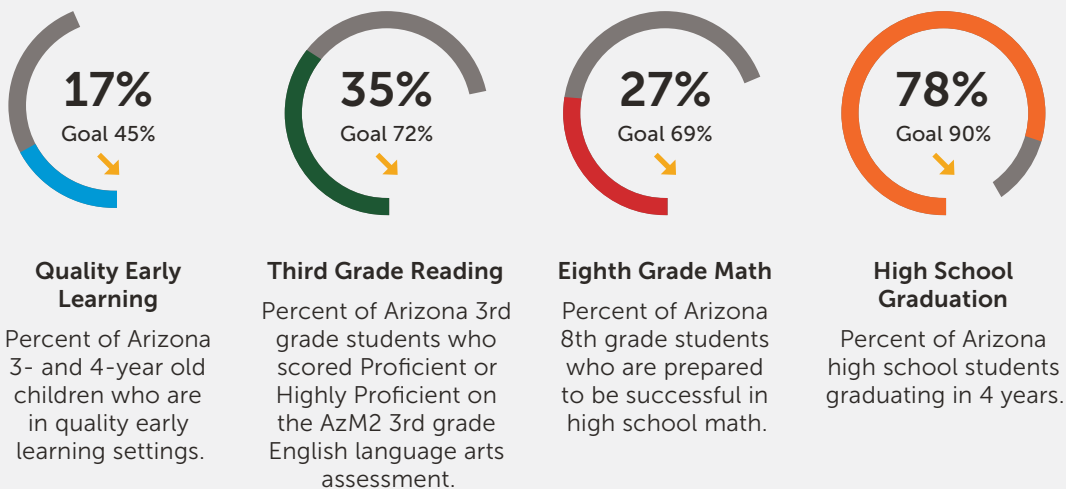
The pandemic has likely contributed to statewide declines in performance.

Efforts to improve attainment rates in Arizona cannot begin and end with our state’s postsecondary institutions. The ability of our state’s early learning and K-12 systems to prepare students for postsecondary success—such as reaching key educational milestones like reading on grade level by third grade or eighth-grade math proficiency—are essential to ensuring that more high school graduates are ready for college.

Without a diploma or high school equivalency, students are typically ineligible for postsecondary participation.

But, as the most recent Arizona Progress Meter data show, Arizona’s school system is falling short on key metrics across grade levels. Given the disruption of the pandemic, performance on these metrics has declined in the past year.

Figure 1: Select K-12 Metrics From Arizona Progress Meter, 2022



Source: Education Forward Arizona, Center for the Future of Arizona



Arizona’s high school graduation rate—12 percentage points short of our state goal—is particularly problematic in that it is both symptomatic of shortcomings on other metrics and contributes to lower rates of postsecondary enrollment and attainment among young adults in Arizona. Without a diploma or high school equivalency, students are typically ineligible for participation in postsecondary education opportunities.

In addition to factors related to schooling, other impediments to postsecondary participation and completion also impact enrollment and attainment rates. These range from affordability (including access to financial aid)—one of the most significant barriers students and families face—to a lack of information and guidance about college options, social and cultural factors, and geographic isolation.

High-skill workers are prospering while opportunities for low-skill workers appear stagnant.



How Individual Arizonans Benefit From Postsecondary Attainment

KEY TAKEAWAYS

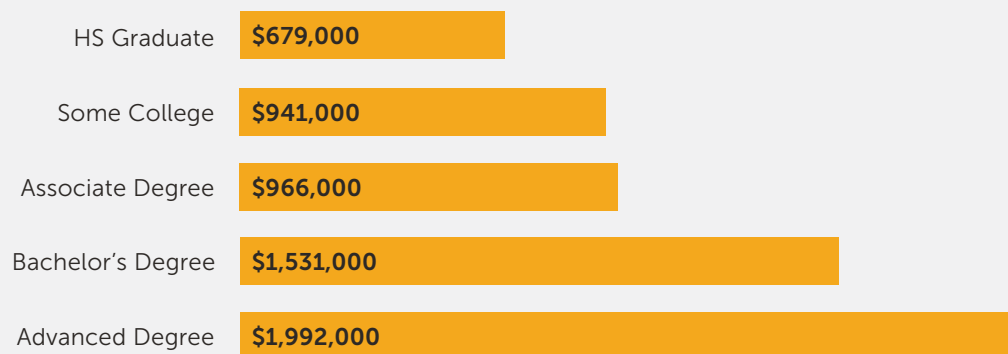
- 1** Postsecondary education almost certainly causes higher earnings.
- 2** Lifetime earnings for individuals with bachelor’s degrees are nearly three times greater than for individuals whose education stops after high school graduation.
- 3** Opportunities for low-skill workers with less education are comparatively limited; the pandemic has made these disparities worse.

When it comes to economic impact and return on investment for states, analyses tend to downplay, or set to one side, discussion of the personal gains for individuals as a result of earning a college certificate or degree. But it is worth emphasizing the significance of personal gains; the clear lifetime earnings premium associated with a college education is potentially life-changing for individuals and their families.

■ Postsecondary education almost certainly causes higher earnings.

Even individuals who enroll in college but do not earn a degree stand to gain significantly—39 percent more in lifetime earnings—compared to high school graduates without any postsecondary education. On average, lifetime earnings for individuals with bachelor’s degrees are nearly three times greater than for individuals whose education stops after high school graduation.

Figure 2: Lifetime Earnings, by Highest Education Level



Present values at age 18; discount rate 3.5%. 2022 dollars.



Arguments and campaigns to the effect of “college is not for everyone” are growing louder in Arizona. These arguments are often grounded in the belief that college (and secondary curricula focused on college readiness) does not provide students the knowledge or skills for success in the workforce or that participation in the existing postsecondary education system is an inefficient use of time and resources.

Regardless of whether such critiques of the higher education system are valid, and absent a seismic shift in the labor market, college certificates and degrees matter and they confer an undeniable advantage to individuals who hold them. In general, employers across industries seek to hire individuals who have a postsecondary education and will pay them more over their lifetimes. A certificate or degree provides individuals with more options and greater earning potential.

Put another way, postsecondary education almost certainly *causes* higher earnings.³ As such, efforts to ensure that all high school graduates at least have the option to access postsecondary education—whether through certificate programs or advanced degree programs—should remain a cornerstone of education policy.

HOW LIFETIME EARNINGS ARE CALCULATED

Lifetime earnings by education level are calculated using gross earnings data taken directly from the Arizona resident sub-sample (more than 95,000 individuals) of the Current Population Survey 2009-2020. Gross earnings—including tax payments and employer contributions—are grouped by

education level and age, and, in a separate analysis, by race and gender. Average gross earnings (for each age band up to age 64) are derived and these are then used to create a smoothed, annualized lifetime earnings profile for each education level.

Moreover, long-term labor market trends indicate that high-skill, college-educated workers are much better positioned to prosper in the future across all sectors of Arizona’s economy and in all regions of the state. Opportunities for low-skill workers with less education are comparatively limited. The pandemic has exacerbated these disparities; less educated individuals have experienced greater adversities than their college-educated counterparts.

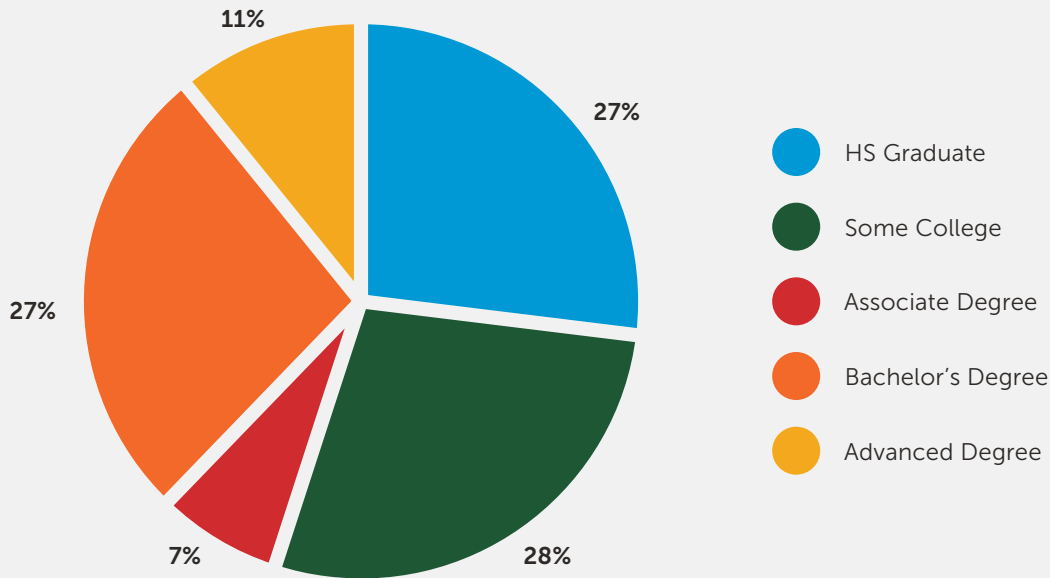
Considered in these terms, a college education (and, again, especially a bachelor’s degree) represents a key step toward greater economic opportunity, mobility, and security in a rapidly changing economy.

³Recent studies include: Autor (2014); Webber (2014); Gelbach (2016); Guvenen et al. (2017); Heckman et al. (2018); Ashworth et al. (2021); for analysis at different levels of college progression, see Belfield and Bailey (2018); Carruthers and Sanford (2018); Xu et al. (2020). For gender/race gaps, see Olitsky (2014); Cheng et al. (2019); Sloane et al. (2021).

Predicted Attainment Levels in Arizona

Attainment is measured as the highest level of postsecondary education completed. Figure 3 shows the *predicted* educational attainment per new cohort of high school graduates in Arizona, as modeled in this analysis. Note that these figures differ from retrospective attainment rates published by the Arizona Progress Meter and elsewhere.

Figure 3: Predicted Educational Attainment in Arizona Per New Cohort



2022 public school 12th grade cohort, high school dropouts excluded. College enrollment includes all two-year and four-year colleges (public, private, for-profit and tribal). Numbers rounded to 10. Calculations are derived from adjusted census data and include a college progression adjustment (Monaghan, 2020).

Across this cohort, 18,600 (27 percent) will not enroll in college, and 19,320 (28 percent) will enroll but not complete college. Therefore, less than half of high school graduates in Arizona will obtain a college certificate or degree: 4,830 (7 percent) will obtain an associate degree; 18,590 (27 percent) will obtain a bachelor's degree; and 7,350 (11 percent) will complete an advanced degree (professional or academic).

Postsecondary attainment varies by race and gender. Students from racial and ethnic minority groups are less likely to enroll and complete college. When students from these groups do enroll, they are more likely to be in two-year degree programs, which are less remunerative over a lifetime (on average).



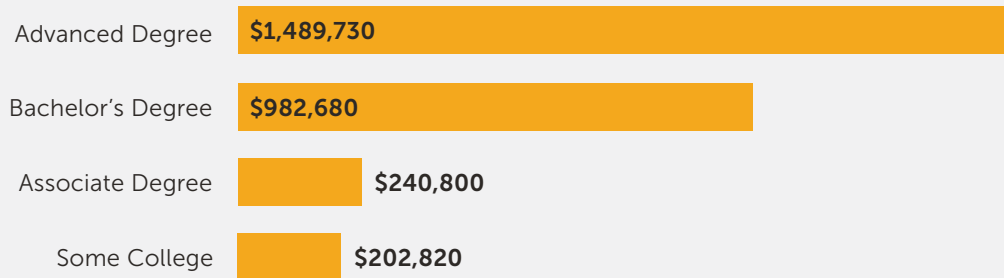
Social Value of Postsecondary Enrollment and Attainment

KEY TAKEAWAYS

- 1** Arizonans with bachelor's degrees contribute \$982,680 more in social gains per individual than high school graduates.
- 2** Increasing college completion rates by 10 percent would lead to social gains of \$1.37 billion per cohort.
- 3** Increasing postsecondary enrollment by 20 percent would lead to social gains that exceed \$5 billion per cohort.

Analyzing the economic impacts of postsecondary enrollment and attainment shows the value for the state of Arizona. Compared to a high school graduate, an individual with at least some college education contributes \$202,820 more in lifetime social gains (i.e., gains related to earnings, health, welfare, productivity, and reduced METB). And, the more years of postsecondary education an individual completes, the greater the social gains. Arizonans with bachelor's degrees contribute \$982,680 more in social gains per individual than high school graduates.

Figure 4: Lifetime Social Gains by Education, Relative to High School Graduate



Per college-educated person. Present values at age 18; discount rate 3.5%. 2022 dollars.

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With this fact in mind, we can examine the impact of a more educated Arizona. Increasing postsecondary enrollment by 20 percent would lead to social gains that exceed \$5 billion per cohort. Further, increasing college completion rates by 10 percent would lead to social gains of \$1.37 billion per cohort (\$19,900 per high school graduate in the cohort).

Figure 5: Statewide Social Impacts of Increased Enrollment and Completion, Per Cohort (\$ billions)



Present values at age 18; discount rate 3.5%. 2022 dollars.

The clear lifetime earnings premium associated with a college education is potentially life-changing for individuals and their families.





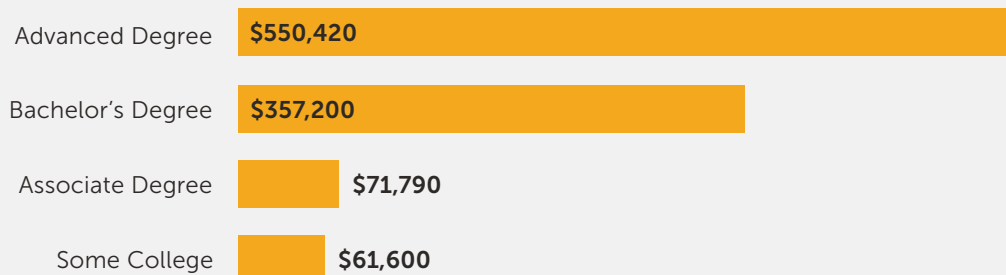
Fiscal Value of College Enrollment and Completion

KEY TAKEAWAYS

- 1** The fiscal gains from increasing college enrollment and attainment are smaller than the social gains, but still substantial.
- 2** Increasing college enrollment rates by 20 percent would lead to gains of \$1.82 billion per cohort.
- 3** This amounts to more than twice what Arizona allocated for universities in the 2022 General Fund budget.

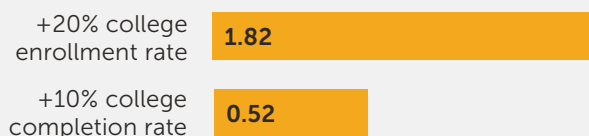
Additionally, the impact of college enrollment and completion on Arizona’s economy can be calculated as fiscal gains or how participation in postsecondary education benefits Arizona from the perspective of taxpayers. The fiscal gains that accrue from postsecondary education range from \$61,600 to \$550,420 per college-educated person (on average, depending on the level of attainment), compared to high school graduates.

Figure 6: Lifetime Fiscal Gains by Education, Relative to High School Graduate



Per college-educated person. Present values at age 18; discount rate 3.5%. 2022 dollars.

Figure 7: Statewide Fiscal Impacts of Increased Enrollment and Completion, Per Cohort (\$ billions)



Present values at age 18; discount rate 3.5%. 2022 dollars.

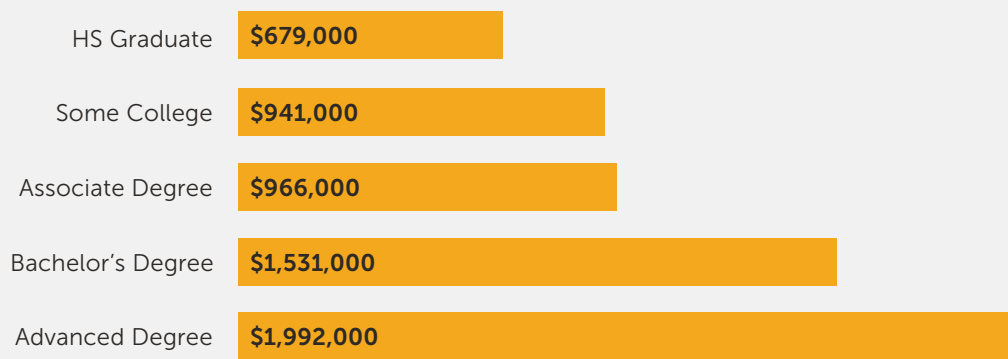
The fiscal gains from increasing college enrollment by 20 percent would be equivalent to 15 percent of Arizona’s 2022 General Fund budget.⁴ This is more than double what the state allocated for its public universities (\$0.9 billion) in that budget.

⁴azospb.gov/2022-budget.html and azeconcenter.org/state-budget-101

**INVESTING IN GREATER COLLEGE-GOING RATES
CAN SPARK REMARKABLE ECONOMIC BENEFITS:**

An Overview of Projected Gains Per Cohort

Predicted Lifetime Earnings Increase as Individuals Become More Educated



College Education Leads to Substantial Lifetime Social Gains for Arizona (Compared to High School Graduate)

Advanced Degree

\$1,489,730

Bachelor's Degree

\$982,680

Associate Degree

\$240,800

Some College

\$202,820

Increased Enrollment and Completion Lead to Large Social Gains Per Cohort (\$ billions)

+20% college enrollment rate

5.09

+10% college completion rate

1.37



College Education Leads to Substantial Lifetime Fiscal Gains for Arizona (Compared to High School Graduate)

Advanced Degree

\$550,420

Bachelor's Degree

\$357,200

Associate Degree

\$71,790

Some College

\$61,600

Increased Enrollment and Completion Lead to Substantial Fiscal Gains Per Cohort (\$ billions)

+20% college enrollment rate

1.82

+10% college completion rate

0.52

For Certain Sectors, Economic Gains from Attainment are Notably Higher than the State Average

● Social Gains ● Fiscal Gains

Advanced manufacturing

\$412,280

\$128,810

Cyber-technology

\$261,340

\$86,880

Health care

\$686,000

\$245,240

Financial services

\$318,600

\$121,170

Achieving Postsecondary Racial Parity Would Lead to Significant Statewide Gains (\$ millions)

● Social Gains ● Fiscal Gains

Four-year Degree Completion Rate Parity

8,688

3,291

College Enrollment Rate Parity

574

209

Prioritizing Postsecondary Equity Will Contribute to Gains for All Arizonans

KEY TAKEAWAYS

- 1** If all students in Arizona enrolled at equal rates, there would be significant aggregate economic gains. The largest impact would be in social gains, which would amount to an estimated \$574 million per cohort.
- 2** Completion parity would lead to social gains of \$8.69 billion per cohort.
- 3** With Latino residents making up a greater and greater proportion of the population, racial parity in college enrollment and completion is likely to be even more important in the coming years.

Regardless of their race or ethnicity, all students benefit from postsecondary enrollment. They benefit even more from completing two- or four-year degrees. In turn, Arizona benefits in the form of social and fiscal gains. Given the exceptional value of postsecondary education, both for individuals and the state, it is vital that Arizona ensure that all students have opportunities to attend and succeed in college.

But college enrollment and completion rates are racially stratified across Arizona. Non-white students are much less likely to enroll in college—and much less likely to complete a four-year degree if they do enroll—compared to white students. The gap separating white and Hispanic/Latino students is especially wide; the enrollment rate for Latino students is 8–10 percentage points lower, and the degree completion rate is less than half of what it is for white students.

Figure 8: Educational Attainment per Arizona Cohort, by Race and Gender

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Female					
White	19%	14%	3%	40%	17%
Hispanic/Latino	26%	30%	8%	18%	6%
Black/African Amer.	22%	26%	7%	23%	10%
Native Amer.	22%	18%	4%	30%	14%
Asian/Other	25%	30%	8%	21%	5%
Male					
White	24%	21%	5%	28%	12%
Hispanic/Latino	29%	33%	8%	12%	4%
Black/African Amer.	26%	30%	8%	17%	5%
Native Amer.	24%	25%	7%	21%	8%
Asian/Other	28%	33%	8%	15%	4%

2022 public school 12th grade cohort, high school dropouts excluded. College enrollment includes all two-year and four-year colleges (public, private, for-profit and tribal). Numbers rounded to 10.⁵

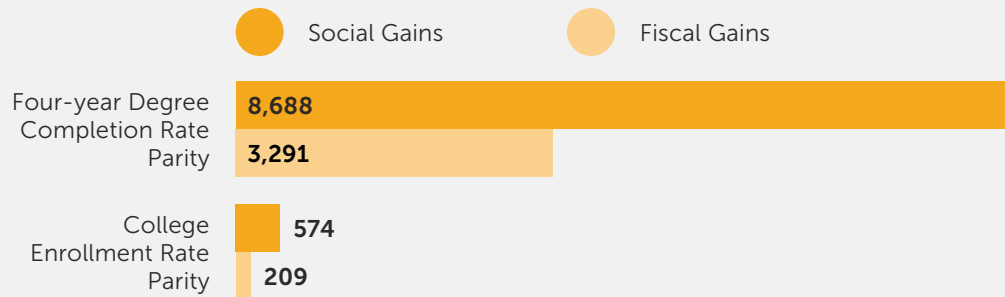
⁵Sources: Arizona Department of Education, azreportcards.org; Digest of Education, 2019, Table 219.85a. Arizona Postsecondary Attainment Report 2020, www.azregents.edu/postsecondary-attainment-report-fy2020.pdf. For college-going: Current Population Survey, Census data; higher.ed.gov/amepac-research-studies-and-reports, 2018 data (adjusted to 2022). College progression adjustment (Monaghan, 2020).



If all students in Arizona enrolled at equal rates, there would be significant aggregate economic gains. The largest impact would be in social gains, which would amount to an estimated \$574 million per cohort. The labor market benefits would amount to \$493 million per cohort. The aggregate fiscal benefits to Arizona taxpayers would be \$209 million per cohort.

There would be even bigger economic gains if Arizona achieved parity in college completion rates by race.⁶ Completion parity would lead to \$7.35 billion in lifetime earnings gains, with fiscal gains of \$3.30 billion and social gains of \$8.69 billion.

Figure 9: Aggregate Gains from Postsecondary Parity (\$ millions)



Present values at age 18; discount rate 3.5%. 2022 dollars.

Given the shifts in Arizona’s demographics—with Latino residents making up a greater and greater proportion of the population—racial parity in college enrollment and completion is likely to be even more important in the coming years.

⁶“Parity” is defined as having all racial groups access college and complete college at rates equivalent to those of white students. In effect, the calculations show the economic consequences for Arizona if race was not a factor in postsecondary participation or performance.

Economic Gains From Increased Postsecondary Enrollment and Completion Vary by Region

KEY TAKEAWAYS

1

Labor market gains related to postsecondary education are conventionally higher in urban areas, where wages are higher overall, and wage inequality is more significant.

2

For Maricopa County, the overall social impact of increasing the college completion rate 10 percent would be \$306.75 million per cohort.

3

In areas where there are fewer students overall, the fixed percentage increases modeled show substantial gains.

The gains from higher enrollment and attainment rates are conditioned by factors such as community demographics, baseline educational attainment rates, returns to college, and local economic circumstances. As such—and although there are strong economic benefits for all regions—gains can vary substantially among regions.

Accordingly, modeling the economic impacts of increased postsecondary education for seven localities across the state—Maricopa; Pima; Casa Grande (Pinal); Flagstaff (Coconino); Prescott-Sedona (Yavapai/Coconino); and Safford, Thatcher, Pima (Graham)—demonstrates both the extent of the regional variation as well as the reasons for that variation. For each locality, the economic impacts of the following changes are modeled:

- 10 percent increase in the postsecondary completion rate
- 20 percent increase in the postsecondary enrollment rate
- 20 percent decrease in college readiness due to pandemic learning disruptions

Regional differences are especially evident when comparing social gains for urban localities with suburban or rural localities. This is because labor market gains related to postsecondary education are conventionally higher in urban areas, where wages are higher overall, and wage inequality is more significant. In keeping with this, the impacts of increased postsecondary enrollment and completion are high in Maricopa County relative to localities like Flagstaff or Prescott-Sedona.

At the same time, a fixed percentage increase (like those modeled) affects more students in localities where initial levels of enrollment and attainment are low; as such, there are large per-student gains in these areas. This explains, for example, the relatively high social gains in Safford, Thatcher, and Pima.



Figure 10: Regional Postsecondary Enrollment and Completion, Gains and Pandemic Losses

	Social		Fiscal	
	Per HS Graduate	Cohort (\$m)	Per HS Graduate	Cohort (\$m)
Maricopa				
College completion rate +10%	\$9,170	\$306.75	\$3,370	\$112.74
College enrollment rate +20%	\$74,360	\$248.76	\$29,780	\$996.35
Lost college-readiness –20%	\$-103,700	\$-3,468.96	\$-42,160	\$-1,410.22
Pima				
College completion rate +10%	\$10,110	\$85.01	\$2,870	\$24.12
College enrollment rate +20%	\$66,550	\$55.99	\$21,540	\$181.18
Lost college-readiness –20%	\$-108,330	\$-911.37	\$-35,270	\$-296.69
Casa Grande (Pinal)				
College completion rate +10%	\$11,120	\$35.26	\$2,280	\$7.23
College enrollment rate +20%	\$77,260	\$24.50	\$19,560	\$62.02
Lost college-readiness –20%	\$-77,240	\$-244.89	\$-18,580	\$-58.92
Yuma				
College completion rate +10%	\$11,370	\$15.65	\$2,040	\$2.82
College enrollment rate +20%	\$76,390	\$10.52	\$17,600	\$24.25
Lost college-readiness –20%	\$-77,860	\$-107.25	\$-16,810	\$-23.15
Flagstaff (Coconino)				
College completion rate +10%	\$9,310	\$5.82	\$2,560	\$1.60
College enrollment rate +20%	\$62,250	\$3.89	\$19,580	\$12.23
Lost college-readiness –20%	\$-109,980	\$-68.72	\$-34,990	\$-21.86
Prescott-Sedona (Yavapai/Coconino)				
College completion rate +10%	\$9,950	\$4.78	\$2,600	\$1.25
College enrollment rate +20%	\$68,420	\$3.29	\$20,700	\$9.95
Lost college-readiness –20%	\$-107,830	\$-51.82	\$-32,690	\$-15.71
Safford, Thatcher, Pima (Graham)				
College completion rate +10%	\$11,910	\$1.82	\$2,430	\$0.37
College enrollment rate +20%	\$80,980	\$1.24	\$20,600	\$3.15
Lost college-readiness –20%	\$-76,820	\$-11.75	\$-18,310	\$-2.80

Per scenario, constant secondary transition rates across education levels. High school graduates (not per additional college enrollee/completer). Present value at age 18, discount rate 3.5%. 2022 dollars.

Notably, there is less variation when economic impacts are evaluated from the fiscal perspective. Federal and state tax rates (and government program eligibility) do not vary statewide, but variations in local tax rates across Arizona—which are reflected in local government revenues—lead to some modest differences in fiscal impact by region.⁷

⁷https://azdor.gov/sites/default/files/media/REPORTS_STATS_2017_ArizonaIndividualIncomeTaxStatistics.pdf. These differences are also influenced by population density. And, like the social gains modeled, higher earnings translate into higher tax contributions and lower government expenditures.

Different Economic Sectors Provide Variable Returns on Postsecondary Education

KEY TAKEAWAYS

1

Among four sectors analyzed, the healthcare sector showed the most substantial social and fiscal returns per graduate relative to the statewide average.

2

Encouraging college students to pursue degrees in advanced manufacturing, financial services, cyber-technology, and health care sectors would generate large per-graduate social gains for Arizona and increase Arizona's tax revenues considerably.

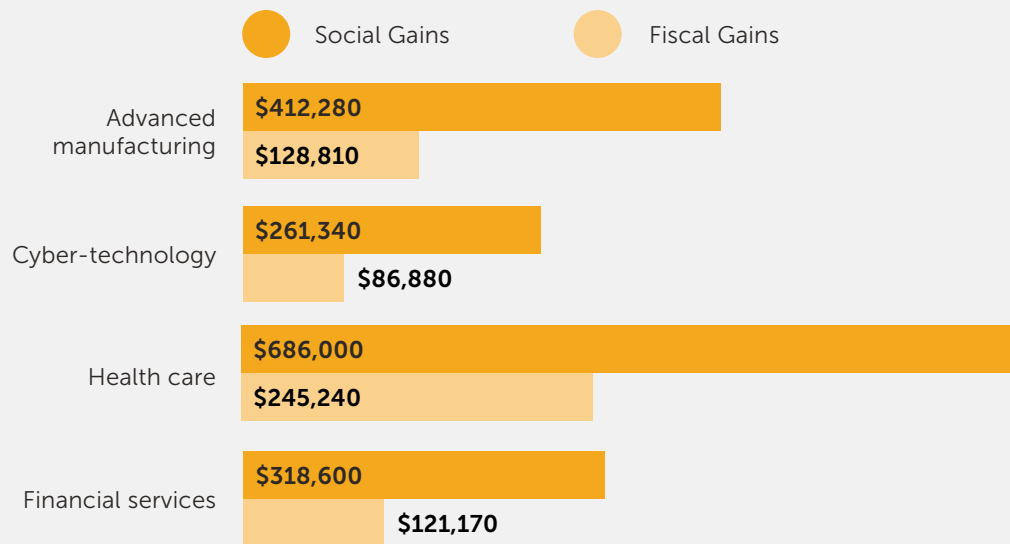
The gains associated with postsecondary education vary by economic sector. This variation stems from differential returns on degrees and the occupations of college graduates in each sector. For example, individuals employed in the business/finance, engineering, or computing sectors earn more on average than individuals employed in other sectors. In certain sectors, like health, there are significant differences from one occupation to the next in terms of required education and earnings. Many health-related occupations are high-paying, but many jobs across the health sector—nurse aides or home-care workers—are relatively low-paid.

Modeling this variation in terms of individual, social, and fiscal gains demonstrates that, when it comes to the economic impact of postsecondary education, it matters which sectors of the economy college graduates are employed. Accordingly, the life-course model is (with requisite adjustments⁸) restricted to four designated high-skill sectors—advanced manufacturing, financial services, cyber-technology, and health care—to show the relative differences in economic gains among the sectors and compared to the statewide average.

⁸Adjustments are made with respect to the specific educational requirements per occupation (including type of award and institutional type) and variation in labor market returns per sector. Earnings variations have implications for tax revenues, productivity spillovers, the METB, and (modestly) for welfare eligibility. The model parameters for health and crime are constant regardless of subject of degree.



Figure 11: Sectoral Gains Per Graduate, Relative to Statewide Average



Social and fiscal values per college graduate within given sector, in excess of statewide per graduate average. Calculations exclude high school graduates. Present values at age 18; discount rate 3.5%. 2022 dollars.

In each of these four sectors, the employment growth rate is significantly higher than the statewide average rate. Additionally, earnings across the four sectors range from \$73,390 to \$101,940, much higher than the \$55,170 statewide average. Additionally, the social and fiscal gains are much higher for individuals whose occupations are in one of the four designated sectors. These sectoral differences are economically meaningful. Encouraging college students to pursue degrees in these sectors would generate large per-graduate social gains for Arizona and increase Arizona’s tax revenues considerably.

The Effects of the Pandemic on Arizona Students Have a Substantial Economic Impact

There is little question that the pandemic has massively affected K-12 students' educational experience and that the learning disruptions associated with the pandemic have negatively affected students across numerous measures. Mounting evidence identifies four primary ways the pandemic has harmed students' schooling:⁹

- Lost schooling directly from infection
- Lost schooling due to school closures
- Reduced school-level productivity (e.g., from teacher absence or changed curricula)
- Reduced instructional productivity from online classes

Analysis conducted by the Arizona State Board of Education, Arizona Department of Education, and Helios Education Foundation on the impact of the pandemic shows significant declines in student achievement and growth. At the same time, student mobility and absenteeism have increased markedly, contributing to further learning disruptions for students.

In addition to harming individual students—and their families, educators, and schools—the learning disruptions associated with the pandemic also have a significant economic impact on the state. This impact can be expressed—and modeled for Arizona by adapting expected losses identified by researchers¹⁰—in terms of lost college readiness or postsecondary attainment.

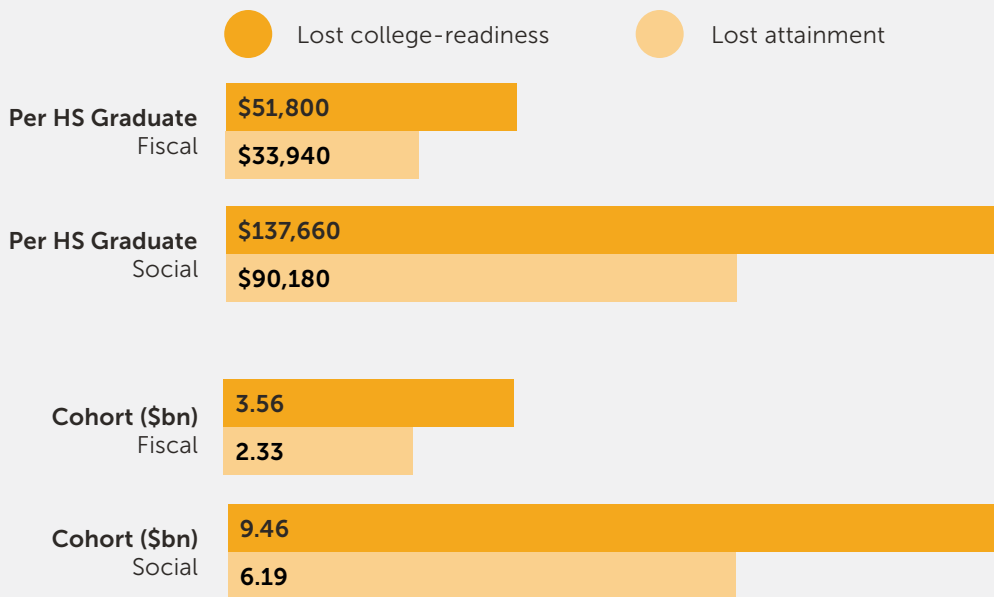


⁹See, for example: Goldhaber et al. (2022); Fuchs-Schündeln et al. (2020); and Escueta et al. (2020).

¹⁰Goldhaber et al. (2022)



Figure 12: Statewide COVID-19 Pandemic Losses



Notes: Attainment reduced by one year per student. College-readiness reduces college enrollment and college completion (all levels). Each scenario holds constant secondary transition rates across education levels. Cohort=68,690 high school graduates. Present values at age 18; discount rate 3.5%. 2022 dollars.

The corresponding economic impacts are sizable. In terms of readiness, one-third of high school graduates were no longer college-ready, which, in turn, lowers rates of college enrollment and completion. This translates to a per-student social loss of \$137,660 and a \$9.46 billion loss for the entire cohort.

Economic burdens due to the pandemic can also be understood in terms of lost schooling. Each high school graduate lost approximately one whole year of schooling (in the period from March 2020 to March 2022), the equivalent of \$90,180 per graduate and \$6.19 billion for the cohort.

Without a diploma or high school equivalency, students are typically ineligible for participation in postsecondary education opportunities.

Call to Action

Investments Arizona makes to increase college enrollment and completion rates are very likely to see substantial returns. This is true even in the face of the significant economic burdens that stem from pandemic-related disruptions to student learning, which are estimated to have cost students an average of one year of lost schooling and substantial losses in terms of their college readiness.

Central to any investments and initiatives that the state undertakes should be a broad commitment to ensuring that all students in the state, regardless of their background, have access to the educational supports, services, and opportunities that make postsecondary education not only possible, but also realistic and achievable. Through this lens, the following investments and strategies can help to increase college enrollment and completion rates statewide, thereby strengthening the prospects of individuals and families, while also delivering robust economic gains for the state.

Arizona can invest in bolstering college readiness efforts and strengthening the linkages between the K-12 and postsecondary education systems. These investments could include expanding access to dual enrollment opportunities, which, in addition to providing students with rigorous courses that better prepare them for postsecondary success, bridge the two sectors and provide students with a better understanding of what college-level expectations entail. The state can also promote student-centered pathways, from kindergarten through to college, that provide students and families with a clear, coherent picture of the steps required to prepare for and succeed in college.

Arizona can invest in reducing non-academic barriers to college-going and college completion. Given the breadth of the challenges that students throughout the state face in accessing and completing college, such investments could take many forms. Investments could include expanding access to school counselors and guidance services and greater support for community-based organizations that help students and families (especially those

from groups who are underrepresented in postsecondary education) navigate successful paths through college.

Arizona can invest in making college more affordable for all students. Cost, both in terms of tuition and fees as well as perceived opportunity cost delaying entry into the workforce, is the most significant barrier that many students face when it comes to enrolling in and completing college. Such investments could include a state-sponsored need-based grant aid program, increased state subsidies for postsecondary institutions, and broader support for efforts and infrastructure intended to increase FAFSA completion statewide.

Arizona can invest in programs and initiatives, including public-private partnerships, that incentivize more students to pursue college degrees in high-value sectors. Such investments could contribute to enhanced economic returns for the state, build a stronger workforce with the relevant skills to sustain key industries in the state, and guide students toward professions and industries in which they can prosper.





APPENDIX

Supplementary Data Tables
and Methodological Notes

APPENDIX

For a bibliography of sources that informed the analysis discussed in this report, please refer to: Belfield, C.R. (2022). The Economic Benefits of Increasing Post-Secondary Education in Arizona. Center for Benefit-Cost Studies in Education, University of Pennsylvania.

Table A1: Earnings by Education Level

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Female					
White	\$537,418	\$722,270	\$703,849	\$1,224,306	\$1,685,860
Hispanic/Latino	\$373,176	\$913,768	\$931,324	\$976,329	\$1,176,235
Black/African Amer.	\$467,057	\$668,500	\$692,614	\$1,216,908	\$1,432,770
Native Amer.	\$376,165	\$554,113	\$586,558	\$1,013,494	\$1,183,404
Asian/Other	\$404,264	\$714,399	\$757,484	\$1,034,026	\$1,219,171
Male					
White	\$998,266	\$1,242,061	\$1,273,002	\$2,217,242	\$2,827,497
Hispanic/Latino	\$848,000	\$945,776	\$990,469	\$1,959,554	\$2,473,488
Black/African Amer.	\$626,444	\$893,511	\$923,031	\$1,365,728	\$1,875,002
Native Amer.	\$744,655	\$841,417	\$854,531	\$2,249,994	\$2,682,159
Asian/Other	\$764,099	\$903,049	\$885,622	\$1,886,581	\$2,293,276

Source: Current Population Survey (CPS), 2009-2020; Arizona sample includes all persons aged 18-64 (employed or not). Notes: Gross earnings before tax. No adjustments are made for labor market participation (annual and lifetime), GED receipt, or incarceration rates. Labor market activity begins at age 18 (conditional on not being in college) and lasts until age 65. Model includes health and pension benefits incidence as per Arizona sub-sample of CPS; alpha factor of 10%; productivity growth rate 1.5%; pandemic adjustment factor Albanesi and Kim (2021). Present values at age 18; discount rate 3.5%. 2022 dollars.

Table A2: Tax Contributions by Education Level

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Federal Tax	\$174,850	\$220,170	\$226,810	\$391,270	\$505,440
State/Local Tax	\$67,140	\$84,550	\$87,090	\$150,250	\$194,090

Source: CPS, 2009-2020; Arizona sub-sample aged 18-64. Notes: Earnings profiles as per Appendix Table A1. Average from: (1) reported tax payments from CPS; (2) predicted taxes from TAXSIM at <http://users.nber.org/~taxsim/taxsim35/>; (3) rate of 25% of earnings (Saez and Zucman, 2019). Present values at age 18; discount rate 3.5%. 2022 dollars.



Table A3: Health Valuations by Education Level

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Social Gains	\$16,500	\$55,500	\$75,700	\$79,600	\$86,880
Federal Burdens	\$1,000	\$600	\$120	\$80	\$40
State/Local Burdens	\$1,500	\$900	\$180	\$120	\$60

Sources: State/federal spending: www.kff.org/statedata/. ACA: www.kff.org/state-category/affordable-care-act/. MEPS, Muennig et al. (2010); Schoeni et al. (2011); Krueger et al. (2015). Medicaid spending: www.macpac.gov/publication/march-2022-report-to-congress-on-medicaid-and-chip/. State health spending: www.azdhs.gov/documents/operations/financial-services/azdhs-budget-request-fy-22.pdf. Notes: Medicaid spending over-65 and CHIP spending excluded. ACA enrollment assumed fixed as per 2018. Present values at age 18; discount rate 3.5%. 2022 dollars.

Table A4: Crime Burdens by Education Level

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Social Burden	\$39,110	\$22,770	\$11,520	\$7,370	\$3,760
Criminal Justice System Burden: Federal	\$3,640	\$2,120	\$1,070	\$690	\$350
Criminal Justice System Burden: State/Local	\$14,550	\$8,470	\$4,290	\$2,740	\$1,400

Sources: Anderson (2011); Ewert et al. (2014); Krueger et al. (2015); Cano-Urbina and Lochner (2019); Cruz and Lopez (2019); Koegl and Farrington (2021); Miller et al. (2021). Federal spending: bjs.ojp.gov/sites/g/files/xyckuh236/files/media/document/jeeus17.pdf. State spending: azospb.gov/Documents/2021/FY-202022-20Summary-20Book.pdf; www.azdps.gov/about/reports/budget. Incarceration population: corrections.az.gov/--/reports/inmate-statistics. Notes: Present values at age 18; discount rate 3.5%. 2022 dollars.

Table A5: Other Economic Benefits by Education Level

	High School Graduate	Some College	Associate Degree	Bachelor's Degree	Advanced Degree
Economic Spillovers	\$25,110	\$41,960	\$52,840	\$54,430	\$93,900
Welfare: Federal	\$140	\$110	\$80	\$30	\$20
Welfare: State/Local	\$1,050	\$750	\$300	\$150	\$130
Education Costs: Social	\$0	\$12,000	\$54,800	\$78,200	\$87,020
Education Costs: Federal	\$0	\$4,000	\$4,400	\$6,000	\$6,640
Education Costs: State/Local	\$0	\$3,220	\$19,200	\$25,400	\$27,970
METB	\$21,950	\$44,090	\$53,730	\$55,330	\$100,630

Sources: Productivity: Monaco and Yamarik (2015); Liu et al. (2020). METB: Ghavari (2006). Welfare receipt: www.census.gov/data/tables/2019/demo/public-assistance/sipp-receipts508.html. Welfare spending: des.az.gov/--/DES-1139A.pdf?time=1651701512681. Higher education costs: highered.az.gov/--/FY2023-20PEA-20Final-20Budget-20Submission.pdf. K-12 school costs: www.azed.gov/--/2022/03/SAFR2021vol1.pdf. Notes: Present values at age 18; discount rate 3.5%. 2022 dollars.

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