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# **Failure to Launch:**

The Social and Economic Impacts of  
K-12 Learning Loss Since 2020

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## About the Author



**Glenn Farley** is CSI Arizona's Director of Policy & Research. Before joining CSI in 2022, Glenn worked in the Office of the Arizona Governor, most recently as Gov. Doug Ducey's Chief Economist and a policy advisor. In that role he advised on issues of tax, fiscal, and regulatory policy, and was one of the Governor's lead architects of his two major tax reforms – including the 2021 income tax omnibus which phased in a 2.50% flat tax (the lowest in the country). Glenn also led the budget team that produced the Executive revenue forecasts and caseload spending numbers that have helped ensure the longest run of structurally balanced budgets in State history. Glenn has a Master's Degree in Economics from Arizona State University's WP Carey College of Business, as well as a B.S. from Arizona State University. He was born and raised in Arizona where he now lives with his wife and two daughters.

### About Common Sense Institute

**Common Sense Institute** is a non-partisan research organization dedicated to the protection and promotion of Arizona's economy. CSI is at the forefront of important discussions concerning the future of free enterprise and aims to have an impact on the issues that matter most to Arizonans. CSI's mission is to examine the fiscal impacts of policies, initiatives, and proposed laws so that Arizonans are educated and informed on issues impacting their lives. CSI employs rigorous research techniques and dynamic modeling to evaluate the potential impact of these measures on the Arizona economy and individual opportunity.

# *Teams & Fellows Statement*

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CSI is committed to independent, in-depth research that examines the impacts of policies, initiatives, and proposed laws so that Arizonans are educated and informed on issues impacting their lives. CSI's commitment to institutional independence is rooted in the individual independence of our researchers, economists, and fellows. At the core of CSI's mission is a belief in the power of the free enterprise system. Our work explores ideas that protect and promote jobs and the economy, and the CSI team and fellows take part in this pursuit with academic freedom. Our team's work is informed by data-driven research and evidence. The views and opinions of fellows do not reflect the institutional views of CSI. CSI operates independently of any political party and does not take positions.

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## Summary & Key Findings

In 2001, the United States' focus on performance-based education came to a head with passage of the *No Child Left Behind Act*. Over the next fifteen years, NAEP scores – the only standardized, long-term measure of student academic learning for the nation – rose about 5%. In 2020, the Covid pandemic resulted in the first widespread, extended closure of American K-12 schools in modern history, and even today traditional in-person instruction remains subject to sporadic, isolated disruption.

As a result of this, and a general movement away from a focus on performance, academic metrics are by some measures back to where they were at the beginning of the 21st century. **These are the largest score declines in the history of the long-term assessment. In some cases, such as 4th grade math, this is the first decline ever recorded in the United States.** For Arizona, this means:

- **CSI projects Arizona will have 18,419 fewer high school graduates by 2032 if these losses are not reversed.** The high-school graduation rate for Arizona's current K-12 cohort could be 1.5% lower than it would have been, given 2019 assessment scores.
- **Arizona could produce as many as 26,281 fewer college graduates by 2026 as a result.** Reduced academic- and career-readiness among the cohort means fewer of students who do graduate will enroll in and ultimately graduate from college.
- Lost economic opportunity from reduced education is associated with higher crime rates – **the state could see over 10,000 more crimes committed annually over the next decade, at a social cost of up to \$2.1 billion.**
- Job and income losses impose their own economic and social costs – the state's economy could be \$800 million smaller in 2032, and **Arizonans could lose a cumulative \$11 billion in personal income over the next decade if learning losses are not reversed.**
- Policymakers anticipated that learning loss could occur because of remote learning and other classroom disruptions during the pandemic and allocated significant resources to schools to mitigate these losses. In Arizona, public district and charter schools received \$4.5 billion in emergency federal funds since 2020. **As of July 2023, schools have spent \$2.2 billion of these resources – but CSI estimates only about \$134 million was allocated to addressing learning loss.**

The impacts from the recent learning loss rely on two central assumptions: that learning loss captured in the 2022 NAEP assessments is permanent to the pandemic-era K-12 cohort (those aged 5-17 in 2020-2021), and that the loss is isolated to only that cohort as future cohorts return to pre-2020 learning trends.

# Background

## The Rise & Fall of Performance-Based Education

In 1983, the United States National Commission on Excellence in Education famously declared the U.S. “A Nation at Risk”<sup>i</sup>. Among its key findings at the time: about 13% of young people in the United States were functionally illiterate (and the rate was as high as 40% among some minority sub-populations), and a quarter of high-school credits earned by general track students weren’t in the core areas of reading, writing, arithmetic, and the sciences. Instead, many students were relying on credits in health education, remedial coursework, or personal development (“adulthood training”) to graduate.

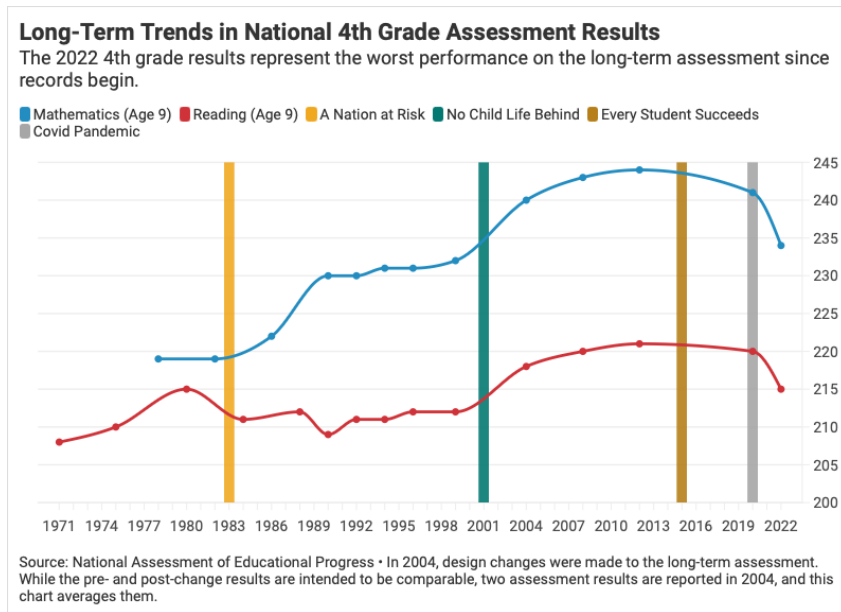


Figure 1

Over the following 15 years, state governments and local school districts responded to the criticism, but their efforts were scattershot; there was no centrally driven philosophy guiding the approach. Still, a distinct culture of standards-based educational reform emerged and reforms were implemented from the bottom (at the state- and local-level) up. A 1988 change in federal law allowed and encouraged the use of standardized, nationally comparable testing in state high school competency assessments, and by the end of the 20th century 48 states had statewide student assessment tests. Still, a 2001 study found wide variation in how the tests were administered and what was tested; only 31 states had nationally normed testing that allowed cross-state comparisons of results<sup>ii</sup>.

Results were mixed. Between 1988 and 2000, the high school graduation rate for American adults had risen from 20% to 76%. For college graduation, it rose from 25% to 84%.<sup>iii</sup> The National Assessment of Educational Performance (NAEP) scores over the same period, on the other hand, showed only modest gains (in Mathematics) or no gains at all (in Reading). In 2001 – responding to the perception that the country was still lagging, particularly internationally – Congress enacted the *No Child Left Behind Act* (NCLB). This new law institutionalized a culture of performance evidence-based K-12 education. It established benchmarks to monitor achievement via nationally norm-references, mandatory statewide assessments (though with the tradeoff of much greater federal involvement in the traditionally state and locally controlled area of American public primary schooling). Over the following decade, the country enjoyed its fastest ever growth in K-12 academic performance, at least as measured by time- normed NAEP assessments. In the ten years after passage of NCLB, national Math scores rose 5.2% and Reading scores rose 4.2%.

Arizona embarked on its own series of educational reforms intended to drive academic performance in schools. In 1995, Arizona created one of the broadest charter school regimes in the country. In 2000, Arizona created a statewide assessment all students were required to take and pass as a condition of high school graduation (Arizona’s Instrument to Measure Standards, “AIMS”). In 2010, the state created an A-F letter grade system for all public schools (district and charter), which combined with the states open enrollment was designed to enable parents to make informed educational decisions and administrators and policymakers to provide objective oversight of state school performance. And in 2016, the state set aside funds specifically for high-performing schools through the Results Based Funding program – a small but philosophical shift from the traditional American public school funding formula based solely on student count, toward one that sought to recognize and expand success. However, by the 2010’s, perception of the increasingly test-driven nature of the new American public school system had begun to sour<sup>iv</sup>, and the United States began to roll back some of its more rigorous reforms. In 2012, the U.S. Department of Education granted NCLB waivers to 26 states – and by the end of the year 32 states and the District of Columbia (most of the country) had been at least partially exempted from the performance and improvement requirements in the original Act<sup>v</sup>. In 2015, federal policymakers replaced NCLB with the *Every Student Succeeds Act*, which reduced testing requirements, gave states greater flexibility in designing both their assessments and curriculum, and reduced the influence of testing and test-performance on assessments of state public school performance<sup>vi</sup>. While this new regime restored state freedom and flexibility in K-12 system design following decades of centralization and homogenization following the *A Nation at Risk* report, it was also emblematic of the rejection of a rigorous and performance-focus approach that had appeared to be working. Between 2012 and 2020, nationwide academic performance (NAEP measured) again flatlined.

## The Covid Pandemic & Learning Disruption

The onset of the Covid-19 public health emergency in 2020 and subsequent emergency actions by the various states – often at the behest of federal public health officials– brought about unprecedented disruptions to the traditional American K-12 learning environment.

According to a comprehensive report by Ballotpedia, all 50 states saw school closures during the 2019/20 school year, and 48 of the 50 states had extended closures for the remainder of the academic year from around mid-March 2020<sup>vii</sup>. Even by early 2021, nearly 60% of

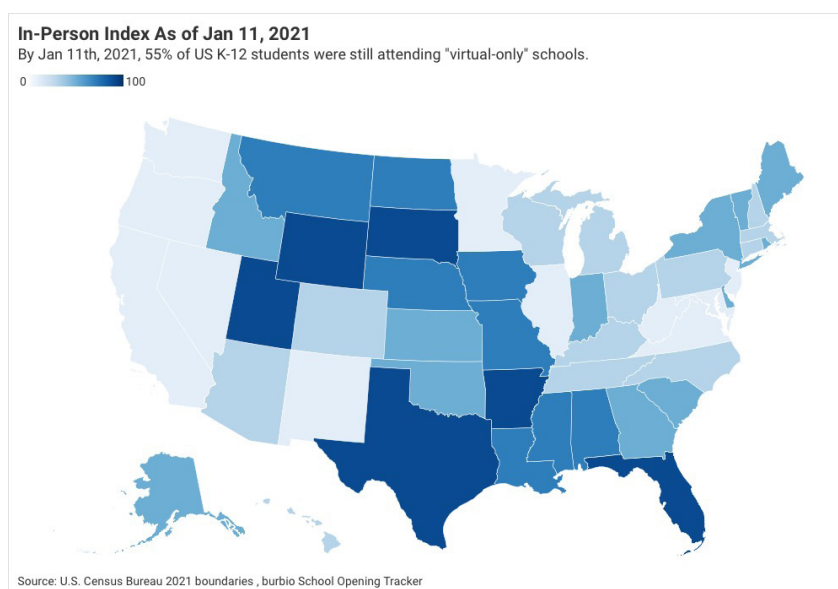


Figure 2

*By early 2021, nearly 60% of students were attending schools that remained closed to in-person learning.*

students were attending schools that remained closed to in-person learning<sup>viii</sup>. Not until the 2022/23 school year (beginning August 2022) had most schools returned to regular learning, though many catalogued a permanent increase in so-called “hybrid learning” models that feature a combination of in-person and remote learning. Even in 2022, a data aggregator recorded over 17,000 schools “actively disrupted” on one or more academic days due to Covid mitigation efforts<sup>ix</sup>.

This thrust to online and other unconventional learning methods was novel and sudden – teachers, administrators, and other school officials with no prior experience or training with online, masked, or otherwise modified instruction were suddenly required to administer it. Students, similarly, were suddenly required to learn in it. In the absence of the pandemic, it is highly unlikely any policymaker or educator would have proposed this kind of sudden change in the K-12 learning environment, and if proposed there likely would have been substantial discussion about the ramifications for students and student learning.

Subsequent academic data reveals that these extended periods of school closures, coupled with other mitigation efforts that continued even after in-person and hybrid learning resumed (like mask mandates, suspension or modification of certain in-school activities, etc.) noticeably reduced student academic performance and educational investment.

Measures of student satisfaction showed immediate response to the change. A large survey of college students conducted between May and June 2020, found a three-fold increase in reported dissatisfaction with their courses after the move to remote learning (from 12% to 40%), including a four-fold increase in the percent reporting very dissatisfied<sup>x</sup>. 79% of surveyed college students reported difficulty staying motivated during online instruction. 59% of teenagers surveyed by SurveyMonkey in September, 2020 said online learning was worse than in-person learning (with 19% calling it “much worse”)<sup>xi</sup>.

Unfortunately, more objective measures of student well-being and academic performance are becoming available only with a significant lag. According to an April 2022 survey of public schools by the National Center for Education Statistics (NCES), 69% of public schools reported an increase in the degree to which students seek mental health services at school since 2020<sup>xii</sup>. New data (early 2023) from the National Center for Health Statistics show an 8% increase in the rate of suicide among young people (aged 10-24) between 2019 and 2021<sup>xiii</sup>, arresting a prior decline in rates from there 2017/18 peak.

Finally, this year NCES published the 2022 results for the Long-Term Trend Assessments – the national standardized test intended to track normalized K-12 student academic performance over time. These are the first official results recorded since the pandemic.

Nationally, reading scores have fallen 1.5% and 1.1% for 4th and 8th graders since 2019, while math scores declined 2.1% and 2.8% for the same age groups respectively. This represents the first-ever decline in mathematics scores and the largest ever decline in reading scores since the long-term assessments began in the 1970’s.



## Arizona's Performance Since 2020

Arizona was not immune to the national educational disruption that began in 2020. In March 2020, Arizona's public schools joined virtually every other public school system in the country<sup>xiv</sup> in closing in-person instruction for the remainder of the 2019-2020 school year.

According to the Burbio In-Person Index, Arizona ranked near the middle of the country for in-person classroom instruction during the 2020-2021 school year (running from August 2020 to May 2021) – about 60% of an average student's time was spent on traditional in-person classroom instruction.

By summer 2021 and the beginning of the 2021-2022 school year (August 2021), instruction was largely normalized. However, isolated disruptions persisted even last year, again according to data tracked by Burbio<sup>xv</sup>. During the pandemic period, over 37,000 students left the state's public schools, according to enrollment data.

As a result of these disruptions to their traditional learning environment, Arizona students joined their national peers in experiencing learning loss during the pandemic. In terms of academic performance as measured by the National Assessments:

- **Arizona's 4th and 8th grade Reading scores declined -0.2% and -0.4% respectively** – outperforming their national peers (U.S. average scores fell 1.5% and 1.1%, respectively). However, this may be because Arizona students were already performing (in 2019) at similar levels to the average U.S. student in 2022.
- **Arizona's 4th and 8th grade Mathematics scores declined -2.4% and -3.3%, respectively, between 2019 and 2022.** These were larger declines than for the U.S., and the state is now ranked 37th in the country for 4th grade Math scores.

According to NCES, Arizona's high school graduation rate in 2020 was already the lowest in the nation among states (at 77%, and ahead of only D.C. overall)<sup>xvi</sup>. This was a decline of 4 percentage points from its NCES-reported 2019 level. However, it is unlikely that this decline is attributable to pandemic-period learning loss, as we would expect the academic consequences of pandemic policy disruptions to occur slowly over several years, and not necessarily substantially impact graduating seniors in 2020. For the



## Arizona's 2020 K-12 Experience

**-0.2%**

4th Grade Reading Scores, NAEP

**-2.4%**

4th Grade Mathematics Scores, NAEP

**-6%**

Statewide Assessment Passing Rate

**-1.5%**

High School Graduation Rate

U.S. overall, for example, high school graduation rates actually increased between 2019 and 2020 (again according to NCES data) – despite sustained and persistent national pandemic-era classroom disruptions and widespread learning loss in the assessments. High school graduation rates during the pandemic period may more to do with state policy as with academic performance (e.g. states relaxing their standards to maintain or grow graduation rates)<sup>xvii</sup>.

Like most other states, Arizona paused statewide assessments during 2020. However, trends between 2019 and 2021 mirror those in the recently-released National Assessment data – students scoring “proficient” or above on the state’s English Language assessment fell about 6% between 2019 and 2021 to 35% for boys and 42% for girls<sup>xviii</sup>.

## The Social Importance of Education

### Education, Employment, and Income

In general, educational attainment – and attaining a high school diploma in particular – is the strongest single indicator of future economic success. Over the past several decades opportunities for those without at least this minimum credential have dwindled. Today, a high school diploma is a basic requirement for 85% of jobs in the United States<sup>xix</sup>, and according to the Brookings Institute and the Bureau of Labor Statistics real wages for men without a diploma have fallen over 20% since 1980<sup>xx</sup>.

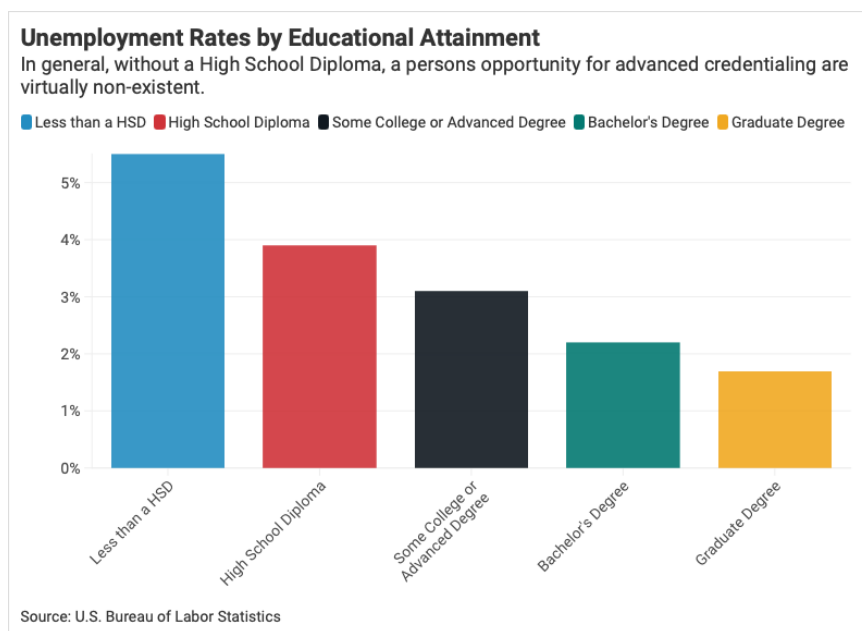


Figure 3

As of 2022, the unemployment rate for someone without a high school diploma was roughly double that of someone with at least that credential. Further, there are few credentialed opportunities available to those without this diploma, even as the economy becomes increasingly tailored to individuals with some kind of advanced degree, license, or other professional credential. Becoming a licensed electrician, for example, generally requires a high school diploma and several years’ work experience<sup>xxi</sup>.

Households whose primary earner has less than a high school diploma earned just \$31,459/year in 2021, according to the Consumer Expenditure Survey – versus \$87,432 for the average household overall. In Arizona, the result is much the same – expected household income jumps 49% from less than \$30,000 to \$43,625 annually when the primary earner goes from not having to having a high school diploma. While expected income continues rising with attainment of further credentialing, this becomes impossible for those without the minimum high school diploma.

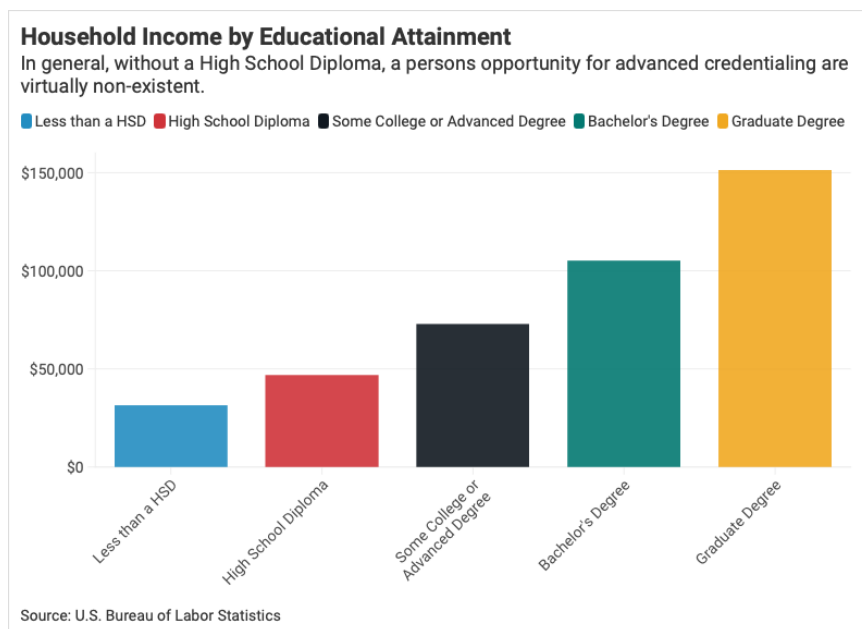


Figure 4

And perhaps surprisingly, the educational wage premium – the additional value placed by the market on educational attainment in terms of lifetime earnings – has increased over time, even as the relative supply of those with advanced education (High School, College, and post-College diplomas) has grown rapidly. Employers appear to have responded to the rapid saturation of the marketplace with high school and college degrees (in 2021, over 91% of U.S. working-age adults had at least a High School Diploma<sup>xxii</sup>) by establishing these benchmarks as minimum requirements for nearly any applicant – often apparently independent of underlying skill needs, since the same occupations with little or no change in working requirements today require credentials they often didn't in the past<sup>xxiii</sup>. This means that – even fixing applicant quality by other measures – failure to attain at least a high school diploma makes it effectively impossible to compete in the modern American economy.

In general, households with lower educational attainment are lower-income, and a larger share of their income comes from government assistance. This is especially true for households without at least a high school diploma. For example, the value of government benefits for a household earning \$20,000 per year could be over \$14,000, according to an analysis by Brookings<sup>xxiv</sup>. This creates additional social consequences of increasing the share of the population without the minimum high school diploma, beyond reduced employment and productive participation in the economy:

- Increased dependence on government assistance creates additional taxpayer and public treasury burdens.
- High marginal tax rates associated with loss-of-benefits at lower incomes creating powerful disincentives for these households to try and improve their economic fortunes.

## Education & Crime

As with employment and income, educational attainment is highly correlated with both the likelihood of arrest and incarceration, and propensity for criminality as revealed in social surveys of behavior. This link is particularly strong around attainment of a High School Diploma – in general, probability of criminality is significantly higher for men without a High School Diploma than for any other social demographic<sup>xxv</sup>. Crime presents enormous social costs:

- Incarceration (on a per-prisoner basis) is one of a state government’s most expensive responsibilities. Arizona, for example, annually spends over \$25,000 per prisoner on incarceration<sup>xxvi</sup>, and, at nearly \$1.5 billion in funding, its Department of Corrections is the third-largest General Fund agency.
- Criminal activity imposes significant direct costs on the victims of crime – loss of life, health, and property. An individual injured by crime foregoes wages during their recovery period and incurs hospital bills. Property lost to theft or criminal destruction must be replaced. A 2020 study by Ted Miller et. al. estimated the U.S. cost of 120 million identified crimes at \$620 billion in direct monetary expenses and another \$1.95 trillion in indirect social costs<sup>xxvii</sup>.

Causal theories vary, but economists generally acknowledge a strong opportunity cost to crime – a person engaging in criminal or otherwise socially-undesirable conduct foregoes the opportunity to participate in regular markets (both indirectly, in that employers and most private citizens try to avoid direct association with criminal behavior, and directly, in that time spent either committing crimes or incarcerated is time that can’t be spent working). This implies that, all else equal, we would expect willingness to commit crimes to rise as opportunity or ability to participate in the conventional economy falls.

As already established, there is a strong link between educational attainment and employment and income-earning opportunity, and over 85% of the legal economy is “gated” behind a High School Diploma. As of the late 1990’s, 68% of people in state prisons had not received a high school diploma<sup>xxviii</sup>.

Confirming this theory, landmark 2003 research established a strong correlation between primary school educational attainment and criminality – with the break being especially pronounced around receiving (or not) a High School Diploma<sup>xxix</sup>. A high school dropout has over 10 times the incarceration rate on average of a college graduate. **A 10-percentage point increase in the high school graduation rate is associated with an 8% decrease in the violent crime rate, and a 6% decrease in the property crime rate.**

## NAEP Scores & Educational Outcomes

**Finally, we assert that National Assessment of Educational Progress (NAEP) scores are reliable indicators of lagged high school graduation rates.** Using data on 2020 graduation rates (reported in 2022), 4th grade Reading and Mathematics scores from 8 years ago, and 8th grade Math and Reading scores from 4 years ago, CSI can explain about 22% of the cross-state variation in reported high school graduation rates (Figure 6).

Reading scores are particularly strong indicators – nearly 20% of the variation in 2022 state high school graduation rates can be explained by their 2013 NAEP Reading scores alone. While Mathematics scores are a generally weaker predictor of graduation rates, the relationship remains both positive and significant – in general, lagged 4th grade Math scores explain about 10% of the variation in state high school graduation rates, and a 10% increase in those scores would lead to a predicted 2.6% increase in high school graduation rates eight years later. This finding is statistically significant.

Exploiting these findings, CSI constructed a simple model that predicts the expected change in Arizona’s future high school graduation rates given only its new 2022 NAEP scores. By design, we consider only the relationship between current high school graduation rates and lagged (pre-pandemic) NAEP scores; we assume the impacts on graduating seniors in recent years due to pandemic-era learning loss is de minimis. This assumption appears generally safe given that national graduation rates increased between 2019 and 2022, even as NAEP scores and self-reported measures of student satisfaction with distance learning suggest K-12 educational quality declined over the same period. To the extent that learning loss will manifest itself in reduced probability to graduate high school, it must be the case that its effects occur with a lag.

Our model predicts that – given its 2022 scores and predicted impacts on graduation rates averaged across assessments – **the high school graduation rate for Arizona’s current K-12 cohort could be 1.5% lower than its predicted rate given 2019 assessment scores.** For context, according to the U.S. census, there were 1.2 million people in Arizona between the ages of 5 and 17 in 2021 and subject to the pandemic-era learning loss and its associated decline in expected educational outcomes (the K-12 “school aged population”).

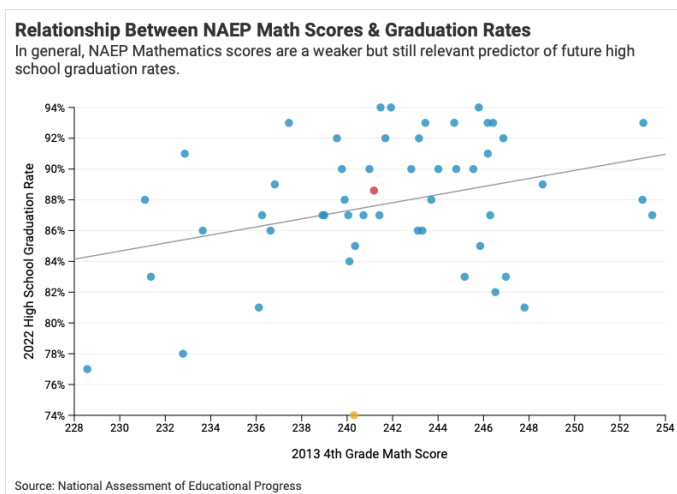
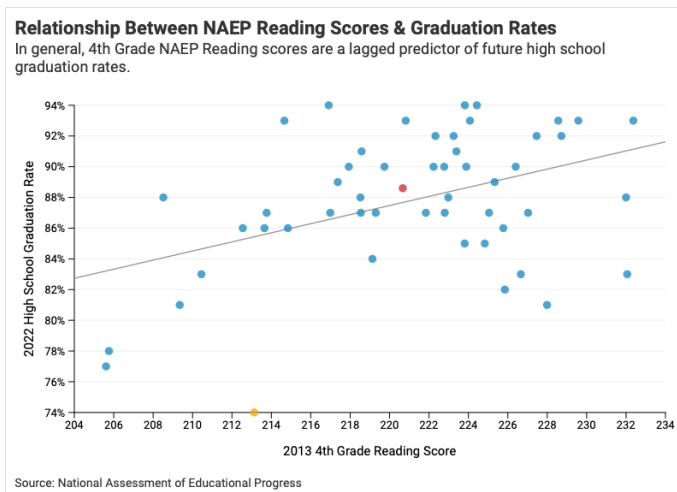


Figure 5

Because these predictions are based on a single year of NAEP assessment data given to only two grade-levels within the pandemic-era K-12 cohort (grades 4 and 8), we have assumed both that the learning loss is persistent for this cohort across time and that the measured losses for those grades are generally representative of equivalent losses for the cohort (roughly, people aged 5-17 in 2020/21) as a whole. While there is an absence of historical parallel for the 2020 school closures and associated learning loss, in general, NAEP scores are relatively persistent across time and past results are strong predictors of contemporary scores (Figure 1). This has been particularly true for Reading scores (which in turn are our strongest predictors of future graduation rates). To the extent scores break with past results in the long-term data, this appears correlated with policy changes intended to induce performance improvements.

This leaves open the question of whether the learning-loss is “one-time” and limited to the cohort unfortunate enough to have been directly exposed to pandemic-era classroom disruptions, or more persistent. Insufficient data exists as of now to answer it directly. For context, over 100,000 new five-year-olds enter the states K-12 system annually, and it has historically been a slow and difficult process to significantly increase NAEP scores. Should the apparent pandemic-era performance loss prove persistent even among incoming students and future K-12 cohorts, the implications could be significant and larger than modeled here (which assumes the impacts apply only to the pandemic-era cohort).

However, these results should be considered against both the backdrop of heavy state and local policy influence over high school graduation rates. Specifically, if policymakers respond to declining educational performance over the pandemic-period by suspending or relaxing standards, this may offset the predicted declines in graduation rates otherwise associated with lower NAEP scores. For example, according to a pre-pandemic analysis of the relationship between Assessment scores and graduation rates over the ten-year period ending in 2019, U.S. graduation rates increased while testing performance remained flat<sup>xxx</sup>. While on its face this may suggest the value of a high school diploma in terms of learning and skill-gain must be falling over time, even if true, this result does not conform to the apparent rising wage-and-social premium associated with that same diploma over time.

On the other hand, if student behavior observed during the pandemic – specifically, the rise in both “missing kids” who disenrolled from school altogether and in chronic absenteeism among the kids that remained<sup>xxxi</sup> – is persistent, it may prove more difficult for states to address the graduation-rate-risk through relaxed standards alone. After all, an unenrolled child cannot graduate, regardless of ease.

# The Economic Implications of Pandemic-Era Learning Loss in Arizona

According to the U.S. Census Bureau, there were 1,212,029 children and adolescents in Arizona’s pandemic-era K-12 (aged 5-17) cohort<sup>xxxii</sup>. As assessed in 2022, incoming 4th and 8th grade members of this cohort demonstrated marked declines in academic performance – ranging from a -0.2% decline in 4th grade Reading scores to a -3.3% decline in 8th grade Math scores.

Utilizing simple Ordinary Least Squares regression, CSI estimates that the aggregate change in scores between 2019 and 2022 (across all four grade and subject area tests) predicts a -1.5% decline in high school graduation rates for that cohort – if the performance changes for this population were persistent across time and grades.

Given American Community Survey data and assuming a uniform school-aged population distribution, we estimate that approximately 101,002 members of the pandemic-era cohort graduate high school annually beginning in 2021. The cohort will be fully graduated by 2032.

Given our predicted relationship between 2022 NAEP scores, academic performance, and future high school graduation rates, **we estimate that a persistent decline in academic achievement across this cohort and over the next decade will increase the Arizona population of non-high school graduates by 1,535 annually. This means a cumulative 18,419 fewer high school graduates across the cohort by 2032.**

As we have suggested, it is possible for states to ameliorate the impacts on high-school graduation rates through policy changes relaxing standards. However, graduation alone does not imply college- or career-readiness, and lower NAEP scores generally correlate with reduced rates of college completion. According to a 2013 review of NAEP scores and subsequent success in college or professionally, students needed to score at or above a 163 in Grade 12 Mathematics or 302 in Grade 12 Reading to be “academically prepared for college”<sup>xxxiii</sup>. At the time, fewer than 40% of K-12 students scored in that range.

Though we lack data yet on whether the decline in long-term NAEP scores will correlate well with decline in absolute 12th grade scores as a measure of student preparedness for college and/or their careers (the most recently available 12th grade NAEP scores are for 2019 and pre-date the pandemic), the Bureau of Labor Statistics provides annual data on college matriculation rates for recent high school graduates. Between 2019 and 2021, the matriculation rate nationally declines from 66.2% to 61.8% (-4.4%)<sup>xxxiv</sup>.



## The Consequences of Pandemic-Era Learning Loss in Arizona

**18,419**

Fewer High School Graduates by 2032

**26,281**

Fewer College Graduates by 2037

**1,558**

More Violent Crimes Annually

**Up to \$2.1 billion**

Cumulative Cost of Crime Over the Next 12-Years

**\$5.81 billion**

Cumulative State GDP Loss Through 2032 From Reduced Economic Opportunity

Also interestingly, matriculation rates did not recover after 2020 (though here the results vary by sex – women are again enrolling at pre-pandemic rates, while male enrollment rates have continued falling). Given that these trends have persisted after 2020, it is plausible that this is the result of some persistent change in behaviors of the current K-12 cohort overall and not **solely** the result of one-time pandemic disruptions. And it is further plausible that these behaviors are at least partially attributable to reduced academic preparedness attained during the pandemic period. However, less academic progress and fewer high-school graduates due specifically to the pandemic will further exacerbate this problem and result in fewer college-graduates among the pandemic-era K-12 cohort than would have occurred.

Given the decline in high school-to-college matriculation rates since 2019 and assuming this change is persistent across the entire cohort, **pandemic-era learning loss could lead to an additional 26,281 fewer Arizona college graduates over the roughly 12-year period beginning in 2026, or 2,190 fewer college graduates annually.** We assume a six year lag between the start of the cohorts learning loss and when the but-for college graduating population would have begun entering the state’s workforce.

We assume that learning loss is largely marginal. That is, the population of students who will not graduate high school due to pandemic-era learning loss is independent of the population who will not attend college (they are drawn from different segments of current K-12 aged cohort).

## Implications For Crime Rates

Given prior research by Lochner and Moretti, a 1.5% decrease in the high school graduation rate could be associated with a 1.2% increase in the state’s violent crime rates and a 0.9% increase in the state’s property crime rate. According to the Arizona Department of Public Safety, in 2022 there were 28,183 reported cases of violent crime and 206,478 cases of property crime<sup>xxxv</sup>.

Decreases in the high school graduation rate associated with pandemic-era learning loss, then, could lead to an additional 338 violent and 1,858 property crimes being committed in Arizona annually. Miller et. al. posit that only 21.7% of crimes are ultimately reported, suggesting the true increase in criminality could be 1,558 violent and 8,562 non-violent crimes annually. This general increase in criminality could lead to an additional 383 individuals being incarcerated at state prisons, given 2019 incarceration rates reported by the Department of Corrections.

It is difficult to predict the points in time at which the increased incidence of criminality would occur, given the limitations of existing post-pandemic data and the existing research. However, assuming the learning-loss and associated declines in high school graduation rates were both persistent across the pandemic-era K-12 cohort and limited to just that cohort, we can likely expect graduation rates to fall over the 10-12 years immediately following the pandemic before rising again. Correspondingly, crime rates would rise due to this learning loss before falling again thereafter as outcomes normalize – this can happen over decades and be difficult to estimate and track as different cohorts and generations interact over time.

Research by Miller et. al. (2020) estimated the average cost of all violent crime at \$91,110 per incident, and for all non-violent crime (including impaired driving) at approximately \$3,886. This is estimated lifetime direct and indirect social costs, including from public services (policing, incarceration, etc.). CSI estimates the increase in criminality due to pandemic-era learning loss would cost Arizonans between \$38.1 and \$175.1 million annually, or a cumulative \$456 million to \$2.1 billion over the next 12 years. If learning loss associated with the 2020 disruptions and declining assessment scores is persistent beyond just the current K-12 cohort, these costs could persist.



## Implications For Employment & Income

Evidence for reduced employment rates and professional income given reduced educational attainment is strong. In general, data from the Bureau of Labor Statistics suggest that an 18,419-person increase in the state population without a high school diploma and 26,281-person increase in the population without a college degree would reduce employment by 742 persons and reduce Arizona household income by \$900.5 million. Losses would accumulate linearly over the 12-year cohort graduation period between 2021 and 2032 and persist thereafter until those workers left the labor force. Conditional on these losses being transitory, the economy would slowly normalize thereafter; if the losses are persistent, losses would be cumulative and compounding for decades.

An economy is dynamic – the consequences of job and income losses are not limited to the directly affected population. Reduced spending and economic activity would affect other areas of the states’ economy, and these dynamic impacts would compound over time. To model the overall economic impact of pandemic-era learning loss in Arizona over the next decade, CSI uses the Regional Economic Models, Inc. (REMI) Tax-PI model. This is a dynamic program that estimates the impacts of changes in regional economies using a representative sample of national and state-level macroeconomic data in an input-output model. The program accepts as inputs a variety of macroeconomic data, including employment and various measures of income.

To estimate the economic impacts of this learning loss, specifically, we modeled the aggregate economic losses associated with 742 fewer jobs in 2032 and the loss of \$900.5 million in personal income (growing linearly from \$75 million in 2021). We assume that the income losses would come principally from reduced compensation (wage, salaries, and other primary income from work), though it is likely that some of these income losses would be offset by increases in personal transfer receipts in the form of increased public benefits. Actual wage and salary losses, in fact, are likely to exceed the \$900.5 million aggregate net impact on personal incomes after increased public support due.

Given these assumptions and inputs, we estimate the Arizona economy in terms of state GDP would be \$800 million smaller in 2032 than it would have been without the pandemic-era learning loss and associated reductions in economic opportunity. Net economic impacts consider the aggregate impacts of job and population losses, reduced personal income, and offsetting growth from reallocation of activity into other less-impacted sectors.

These economic impacts are independent of and in addition to the separately estimated costs of crime, which did not rely on the Tax-PI simulation. Cumulative economic losses over the 12-year period 2021-2032 are \$5.81 billion, while combined statewide employment and personal income losses by 2032 are 8,083 jobs and \$1.7 billion in Personal Income<sup>1</sup>.

Category	Output (Millions of \$)	Employment
Direct	(\$127)	(742)
Indirect	(\$32)	(181)
Induced & Dynamic	(\$1,140)	(7,160)
<b>Total</b>	<b>(\$1,299)</b>	<b>(8,083)</b>

Source: REMI Tax-PI

Figure 6

<sup>1</sup> Because by assumption the learning loss – and social and economic implications of it – apply to an entire cohort of young people aged 5-17 during the pandemic, it takes time for those impacts to distribute across the entire workforce. Specifically, fully realizing all impacts takes 10-15 years as impacted students proceed through the education system and enter the workforce.

# Fiscal Policy Responses to Pandemic Learning Loss So Far

According to the Peter G. Peterson Foundation, since mid 2020 more than \$4 trillion in federal funds have been distributed to states, businesses, and individuals for relief from Covid-19 and associated public policy interventions<sup>xxxvi</sup>. More than \$277 billion<sup>xxxvii</sup> was earmarked specifically for schools, school districts, universities, and other state and local educational providers. While one might think the primary intent of these investments was to remediate the negative impacts of the pandemic on students and educational service providers, in practice the programs provided wide discretion to recipients over ensuring the money was allocated to remediate learning loss. According to a report by Arizona’s Auditor General, the state’s public District and Charter schools have received more than \$4.5 billion in supplemental federal funding under these programs. As of mid-2022, only about half of that money had been spent (\$2.22 billion). Though specific federal rules for the myriad funding programs are opaque, in general it appears unspent monies revert to the U.S. Treasury around September 30, 2024. For context, prior to the pandemic total spending at all levels on Arizona K-12 education was about \$12 billion per year.

The Auditor General does not separately track and report spending by public schools to remediate “learning loss”, which is an allowable use under the various federal education relief grant programs. However, the state does track and report spending on classroom and non-classroom activities, and within those umbrellas, further tracks spending on “new programs and curriculum to address learning loss and unique student needs”. The Auditor General defines “new programs” as including, for example, summer classes and after-school programs. However, federal guidelines often include parallel activities (like social and emotional support) within “learning loss” designations, again making it difficult to know what kinds of activities are being reported inside of these broad categories.

For purposes of producing an estimate, though, CSI has taken the subset of AG-tracked expenditures by Arizona’s public schools within **both** “new programs and curriculum” **and** “classroom spending”. We have excluded all spending that is either not on new programs or outside of the classroom. **Using this approach, CSI estimates that Arizona’s public District and Charter schools have spent just \$134 million on addressing learning loss. This amounts to only 6% of their total federal emergency support.**

According to the Auditor General reporting, over half of allocated expenditures to-date have gone to “maintaining operations”, which auditors define as “payments to continue employing existing staff and payments for other planned operating costs”. Since 2020, however, combined state and local funding for K-12 education in Arizona has increased 30%, and unlike during the Great Recession, the state never reduced or suspended baseline maintenance and operations funding support during the pandemic period.

## THE BOTTOM LINE

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More than two years after the pandemic and its associated disruptions of K-12 education, we are beginning to receive objective proof of the harm those policies had – including the largest declines in the NAEP long-term assessments of academic learning ever recorded. This will have lasting social consequences for Arizona – fewer kids prepared for college and careers, increased crime, and cumulative combined costs of as much as \$7.91 billion over the next 10-12 years.

Policymakers should redouble their efforts on both reversing learning losses among the pandemic-era K-12 cohort (kids aged 5-17 in 2020-2021) and ensuring those losses are not permanent and don't impact future cohorts.

This paper in some ways is a warning – because it will take years for the losses from the pandemic to manifest as today's young people mature, there is opportunity to both prevent future harm and undo some of the damage caused in the past few years. If academic performance for the pandemic-era K-12 cohort improves going forward the social and economic impacts would be smaller than estimated here.

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