



DECLINES RELATIVE TO THE NATION IN ARIZONA'S GOVERNMENT FINANCE, EDUCATIONAL ATTAINMENT, AND ECONOMIC PERFORMANCE

January 2020

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SUMMARY

In the late 1960s into the early 1970s and relative to the national average, the level of revenue collected by the state government of Arizona declined substantially as a share of the state's personal income. A similar decrease in relative state government expenditures occurred, affecting a number of public programs, including education. Beginning in the 1970s, Arizona experienced decreases relative to the U.S. average in the educational attainment of its residents and in measures of productivity and prosperity.

Further declines in state government revenue relative to the U.S. average have occurred since the early 1970s, particularly since the early 1990s, accompanied by further relative decreases in state government spending. State government general fund revenue per \$1,000 of personal income fell 33 percent between the early 1990s and the last fiscal year, or a total of \$5 billion. In the mid-1960s, Arizona state and local government revenue per \$1,000 of personal income was 20 percent above the national average; by fiscal year (FY) 2017, it was 16 percent below average.

Funding for education has not been spared from these cutbacks. In FY 2017, state and local government revenue per elementary and secondary school student was 40 percent below the U.S. average. To have equaled the national per student average in FY 2017, after adjusting for the state's lower cost of living, an additional \$4.69 billion in revenue was needed. In FY 2017, educational appropriations per FTE student in higher education was 31 percent below average in Arizona. To have equaled the national per student average, revenue would have needed to be \$688 million higher after adjusting for the cost of living. Summing the K-12 and higher education funding shortfalls in Arizona from the national average results in a total of \$5.4 billion in FY 2017 after adjusting for the cost of living.

The educational attainment of Arizonans continues to decline relative to the national average. Among those 25 and older, the share with at least a bachelor's degree fell from 18 percent above average in 1970 to 9 percent below average in 2018.

The state's productivity and prosperity also continues to decrease relative to the U.S. average. Arizona's 2018 figures for GDP per worker and earnings per worker were 8-to-9 percent below the U.S. average after adjusting for the cost of living. Per capita GDP and per capita earnings were between 19-and-20 percent below average after adjusting for living costs. The state's figures had been close to the national average in the early 1970s.

With the relative declines in the state's prosperity, demand for public assistance programs has increased. In fiscal year 2019 — nine years after the end of the last recession — 11.6 percent of Arizonans received nutrition assistance (food stamps) and 26.2 percent were enrolled in the state's version of Medicaid, the public health program for those with limited incomes.

Unless substantial changes are made to the state's support for public programs, particularly education, declines are likely to continue in Arizona relative to the nation in the educational attainment of its residents and in measures of productivity and prosperity, causing demand for public assistance to continue to rise. A simulation of Arizonan's version of Medicaid suggests that increases in the caseload and in costs per person will lead to significantly higher fiscal burdens for state government over the next 30 years.

INTRODUCTION

This paper is an update and extension to the September 2018 Office of the University Economist paper “The Relationship Between Government Finance, Educational Attainment, and Economic Performance” (<https://wpcarey.asu.edu/sites/default/files/taxeducon09-18.pdf>). The summary of that paper begins

“Across the states, a positive relationship exists between indicators of public finance, educational attainment, and economic productivity and prosperity. After adjusting for geographic differences in the cost of living, states with higher levels of overall state and local government revenues and expenditures, measured per person, and higher levels of education funding, measured per student, generally have greater educational attainment among the adult population, and greater productivity (such as per worker gross domestic product) and prosperity (such as per capita personal income). States with lower levels of public finance tend to have lower educational attainment, productivity, and prosperity.”

The summary continued, stating that

“In contrast to the economic indicators that measure productivity and prosperity, economic indicators of the aggregate rate of growth, such as gross domestic product and employment, are unrelated across the states to changes in public finance and educational attainment, expressed relative to the national average.”

The following analysis concentrates on Arizona relative to the national average, exploring how the state’s relationship to the nation has changed over time on measures of aggregate growth, productivity, prosperity, education, and public finance, with a particular focus on education funding.

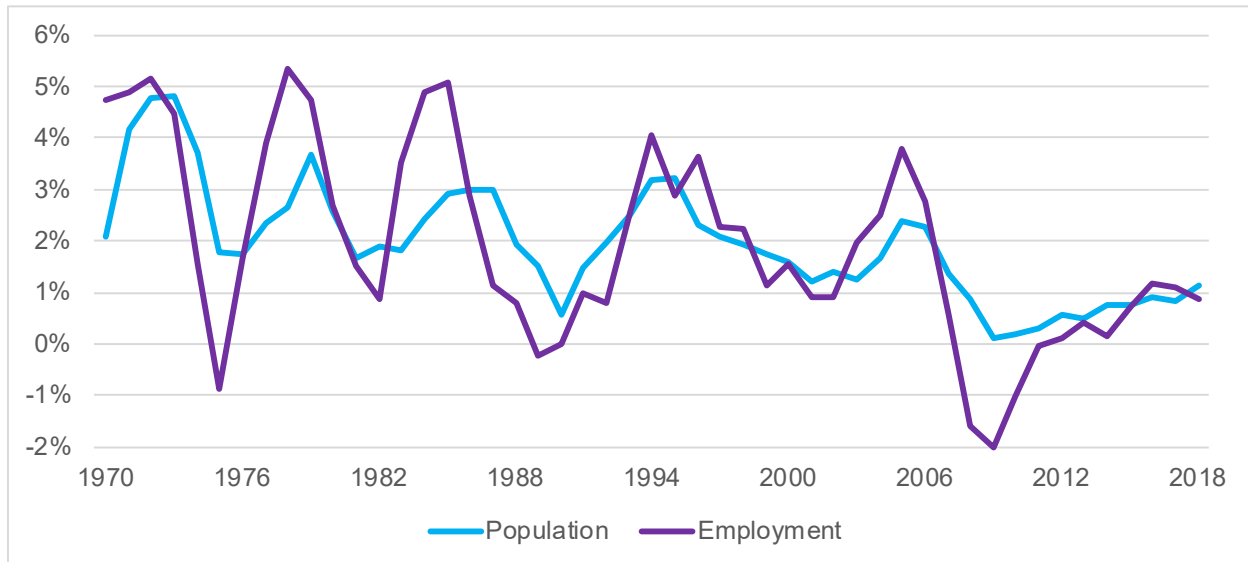
AGGREGATE GROWTH RATES

Nationally, the growth rate of aggregate economic measures is cyclical, rising and falling with the economic cycle. Cyclicity is more extreme in Arizona than the national average and affects population growth as well as economic growth, as seen in Chart 1.

As measured by the percent change, aggregate growth rates in Arizona have trended down relative to the nation since the early 1970s. Some downtrend is natural given the state’s rapid increase in population size — as the base becomes larger, a constant numeric change translates to an ever smaller percent change. In 1970, Arizona’s population of less than 1.8 million ranked 33rd among the states; its 2018 population of 7.1 million was four times greater and ranked 14th.

Since the mid-2000s, aggregate growth rates in Arizona have slowed versus the national average by more than the natural downtrend. The 2008-09 recession was unusually severe, and the expansion since the end of the recession has been relatively weak, in Arizona relative to the nation. Arizona’s population and employment growth rates during the current expansion have peaked at about 1 percentage point higher than the national average. In prior expansions, population growth in Arizona peaked at more than 2 percentage points higher than the nation and employment growth reached at least 4 percentage points above the national average. As a percentage of the national total, the number employed in Arizona in 2018 still was less than it had been in 2007, highlighting Arizona’s poor performance since the mid-2000s.

CHART 1
AGGREGATE GROWTH MEASURES, ANNUAL PERCENT CHANGE,
ARIZONA MINUS THE NATIONAL AVERAGE



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

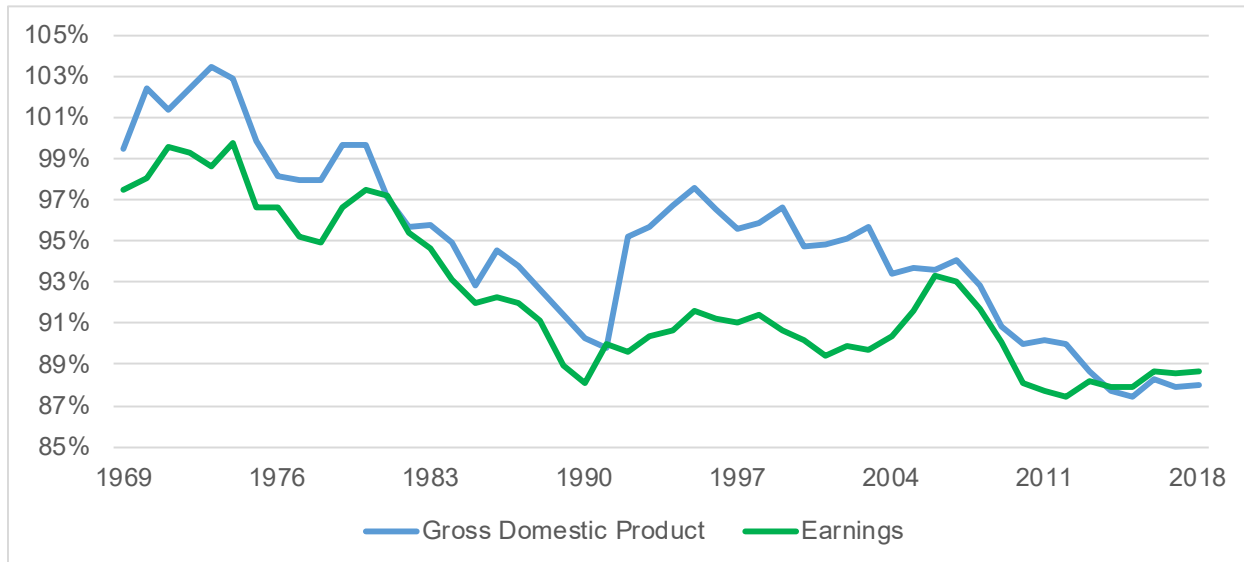
Economic development, however, is not about fast aggregate growth and becoming larger. Instead, the goal is to increase prosperity, which largely is accomplished through gains in productivity.

PRODUCTIVITY AND PROSPERITY

In this section, the time series of Arizona's productivity and prosperity relative to the nation are evaluated based on dollar measures that are not adjusted for regional variations in the cost of living, since consistent estimates of living costs by state are available only for the years from 2008 through 2017. Arizona's cost of living relative to the nation followed the economic cycle from 2008 through 2017, dropping from 0.6 percent above average in 2008 to 4 percent below average in 2014, then rising slightly to 3.4 percent below average in 2017. The historical data that are available suggest that the cost of living in Arizona likely has varied from near average to a little less than the national average over the last several decades. Thus, the cost of living is not a significant issue when comparing Arizona to the nation.

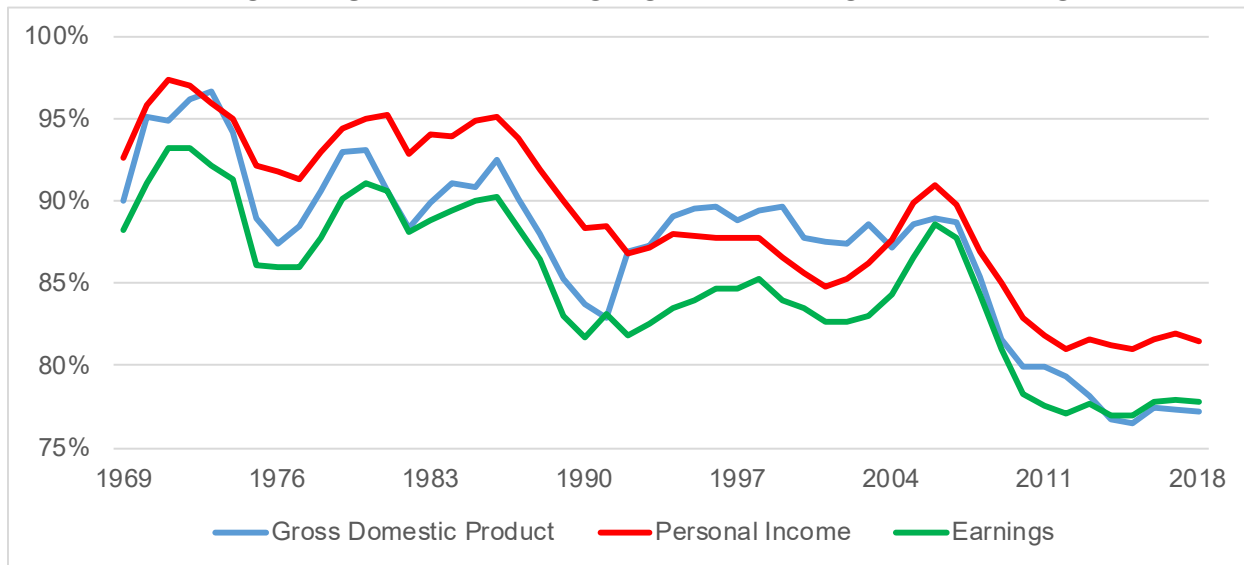
True measures of productivity are not available for subnational regions. Per worker measures provide a crude substitute. Total employment reported by the U.S. Bureau of Economic Analysis (BEA) is used to calculate the per worker values; 1969 is the first year of employment data. Arizona's per worker measures are expressed as a percentage of the national figures in Chart 2. Arizona's gross domestic product (GDP) per worker and earnings per worker relative to the nation are somewhat cyclical. Generally, they have trended down since the early 1970s, when GDP per worker in Arizona exceeded the national average and earnings per worker was close to average. After adjusting for the cyclical, the magnitude of the downtrend has varied over the last five decades, and the downtrend was interrupted in the mid-to-late 1990s. The greatest declines occurred during the 1980s and since the mid-2000s. Hardly any cyclical recovery has

CHART 2
PER WORKER MEASURES,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Bureau of Economic Analysis.

CHART 3
PER CAPITA MEASURES OF PROSPERITY,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Bureau of Economic Analysis.

occurred since the end of the last recession, with the 2018 figures for GDP per worker and earnings per worker 11-to-12 percent below the U.S. average (8-to-9 percent below average after adjusting for the cost of living).

Three per capita measures of prosperity are shown in Chart 3. The prosperity measures are further below the national average, have been more cyclical, and also have experienced a greater downtrend, than the proxy measures of productivity. In the early 1970s, per capita personal income and per capita GDP were within 3 percent of the U.S. average (likely nearly average after considering the cost of living). As with the productivity measures, the downtrend in the prosperity measures since the early 1970s was interrupted during much of the 1990s. The largest declines in prosperity in Arizona relative to the nation have occurred since the mid-2000s; the other period of significant relative decrease was from the mid-1980s into the early 1990s. As with the productivity measures, hardly any cyclical recovery has occurred since the end of the last recession. By 2018, per capita personal income was 19 percent below average (16 percent below average after adjusting for living costs). Per capita GDP and per capita earnings were between 22-and-23 percent below average (19-to-20 percent below average after adjusting for living costs).

Other measures of prosperity are available, such as average household income. The September 2019 Office of the University Economist paper “Causes of Arizona’s Low Incomes” (<https://wpcarey.asu.edu/sites/default/files/income09-19.pdf>) provides an in-depth discussion of the factors contributing to the relative decline in Arizona’s incomes. Prominent among these factors is education, which is a key component of productivity.

EDUCATIONAL ATTAINMENT AND ACHIEVEMENT

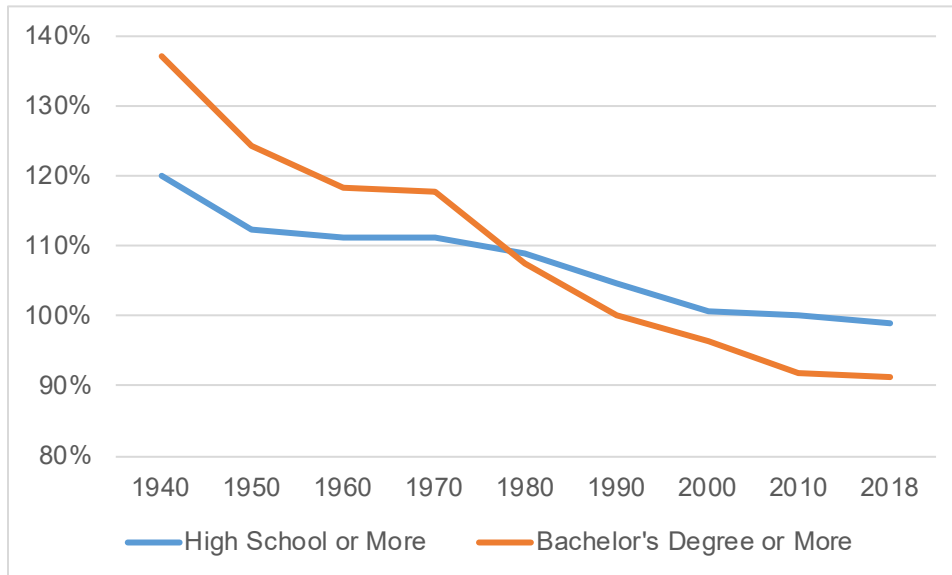
Evaluations of education across regions typically focus on educational attainment, though measures of educational achievement such as test scores also are examined. The topic was discussed in the October 2018 Office of the University Economist paper “An Examination of Public Education in Arizona Compared to the Nation” (<https://wpcarey.asu.edu/sites/default/files/pubeduc10-18.pdf>). Selected portions of that report are updated in this section and in the education funding section later in this paper.

Attainment

Historically, educational attainment in Arizona exceeded the national average, as seen in Chart 4. In 1960 and 1970, the proportion of adults age 25 and older with at least a high school diploma was 11 percent higher in Arizona than the U.S. average; the differential was 18 percent for those with at least a bachelor’s degree. On both measures of attainment, Arizona began to decline relative to the nation during the 1970s. The share in Arizona with at least a bachelor’s degree fell below average after 1990; the share with at least a high school diploma dropped below average after 2010. Small relative declines in each measure continue; Arizona’s share with at least a bachelor’s degree was 9 percent below average in 2018.

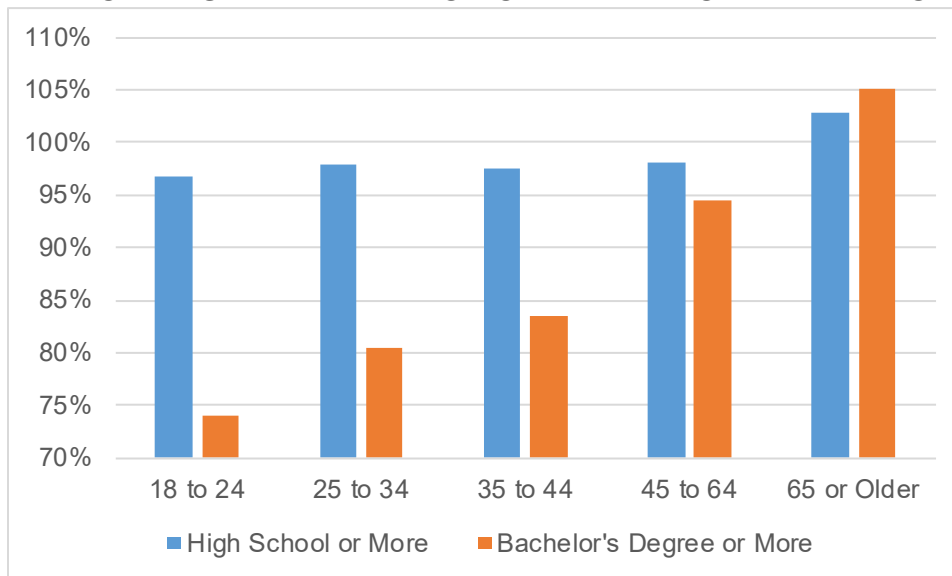
Using the standard measure of educational attainment of those 25 and older camouflages the extent of Arizona’s educational attainment shortfall among those of working age. As seen in Chart 5, Arizona’s senior citizens are more highly educated than their national counterparts,

CHART 4
EDUCATIONAL ATTAINMENT,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau, decennial census (1940 through 2000) and American Community Survey (2010 and 2018).

CHART 5
EDUCATIONAL ATTAINMENT BY AGE GROUP IN 2018,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau, American Community Survey.

Note (Charts 4 and 5): The proportions of the population aged 25 and older in Arizona with at least a high school diploma and with at least a bachelor's degree are shown as a percentage of the national proportions.

while the percentage with at least a bachelor's degree among those younger than 45 is far below average in Arizona.

As measured by the percentage with at least a high school diploma, Arizona's educational attainment improved relative to the nation between 2000 and 2018 among those younger than 35, but the state's attainment versus the nation fell among those 45 and older. As measured by the percentage with at least a bachelor's degree, Arizona's attainment worsened relative to the nation between 2000 and 2018 in each age group 25 and older, with the largest relative drop among those 65 and older.

The relative decline in Arizona's educational attainment after 1970 corresponds to the state's relative decrease in measures of productivity and prosperity. While causality can be difficult to prove, it is highly likely that the state's relative declines in educational attainment at least in part caused its relative declines in productivity and prosperity.

Achievement

In addition to the state's shortcomings on educational attainment, Arizona's students compare unfavorably to their national peers on measures of achievement. The National Assessment of Educational Progress (also known as the Nation's Report Card) tests public-school fourth-grade and eighth-grade students from across the nation on reading and mathematics in odd-numbered years (prior to 2003, the tests were given at irregular intervals). The earliest of these test results are from 1990. Since only a small sample of students in each state take the test, the results by state are subject to considerable sampling error. Results for any year need to be interpreted cautiously.

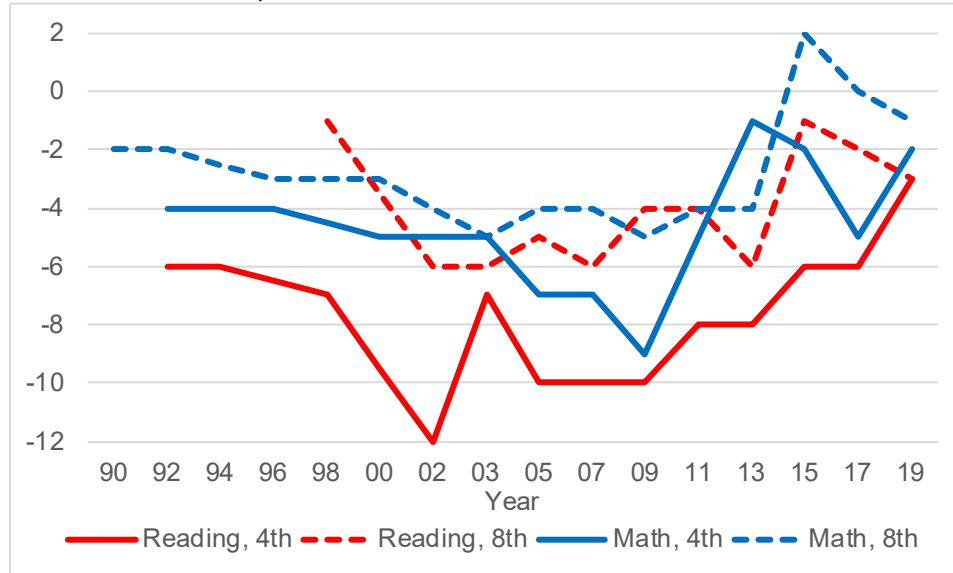
The record of Arizona's performance relative to the national average is shown in Chart 6; the fluctuations by year likely reflect sampling error. In general, Arizona's results were inferior to the national average during the 1990s. The comparison worsened during the 2000s, but in recent years, Arizona's results relative to the nation have improved, back to, or better than, those of the 1990s. Still, Arizona scored below the national average on each of the four tests in 2019 and has equaled or exceeded the national average only on eighth-grade mathematics in 2015 and 2017.

PUBLIC FINANCE

In this section, an overview of public finance in Arizona is presented in order to provide context for the later analysis of public education funding in Arizona. Two sources of public finance data are examined:

- Arizona Joint Legislative Budget Committee (JLBC). Detailed data are available from the JLBC. General fund revenue by type is available from fiscal year (FY) 1971 through FY 2019. General fund expenditures by department (state agency) are available from FY 1979 through FY 2020. Expenditures from other state funds and not-appropriated but authorized spending by department are available from FY 1989 through FY 2020. (For FY 2020, the figures are the budgeted amount.) The not-appropriated category consists of funding from sources other than state government, largely from the federal government. The primary drawback of the JLBC's data is that it cannot be compared to data for the nation or other states due to differing accounting systems.

CHART 6
TEST SCORES, ARIZONA MINUS THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Education, National Assessment of Educational Progress (Nation's Report Card).

- U.S. Census Bureau, annual survey of state and local government finances. State and local governments from each state provide data to the Census Bureau, which standardizes the data using a single accounting system. Thus, Arizona can be compared to other states and to the nation. In order to compare states, state government and local government finance data must be combined due to variations by state in the level of government responsible for various public functions. The revenue data are presented by type (for example, property tax) and the expenditure data are presented by government function (for example, education). The data series begins in FY 1964. The primary drawback of the Census Bureau's data is its lag — the latest data are for FY 2017.

In order to examine the change in revenues and expenditures over time, population growth, inflation, and changes in the ability to pay taxes (due to changes in prosperity) must be controlled for. This is accomplished by expressing government finance figures per \$1,000 of personal income.

State Government Finance in Arizona

According to the JLBC, the state government's overall budget — total authorized spending — for FY 2020 is \$40.6 billion. The majority (62.2 percent, \$25.3 billion) is in the category of not-appropriated funding. The general fund (\$11.2 billion) accounts for 27.6 percent of the total, while the remaining 10.2 percent (\$4.1 billion) comes from a number of specialized state government funds. Over time, the general fund's share of the total has decreased — it was 45 percent in FY 1991 — while the shares of the other categories have increased.

The state government's general fund — the primary source of funding for K-12 education — has experienced a sharp reduction in revenue per \$1,000 of personal income since the early 1990s due to numerous tax law changes, the vast majority of which have narrowed tax bases and/or

reduced tax rates. The cumulative effect of the tax law changes was a loss of tax revenue of \$5 billion in fiscal year 2019. Actual general fund tax revenue was \$11.3 billion. Had no tax law changes occurred, tax revenue in FY 2019 would have been 44 percent higher. Nontax revenue also has dropped over time relative to personal income; taxes accounted for 96 percent of total general fund revenue in FY 2019, the same share as in FY 1971.

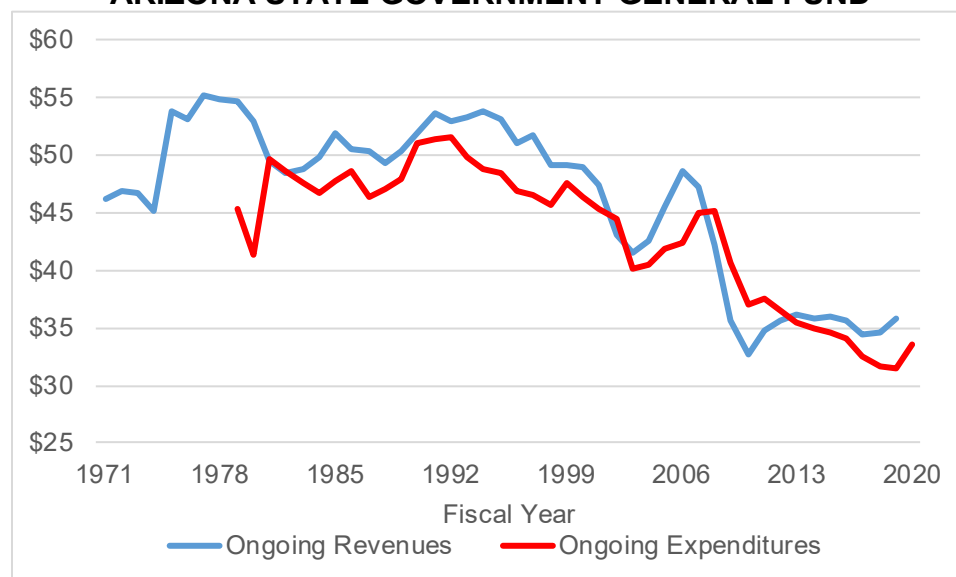
As seen in Chart 7, general fund revenue relative to personal income is cyclical, with the degree of cyclicity increasing as a result of the tax law changes. In recent years, 90 percent of general fund revenue has come from just two cyclical sources: the income tax and the sales tax. Of particular interest is the minimal cyclical rebound in revenue per \$1,000 of personal income since the last recession, corresponding to the weak economic expansion.

Because of the state's balanced-budget provision, the large decline in general fund revenue per \$1,000 of personal income since the early 1990s has necessarily resulted in a similarly large decrease in general fund expenditures. As seen in Chart 7, expenditures per \$1,000 of personal income continued to decrease through FY 2019, nine years after the end of the last recession.

State and Local Government Finance in Arizona Relative to the National Average

The Census Bureau reports revenue collected directly by state and local governments — own-source revenue — and revenue received from the federal government. The federal government's

CHART 7
ONGOING REVENUES AND EXPENDITURES PER \$1,000 OF PERSONAL INCOME, ARIZONA STATE GOVERNMENT GENERAL FUND



Note: Revenue data, which are expressed prior to the subtraction for urban revenue sharing, are through fiscal year 2019; the FY 2019 figures are preliminary. Expenditures extend through FY 2020; the FY 2020 figures are appropriations. Personal income for FY 2020 is projected.

Source: Calculated from Arizona Joint Legislative Budget Committee (revenues and expenditures) and U.S. Department of Commerce, Bureau of Economic Analysis (quarterly personal income).

share of total revenue in Arizona has varied from a low of 12 percent in the late 1980s to a high of 31 percent in FY 2017. Nationally, the federal government's share has not ranged as widely, from 15 percent in FY 1964 to 25 percent in FY 2010.

The time series of Arizona's revenue per \$1,000 of personal income is shown in the top graph of Chart 8 expressed as a percentage of the national average. Own-source revenue relative to personal income was approximately 20 percent higher than the national average in the mid-1960s but dropped to the national average by the early 1970s.

Expenditures are divided by the Census Bureau into capital outlays (purchases of land, buildings, and major equipment) and noncapital expenditures. In Arizona, capital outlays as a share of total expenditures ranged from 28 percent in FY 1967 to 8 percent in FY 2016; the national range was from 25 percent in FY 1964 to 10 percent in FY 2015.

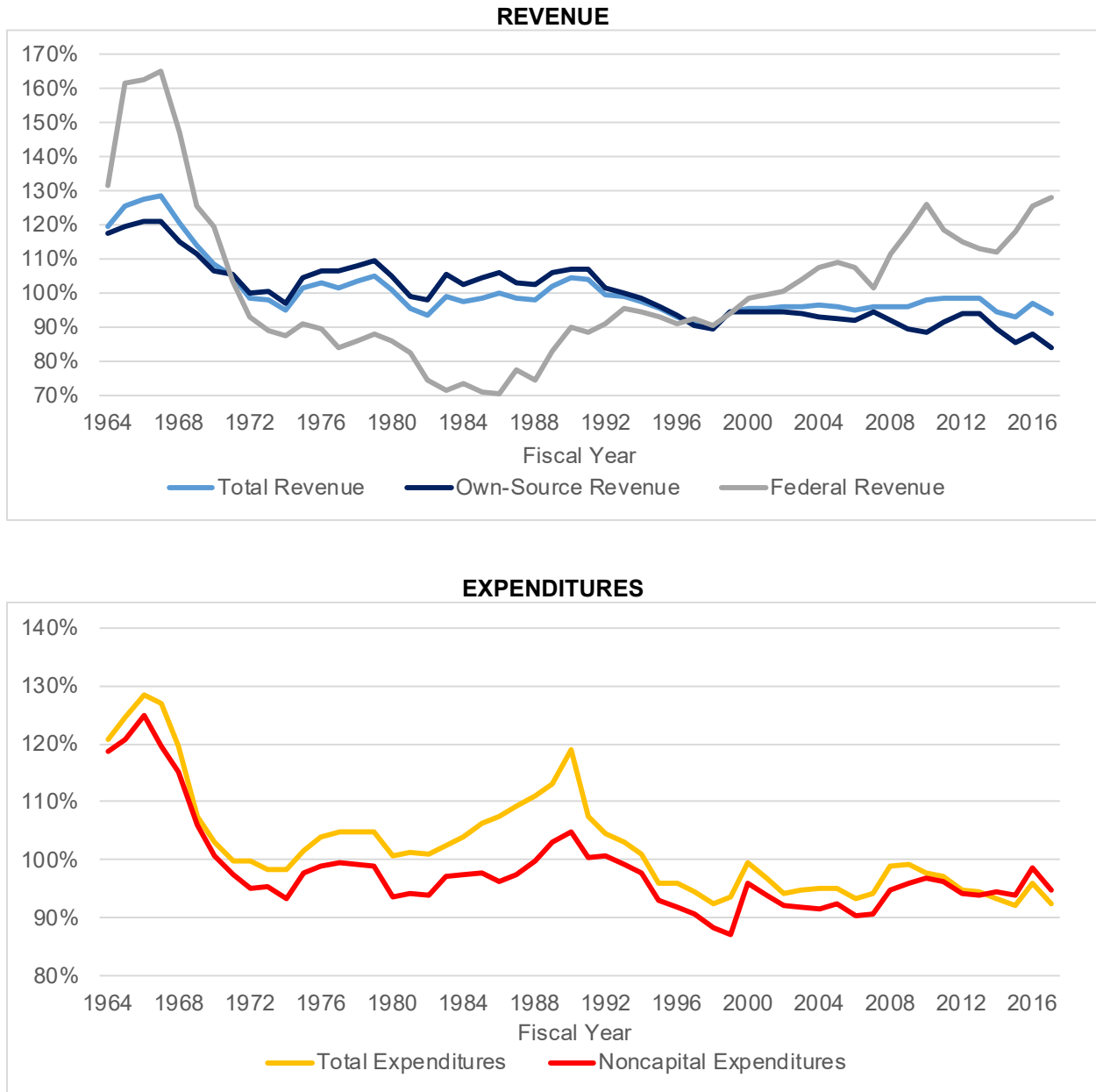
The time series of Arizona's total expenditures and noncapital expenditures per \$1,000 of personal income is shown in the bottom graph of Chart 8 expressed as a percentage of the national average. Noncapital expenditures relative to personal income were approximately 20 percent higher than the national average in the mid-1960s but dropped to below the national average by the early 1970s. In contrast, capital outlays relative to personal income remained considerably higher than the U.S. average.

The large decline in both state government and combined state and local government revenues and expenditures in Arizona relative to the nation between during the late 1960s and early 1970s corresponds to a U.S. Supreme Court decision in April 1966. The Court held that both houses of a state legislature must be apportioned substantially on a population basis. Until this decision, the Arizona Senate consisted of two members per county. House membership was based on the number of votes cast for governor at the last general election.

Prior to the Court's decision, the Democratic Party had dominated the Arizona Legislature since statehood, generally holding more than two-thirds of the seats in both chambers of the Legislature. At the time of the Court's decision, Democrats held 26 of 28 senate seats and 45 of 80 house seats. The U.S. Supreme Court's decision greatly shifted membership in the Senate from the less-populous rural counties to Maricopa County, a Republican stronghold. The number of Republican senators increased from two of 28 to 16 of 30 after the 1966 election. The Republican Party also gained in the House, winning 33 of 60 seats, and won the governorship. The first budget that was determined by the Republican majority was for FY 1968, when Arizona began to decline relative to the nation in the various measures of revenues and expenditures. The relative declines temporarily ceased when the Democrats regained the majority in the Senate and also won the race for governor in the 1974 election.

Based on the Census Bureau's data, own-source revenue per \$1,000 of personal income in Arizona as a percentage of the national average fluctuated without trend from the early 1970s into the early 1990s. The percentage trended down after the early 1990s, dropping to 16 percent below average in FY 2017. Total revenue per \$1,000 of personal income in Arizona relative to the nation has not experienced as much of a downtrend due to a strong increase in federal government revenue after the mid-1980s.

CHART 8
STATE AND LOCAL GOVERNMENT REVENUES AND EXPENDITURES
PER \$1,000 OF PERSONAL INCOME,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau (revenues and expenditures) and U.S. Department of Commerce, Bureau of Economic Analysis (personal income).

Since the early 1970s, noncapital expenditures per \$1,000 of personal income have fluctuated in Arizona relative to the national average, but generally have been about 5 percent below the national average. Total expenditures, including capital outlays, did not drop as much during the late 1960s and early 1970s, but experienced another relative decline during the 1990s. Capital outlays per \$1,000 of personal income have ranged widely in Arizona as a percentage of the U.S. average, from more than 170 percent of the average in each year from FYs 1985 through 1990 to less than 80 percent from FYs 2015 through 2017.

In conclusion, an abrupt shift occurred in the late 1960s and early 1970s in Arizona, from above-average government revenues and expenditures relative to the ability of the state's residents to pay taxes and fees to below average. Arizona's revenues and expenditures per \$1,000 of personal income have fallen further below average since the early 1970s, particularly since the early 1990s.

PUBLIC ASSISTANCE

With the relative decline in prosperity in Arizona, one would expect an increased demand for public assistance. The degree of increase is difficult to determine due to numerous changes over time to the state's public assistance programs, including eligibility rules.

The Family Assistance Administration of the Arizona Department of Economic Security (DES) in its "Statistical Bulletin" (<https://des.az.gov/documents-center>) reports figures for three public assistance programs monthly:

- Temporary Assistance for Needy Families (TANF): the number of families and individuals enrolled in the program and the total cash issuance.
- Supplemental Nutrition Assistance Program (SNAP): the number of families and individuals enrolled in the program and the total cash issuance.
- Medical Assistance: the number of individuals enrolled.

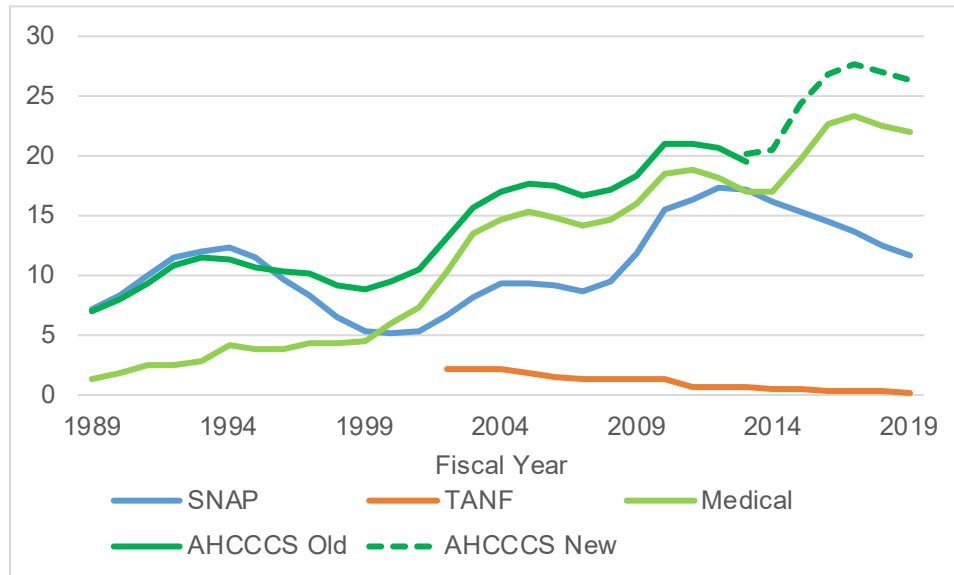
Data extend back to 1988, though the TANF program did not begin until 2001.

The Arizona Health Care Cost Containment System (AHCCCS) also reports program participation figures monthly in its "AHCCCS Population Highlights" (<https://www.azahcccs.gov/Resources/Reports/population.html>). The Medical Assistance figures from the DES represent a subset of the AHCCCS population.

The monthly average number of recipients in the various public assistance programs per 100 residents is shown by fiscal year in Chart 9. Caution is necessary in interpreting the time series due to a number of changes to each program over time that have affected the number eligible. In addition, the per capita number of recipients varies with the economic cycle.

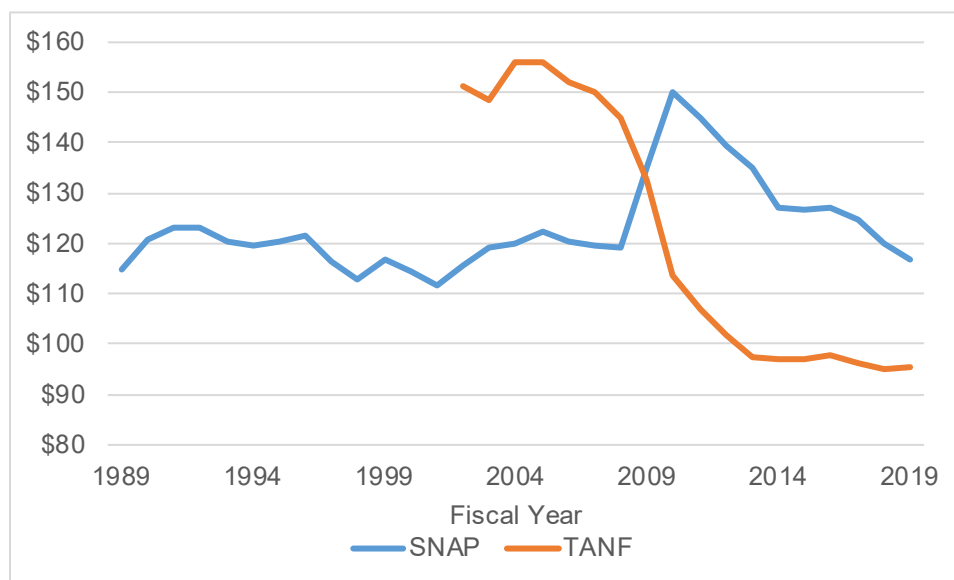
The SNAP, formerly called food stamps, is a means-tested federal program to provide food assistance to low-income households that is administered by states, which have some control over the program's rules. Changes to the program in 1996 had the effect of reducing participation rates, while a temporary increase in benefits from April 2009 through November 2013 is responsible for the increase in the average payment seen in Chart 10. Otherwise, the inflation-adjusted average monthly payment has not changed much while the number of recipients per 100

CHART 9
NUMBER OF PUBLIC ASSISTANCE RECIPIENTS PER 100 RESIDENTS,
ARIZONA



Sources: Calculated from Arizona Department of Economic Security, Family Assistance Administration, Statistical Bulletin (SNAP, TANF, and Medical), Arizona Health Care Cost Containment System, and Arizona Office of Economic Opportunity (population).

CHART 10
PUBLIC ASSISTANCE PER RECIPIENT,
INFLATION-ADJUSTED MONTHLY AVERAGE, ARIZONA



Sources: Calculated from Arizona Department of Economic Security, Family Assistance Administration, Statistical Bulletin and U.S. Department of Labor, Bureau of Labor Statistics (Consumer Price index).

residents has trended up, but also displays strong cyclical. The decline in the number of recipients per 100 residents since the FY 2012 peak is due to improving household finance during the long economic expansion. In FY 2019, the share of the Arizona population enrolled in the SNAP was 11.6 percent, down from a cyclical high of 17.4 percent.

The TANF program is another federal program administered by states in which the states have considerable latitude over rules regarding eligibility, range of services offered, and amount of assistance. In Arizona, the program is limited to families with children, with participation limited to 60 months over a lifetime. This program has a much smaller number of participants in Arizona than the SNAP, with both the number of participants per 100 residents and the average monthly inflation-adjusted payment falling over time.

The AHCCCS program is Arizona's version of Medicaid, another means-tested federal program administered by states that provides health care for those unable to afford private health insurance. States can determine the covered services and eligibility. Through 2001, the strong upward trend in the number of participants per 100 residents in Arizona was in part the result of several program expansions. Additional changes to the program since 2010 have affected the number of participants. In Chart 9, the historical series is split into two parts due to a change in reporting by the AHCCCS. In FY 2019, the share of the Arizona population enrolled in the AHCCCS was 26.2 percent, barely down from the cyclical high.

The JLBC reports the source of funding by state agency. In the budget for FY 2020, total authorized spending by AHCCCS is \$13.1 billion. Not-appropriated funds from the federal government account for 84 percent of the total. The state's general fund is responsible for 13 percent, with other state funds contributing 3 percent.

The DES administers funding for SNAP, while TANF funding is split between the DES and the Department of Child Safety. Each department administers a number of other programs. More than three-fourths of the budget for the DES for FY 2020 is not appropriated, largely consisting of federal funds. The state's general fund is responsible for 17 percent with other state funds contributing less than 8 percent.

EDUCATION FUNDING

While a number of factors may have contributed to Arizona's decline in educational attainment relative to the nation since 1970, changes in funding for public education in Arizona relative to the nation is a key factor to examine given the significant decrease in public revenue that began in the late 1960s in Arizona. Two examples of how funding levels affect educational performance, based on published research, follow:

- The number of pupils in a classroom has an inverse relationship with student performance in elementary school, particularly in kindergarten through third grade. The average class size in Arizona is much larger than the recommended number of 18 or fewer students. A reduction in class size requires more teachers and more classrooms and therefore more public funding.
- The ability of elementary and secondary (K-12) school teachers also has a significant effect on student performance. Teacher quality is in part related to years of teaching

experience. Teacher salaries are an important component in the retention of teachers; experienced teachers earn more than novice teachers.

The latest data on class size from the U.S. Department of Education's National Center for Education Statistics (NCES) are for the 2016-17 school year. Average class size in Arizona was 23.3, the second highest in the nation; the national average was 16.0. In 1986 (the earliest data), Arizona's average of 18.4 was only a little higher than the U.S. average of 17.7.

Data on teacher salaries goes back more than one century, from the NCES and the National Education Association. In every year through 1966, Arizona's average salary was at least 7 percent higher than the national average. A gradual relative decrease has occurred since then, with Arizona's figure in recent years (through 2017-18) about 20 percent below average. The effort to increase teacher salaries in Arizona, which began in FY 2019, is not reflected in these data.

The latest information on teacher qualifications is from 2012. The educational attainment of Arizona's teachers was less than the national average. Through 2004, Arizona has been close to the national norm. Average teacher experience in Arizona was well below average in 2012, with the highest proportion among the states of teachers with less than three years of experience and one of the lowest proportions with at least 10 years of experience. In 2000, Arizona's average teacher experience was not as far below the U.S. average.

The remainder of this section examines public education funding in Arizona, based on data from various sources.

JLBC

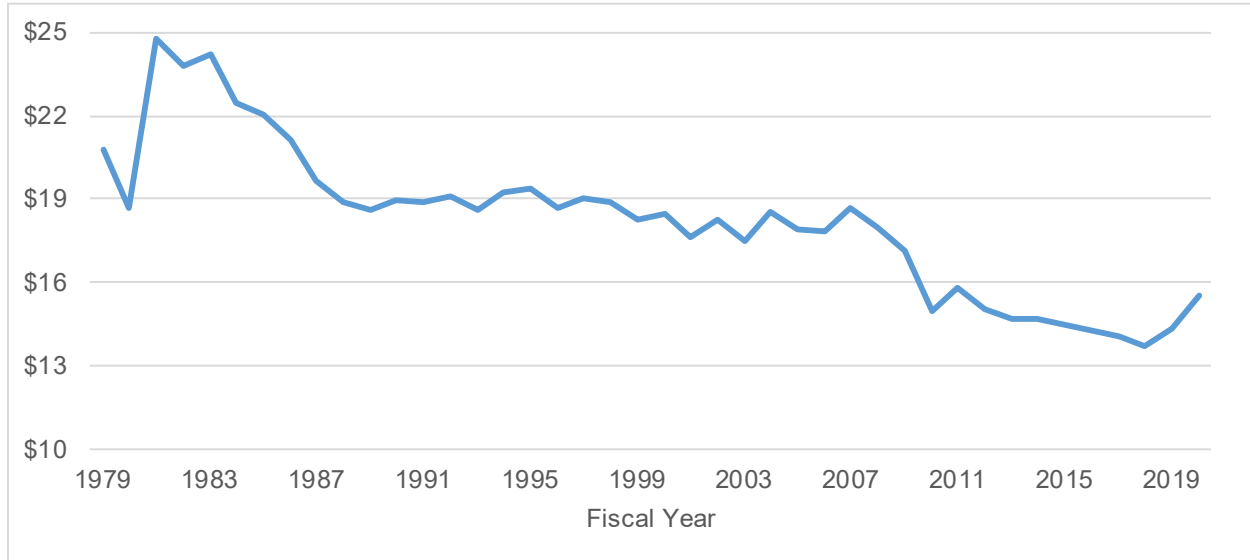
The FY 2020 budget for the Arizona Department of Education, which administers the public K-12 educational system, totals \$7.5 billion. The general fund accounts for 70 percent (\$5.2 billion) of the total, other funds for 4 percent, and not-appropriated monies for 26 percent. The general fund's share has declined over time.

With such a large decrease in overall general fund revenue per \$1,000 of personal income, as discussed in an earlier section of this paper, it is no surprise that declines in funding for K-12 education per \$1,000 of personal income have occurred, as seen in the top graph of Chart 11. Compared to the value in FY 1991, which was representative of the period from the late 1980s through FY 2007, general fund expenditures for K-12 education relative to personal income fell 28 percent as of the trough in FY 2018. Due to the recent effort to boost teacher salaries, funding for K-12 education rose relative to personal income; the FY 2020 figure was 18 percent less than in FY 1991. While funding for K-12 education from sources other than the general fund have increased, total funding for K-12 education relative to personal income was 6 percent lower in FY 2020 than in FY 1991.

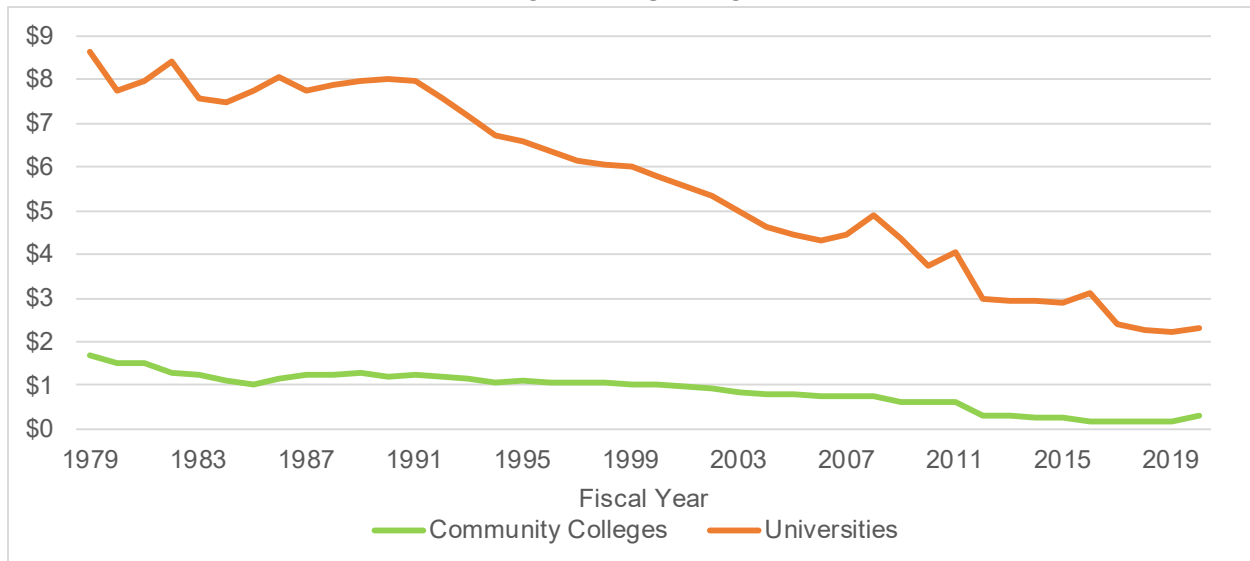
Community colleges receive most of their funding from local property taxes, which are not included in the JLBC's accounting. The declines in both general fund expenditures and total authorized state spending per \$1,000 of personal income for community colleges exceeded 70 percent between FYs 1991 and 2020.

CHART 11 **ONGOING EXPENDITURES FOR EDUCATION PER \$1,000 OF PERSONAL** **INCOME, ARIZONA STATE GOVERNMENT GENERAL FUND**

ELEMENTARY AND SECONDARY EDUCATION



HIGHER EDUCATION



Note: Expenditures extend through FY 2020; the FY 2020 figures are appropriations. Personal income for FY 2020 is projected.

Source: Calculated from Arizona Joint Legislative Budget Committee (expenditures) and U.S. Department of Commerce, Bureau of Economic Analysis (quarterly personal income).

The decrease in general fund expenditures for the Arizona Board of Regents and the three state universities also exceeded 70 percent relative to personal income between FY 1991 and FY 2020 (see the bottom graph of Chart 11). This loss of revenue was largely offset by large increases in tuition. Total authorized funding per \$1,000 of personal income fell only 4 percent relative to personal income between FYs 1991 and 2020.

When a public program serves only a portion of the population, revenue and expenditure data are more meaningfully expressed per participant. Thus, the education finance data are better expressed per student, or per student relative to per capita personal income.

National Center for Education Statistics

The NCES has produced data by state on K-12 education revenue for more than a century. Their data indicate that revenue per student in Arizona was substantially higher than the national average in the early decades of Arizona statehood. Arizona's figure then declined relative to the nation but remained near the national average through the 1970s. Since then, Arizona's revenue per student has dropped to about 30 percent below average.

Census Bureau

The Census Bureau annually produces a detailed report on K-12 revenues and expenditures by state (<https://www.census.gov/programs-surveys/school-finances.html>). For most categories, the earliest data are for the 1991-92 school year, but some data are available back to 1977-78. The latest data are for 2016-17.

Chart 12 presents total K-12 revenues and expenditures per student adjusted by per capita personal income, with Arizona's figures expressed as a percentage of the national average. Arizona's revenues and expenditures were near the national average as late as the early 1990s, but have declined since then to more than 20 percent below average.

In 2016-17, local government supplied 46.2 percent of the total K-12 revenue in Arizona, a share a little above the national average of 44.9 percent. State government's share was 40.1 percent in Arizona, well below the national average of 47.1 percent. In contrast, the federal government's share of 13.7 percent in Arizona was well above the U.S. average of 8.0 percent. The time series of the state's revenue figures relative to the nation on a per student adjusted by per capita personal income basis, are shown by the level of government providing the funding in Chart 13. State funding has dropped the most, but local government funding also has declined relative to the nation.

In FY 2017, Arizona's state and local government revenue per K-12 student was 40 percent below the U.S. average. To have equaled the national per student average, an additional \$4.87 billion in revenue would have been needed. Considering the state's somewhat lower cost of living lowers the shortfall from the national average to \$4.69 billion. The shortfall drops to \$3.96 billion considering the state's well below-average per capita personal income. However, to compete with their national peers, Arizona's students need to receive an equal amount of funding, adjusted for the cost of living. A lesser amount reflecting the state's below-average incomes would still put Arizona's students at a disadvantage and would likely perpetuate Arizona's below-average prosperity.

CHART 12
TOTAL ELEMENTARY AND SECONDARY EDUCATION REVENUES AND EXPENDITURES PER STUDENT ADJUSTED BY PER CAPITA PERSONAL INCOME, ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE

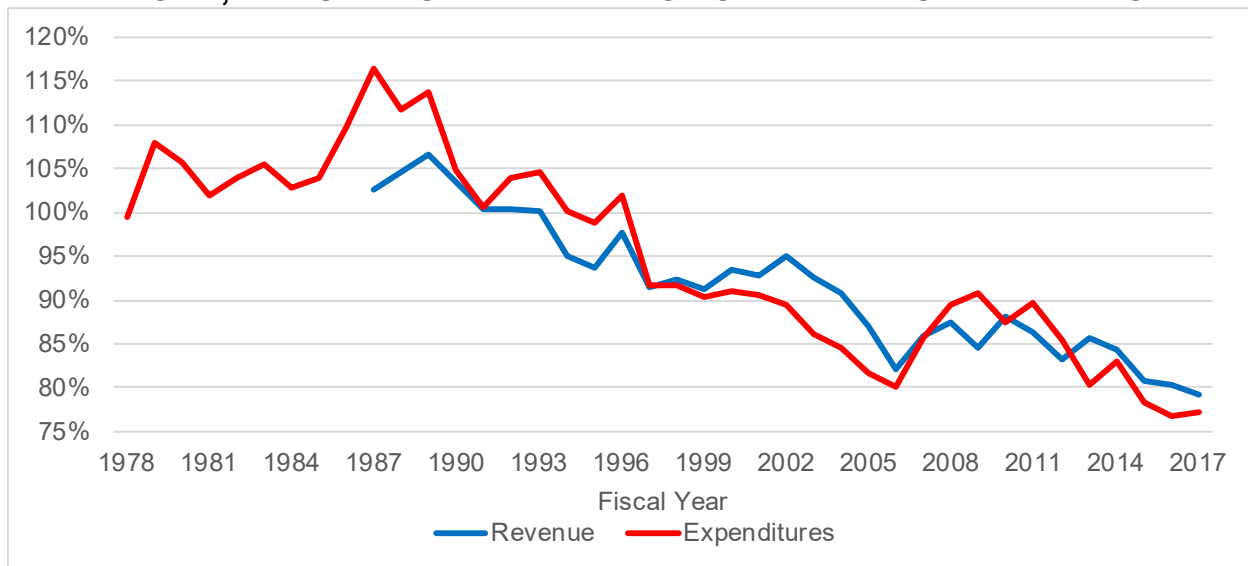
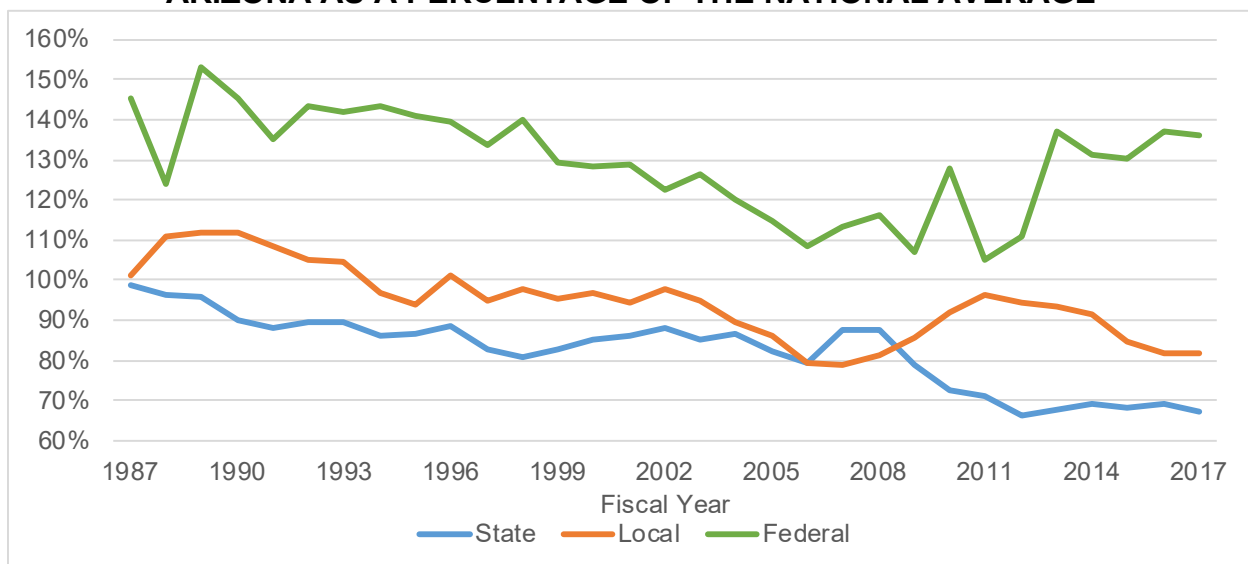


CHART 13
ELEMENTARY AND SECONDARY EDUCATION REVENUE PER STUDENT ADJUSTED BY PER CAPITA PERSONAL INCOME BY LEVEL OF GOVERNMENT, ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source (Charts 12 and 13): U.S. Department of Commerce, Census Bureau, Public Elementary-Secondary Education Finances (revenues, expenditures, and enrollment) and U.S. Department of Commerce, Bureau of Economic Analysis (personal income).

SHEEO

The State Higher Education Executive Officers Association (SHEEO) through their State Higher Education Finance project (<https://sheecomain.wpengine.com/project/state-higher-education-finance/>) reports revenue data for higher education — community colleges and universities combined. Total revenue includes only two categories:

- State and local government appropriations for public higher education — excluding appropriations for special purposes, research, and medical programs.
- Tuition, excluding tuition monies used for capital or debt service.

Data for fiscal years 1980 through 2018 are available. A measure of full-time-equivalent enrollment that excludes medical students is included in the SHEEO's dataset.

As seen in Chart 14, appropriations for higher education as a share of total higher education revenue gradually declined in Arizona from FY 1980 through FY 2008, then fell much more substantially. The share generally had ranked in the middle of the states, but by FY 2018 the share was 12th lowest in the country.

From FY 1980 through FY 2009, higher education revenue per full-time-equivalent student in Arizona generally ranged from 90-to-100 percent of the national average, as seen in Chart 15. Educational appropriations per FTE student and net tuition per FTE student each was generally within the same range. Since FY 2009, however, a substantial diversion has occurred in Arizona, with educational appropriations per FTE student falling to 32 percent below the national average while net tuition per FTE student climbed to more than 20 percent above average. Total educational revenue per FTE student as a percentage of the national average slipped toward the low end of the historical range.

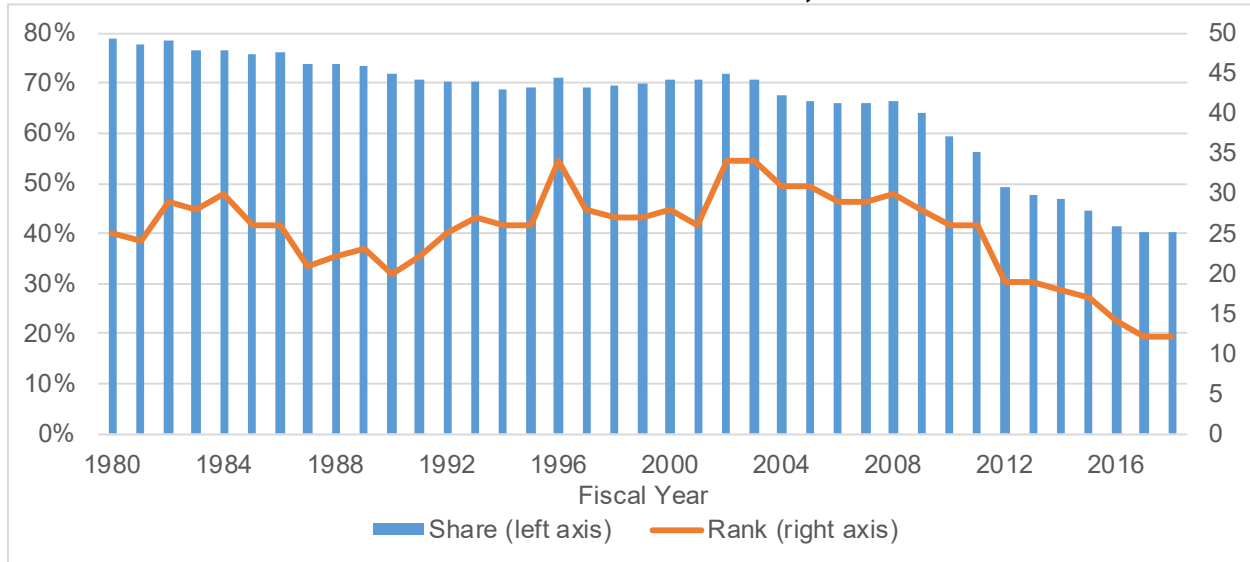
In FY 2017, educational appropriations per FTE student was 31 percent below average in Arizona. To have equaled the national per student average, revenue would have needed to be \$715 million higher. Considering the state's somewhat lower cost of living lowers the shortfall from the national average to \$688 million. The shortfall drops to \$581 million considering the state's well below-average per capita personal income, but as with K-12 education, tying revenue to this measure is not recommended.

Summing the K-12 and higher education funding shortfalls in Arizona from the national average results in a total of \$5.40 billion in FY 2017 after adjusting for the state's cost of living. Even accepting the ability-to-pay argument, additional revenue of \$4.56 billion would have been needed to reach the national average.

PROJECTIONS

In this section, the possible course over the next couple of decades of various of Arizona's measures relative to the national average are qualitatively discussed. To generate more precise projections would require a full econometric model, but long-term projections can be highly inaccurate even when employing such a model.

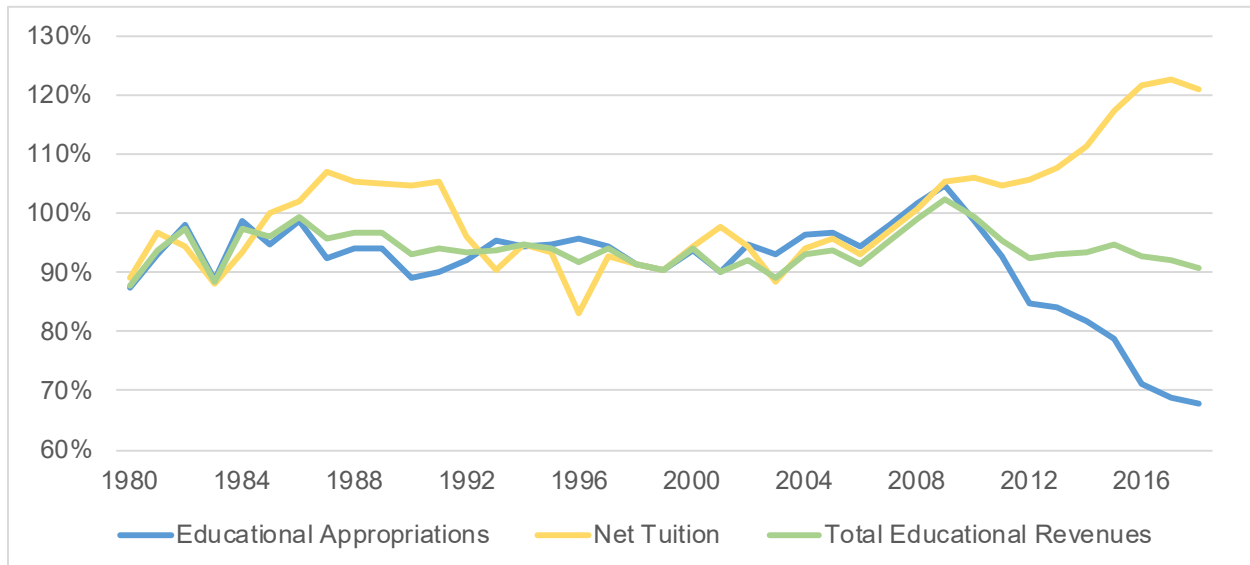
CHART 14
HIGHER EDUCATION APPROPRIATIONS AS A SHARE OF TOTAL REVENUE
AND RANK AMONG THE STATES, ARIZONA



Note: Rank is among 50 states, with the state with the lowest appropriation share assigned a rank of 50.

Source: Calculated from the State Higher Education Executive Officers Association.

CHART 15
HIGHER EDUCATION REVENUE PER FULL-TIME-EQUIVALENT STUDENT,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from the State Higher Education Executive Officers Association.

Aggregate Growth Rates

The percent change in measures of aggregate growth have trended down in Arizona relative to the nation, as expected by the state's faster growth over a period of decades. Beyond this gradual downtrend, the state's aggregate growth rates relative to the nation shifted down after the mid-2000s. Given that this relatively slow growth has persisted for more than a decade, it seems likely that this represents the new normal. That is, in coming decades, the state likely will continue to grow — on average — at rates somewhat higher than the national average on such aggregate measures as population and employment. The strong cyclicalities in Arizona's economy is likely to continue.

Productivity and Prosperity

Expressed relative to the nation, Arizona's productivity and prosperity has trended down over time, but not on a smooth basis. Particularly large declines have occurred in both productivity and prosperity since the mid-2000s.

The reasons for the downtrend in Arizona's relative productivity and prosperity likely are complex and beyond the scope of this paper. One factor is the decline in educational attainment relative to the nation, which is linked to the state's flagging financial support for public education. While an increase in support for K-12 education specific to teacher salaries is underway, the increase is relatively small and K-12 education funding per student will remain far below average. Thus, the increased spending is unlikely to result in much improvement in educational performance measures. Moreover, without additional action, education funding will drop after FY 2025, when Proposition 123 expires.

Assuming that little action is taken to boost Arizona's relative productivity and prosperity and that additional tax cuts will be implemented, though not of the magnitude of those from FYs 1995 through 2001, it seems likely that the downtrend in Arizona's relative productivity and prosperity will continue. However, given the extent to which the percentages of the national averages have already declined, further declines over the next two decades likely will be small, as was the case from the early 1990s to the mid-2000s.

Indeed, using the long-term economic projections made by IHS Markit (which do not presume additional tax reductions), Arizona's percentage of the national average is expected to rise slightly on such measures as per capita GDP (from the current 77 percent to 80 percent in 2039) and per capita personal income (from the current 81 percent to 83 percent in 2039). A separate projection made using a univariate autoregressive model also suggests that Arizona's percentage of the national average will rise somewhat for prosperity measures.

Education

Educational attainment in Arizona has fallen relative to the nation since the 1970s. Assuming that little action is taken to address the shortcomings in Arizona's educational system, it seems likely that the educational attainment of Arizonans will continue to fall relative to their national counterparts. However, the rate of relative decline likely will be slow, as in recent years.

Educational achievement, as measured by test scores, dropped in Arizona relative to the nation during the 2000s, but have recovered in recent years, in some cases exceeding the relative results

from the 1990s. Since the causes of the relative improvement are unclear, it is difficult to prognosticate on the state's future performance. Assuming that little action is taken to address the shortcomings in Arizona's educational system, Arizona's test scores may improve a bit further and then stabilize at just below the national average.

Public Assistance

The projected number of recipients of public assistance programs, and the amount they receive, is highly dependent on changes in eligibility and other provisions of each program. Assuming no significant changes to the programs, slight improvement in Arizona's relative prosperity, slight declines in Arizona's relative educational attainment, and continued increases in income disparity, the number of SNAP recipients and AHCCCS participants likely will trend up at a modest pace, but with the cyclical pattern continuing. The inflation-adjusted SNAP payment is likely to remain roughly steady.

The inflation-adjusted cost per AHCCCS enrollee likely will continue to rise due to higher-than-average inflation in medical care prices. According to IHS Markit, medical care inflation — based on the personal consumption expenditure (PCE) price index — will average 0.6 percentage points per year higher than the overall inflation rate over the next two decades. Based on the consumer price index (CPI), medical care inflation has been further above the overall inflation rate and higher than as measured by the PCE. The CPI inflation rate for medical care is projected to be 1.5 percentage points per year higher than the overall inflation rate over the next two decades.

A simulation was run in which AHCCCS enrollment as a share of the Arizona population increases 0.05 percentage points per year from the FY 2020 figure of 26.22 percent. The cost per enrollee is alternatively assumed to rise at 0.6-or-1.5 percentage points above the overall inflation rate. The results are shown in Table 1.

The calculations in Table 1 are expressed in 2020 dollars. In the higher inflation scenario, the Arizona's portion of the AHCCCS budget will rise 130 percent over the next 30 years, while the cost per Arizonan who is not an AHCCCS participant will increase nearly 70 percent. While it is conceivable that health care inflation and AHCCCS participation will both increase at an even faster rate, it is likely that the pressures that would be exerted on the budget would require formula adjustments. Moreover, the figures in Table 1 do not account for the increase in federal support that would be required to fund the system.

TABLE 1
PROJECTED AHCCCS ENROLLMENT AND COSTS

Assumes Increase in Share of 0.05 Per Year				Assumes Medical Care Costs Increase 0.6 Percent Per Year More Than Overall Inflation*			Assumes Medical Care Costs Increase 1.5 Percent Per Year More Than Overall Inflation*		
	Arizona Population	AHCCCS Enrollment	AHCCCS Share	AHCCCS Budget**	Cost Per Enrollee	Cost Per Non-enrollee^	AHCCCS Budget**	Cost Per Enrollee	Cost Per Non-enrollee^
2020 Actual	7,234,850	1,898,259	26.24%	\$2,100	\$1,106	\$394	\$2,100	\$1,106	\$394
2030	8,235,450	2,201,971	26.74	2,586	1,175	429	2,827	1,284	469
2040	9,201,800	2,506,359	27.24	3,125	1,247	467	3,735	1,490	558
2050	10,055,300	2,789,110	27.74	3,692	1,324	508	4,823	1,729	664
Percent Change:									
2020-2030	13.8%	16.0%	0.50	23.2%	6.2%	8.9%	34.6%	16.1%	19.1%
2020-2040	27.2	32.0	1.00	48.8	12.7	18.6	77.8	34.7	41.7
2020-2050	39.0	46.9	1.50	75.8	19.7	29.1	129.7	56.3	68.7

* Expressed in 2020 dollars

** In millions; the budget is the Arizona portion: the sum of the general fund and other state funds

^ The number of nonenrollees is the difference between the Arizona population and the number enrolled in AHCCCS

Sources: Arizona Office of Economic Opportunity (Arizona Population), Arizona Health Care Cost Containment System (AHCCCS enrollment in 2020), and Arizona Joint Legislative Budget Committee (AHCCCS budget in 2020).

THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

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