REGIONAL ECONOMIC COMPETITIVENESS, PART 3: BUSINESS LOCATION FACTORS AND AN ASSESSMENT OF ARIZONA'S COMPETITIVENESS

May 2023

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P3 | PRODUCTIVITY AND PROSPERITY PROJECT

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

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A Report from the Productivity and Prosperity Project (P3), Supported by the Office of the University Economist

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This report is the third in a series examining Arizona's business competitiveness. The findings clearly indicate that productivity and prosperity in Arizona is considerably below the norm, and has declined over time, relative to the national average and the figures in most comparison states. Traded economic clusters, which drive the economy, account for a below-average share of the Arizona economy, with employment and average earnings in key traded and high-paying clusters subpar. This third paper shows that Arizona is rated as mediocre in various studies of business climate that circulate in the site selector community. It suggests remedies, investment opportunities, and key market niches to target — providing clear direction for an economic development strategy.

Some readers may ask "why focus on competitiveness now?" The state's economy weathered the pandemic better than many states. New businesses, such as Taiwan Semiconductor and LG Energy Solution, have recently announced major advanced manufacturing initiatives. Intel is expanding. The state is moving forward in the electric vehicle industry. The Arizona Commerce Authority reports that their "pipeline" of prospects has never been this active.

However, is the current activity sustainable? Some of the state's recent success has been tied to the federal infrastructure and CHIPS (semiconductor chip manufacturing) bills, which are not permanent. Recent negative announcements by electric vehicle companies are indications of the volatility of a new, competitive industry. The recent successes do not override or indeed change the rating of Arizona's shortcomings illustrated in business climate studies.

Some Arizonans argue that business naturally flourishes in Arizona because of our laissez-faire attitudes, low taxes, and attractive climate where people want to live and work. Hence, state and local government should be limited, public planning of the economy is to be abhorred, and the federal government is to be demonized. These arguments ignore the role played historically by government policies, usually at the federal level, including support for Roosevelt Dam, the national freeway system, the Central Arizona Project, and the Maricopa County freeway system. More recently, significant economic boosts have come from the investment in light rail, Medicare expansion that has fueled growth in the health care delivery and research sectors, federal stimulus related to the pandemic, and the impact of the federal infrastructure and CHIPS bills.

In addition, ongoing injections from the federal Department of Defense support the state's military bases and account for a significant portion of the business of such private-sector companies as Raytheon, Boeing, General Dynamics, and Orbital Sciences. More broadly, according to the Rockefeller Institute of Government (https://rockinst.org/issue-areas/fiscal-analysis/balance-of-payments-portal/), before COVID-19, Arizona received about $1.50 from the federal government for every dollar paid in taxes; that figure is higher today. Thus, much of Arizona's current competitive landscape has been built on a foundation of public investments.

Much of Arizona state government's current fiscal health is due to federal stimulus money. This federal largess will soon be gone, while the latest round of Arizona tax cuts will be fully in place, and expenditures on the universal school voucher program could continue to exceed projections. Of particular concern is funding for public education, which is near the bottom of the states on a

per capita basis, and state government's revenue base. Not only have decades of tax cuts lowered annual revenue by billions of dollars, but the tax base has become highly dependent on the sales tax, which is limited to certain goods that represent a relatively small and declining share of economic activity. State government's fiscal system is dependent on federal government funds and ongoing growth of residents and businesses. Indeed, the state's sales tax rate structure results in a reasonable amount of revenue from new arrivals as homes are constructed and consumer durables purchased. The greater fiscal challenge is raising enough revenue to cover the ongoing public-sector costs of serving Arizona families while they raise and educate their children. When the pace of growth slows even slightly these challenges emerge in the form of revenue shortfalls.

It may now be time for Arizonans to determine their own fiscal fate by actually paying for public services they demand rather than relying on federal handouts. The state and local government tax burden in the state is low for both businesses and individuals, resulting in public spending well below the national average. The state needs to invest in various programs, notably education and infrastructure, that will promote a sustainable economic development agenda to support 21st-century economic competitiveness and result in improvements in the prosperity of Arizona residents. If political sentiment favors vouchers, then why not a new dedicated fund to pay for them? Why not fund a pool of scholarship funds to support the tuition costs triggered by two decades of declining state support for higher education? Investments in other programs, such as support for child and elder care, will improve the standard of living of many residents.

SUMMARY

On the most reliable measures of business climate, Arizona ranks in the middle of the states. The most important business location factors that can be influenced by public policy are labor force quality and availability, and physical infrastructure quality and availability. Education is a key component of labor force quality. Arizona ranks quite poorly among the states on educational attainment, quality, and achievement. Arizona's physical infrastructure is rated as average, but it is at risk of becoming a deterrent to economic development due to limited public-sector investments over the last few decades.

The next most important category of location factors is business costs. Arizona ranks in the middle of the states. However, on the public-policy-determined component of business taxes, Arizona compares favorably.

In order to raise the state's economic competitiveness, investing in Arizona's public educational system is the top priority. The second priority is to invest in physical infrastructure, especially transportation. However, after three decades of frequent and significant tax cuts that resulted in large reductions in public spending, Arizona's state government does not currently have the ability to increase its investments in education and infrastructure. Since both business and individual tax burdens are low in Arizona, considerable increases in public revenue could be achieved without producing a negative economic effect. Similarly, if revenue increases were implemented in a progressive fashion, the standard of living of lower-income Arizonans would not suffer.

Once the state invests significantly in education and infrastructure, it should have more success in its economic development of high-paying, 21st-century jobs. Currently, traded clusters — which drive the economy and mostly pay considerably higher wages than nontraded clusters — make up a below-average share of Arizona's economy. They disproportionately consist of less-skilled and lower-paid activities relative to the national norm. The state has relatively few strong traded clusters as defined by employment concentration.

Among the traded activities that Arizona might continue to target or newly target in the future are aerospace vehicles and defense; semiconductors and related information technology; medical devices; communication services; and higher-paid industries in the financial services, insurance services, and business services clusters.

An improved ability to compete for high-paying traded clusters should reverse Arizona's downtrend in measures of productivity and prosperity, which currently are considerably below the national average.

INTRODUCTION

This is the third of three papers that investigate regional economic competitiveness, as measured by various indicators of productivity and prosperity. The first paper demonstrated that productivity and prosperity in Arizona, and throughout most of the state's subregions, compares poorly to comparable areas nationally and has declined over time. The second paper examined traded economic clusters, finding that employment and average earnings in key traded and high-paying clusters is subpar in Arizona, and throughout most of the state's subregions. This third paper reviews the factors important to economic development and suggests ways in which the state's inferior competitiveness can be addressed. The papers are available at https://economist.asu.edu/reports.

The focus of this paper is the state. Arizona is compared to the national average, to all states (including the District of Columbia), and to a subset of 15 states: 10 western states — Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Texas, Utah, and Washington — and five states along the South Atlantic coast (Florida, Georgia, North Carolina, South Carolina, and Virginia).

BUSINESS COMPETITIVENESS AND LOCATION FACTORS

The economic competitiveness of nations and regions is determined by long lists of location factors, also known as site selection factors. Taken together, such factors are sometimes referred to as the "business climate." This section focuses on the location factors important to businesses. Factors important to individuals are discussed in a later section of this paper.

National

Factors considered as important to the economic competitiveness of nations can be categorized in various ways. One system of categorization, with examples of the factors, follows:

- Institutional conditions: corruption, security, justice system, property rights, corporate ethics and accountability.
- Macroeconomic environment: government budget (tax rates and expenditures), debt, credit rating, savings rate.
- Financial markets: central bank, credit availability, venture capital, international investment, financial regulations.
- Domestic and foreign markets: trade barriers, tariffs, antimonopoly policy, suppliers.
- Basic infrastructure: transportation and utilities.
- Technological infrastructure/research and development: telecommunications, technological absorption and transfer, tech workers, research and development, patents, knowledge transfer.
- Education and training: quantity and quality of education, including expenditures, test scores, and enrollment rates; on-the-job training.
- Labor market: productivity, skills, brain drain, labor relations and regulations, costs.
- Costs other than labor and taxes: land, goods, services.
- Health and environment: pollution, health of working-age population.

Regional

A region must be economically competitive to become more prosperous. Economic competitiveness is necessary for all three forms of economic development to succeed: attracting companies to move to the region, encouraging existing companies to remain and expand in the region, and fostering new businesses. The list of location factors that determine regional competitiveness is not as extensive as the list for nations. This discussion is limited to traded (alternatively called "export" or "base") economic activities, those in which most of the sales are to entities outside the local area. Most of the location factors have limited relevance to agriculture, mining, and tourism, which are traded activities tied to natural attributes.

Area Development magazine, https://www.areadevelopment.com/, annually surveys two groups — corporate executives and consultants — on the importance of 28 business location factors. The corporate survey includes a disproportionate number of manufacturing firms, while the consultants work with companies from a broad range of sectors. As a result, the responses of the corporate executives differ from those of the consultants. In particular, the executives rate cost factors to be more important than do the consultants. However, the availability of skilled labor, highway accessibility, and energy availability and cost rank among the top seven factors of each group of respondents.

In the latest survey, the consultants rated proximity to major markets as the most important factor, but of course this is not something under the control of local economic development experts or other policymakers. The second-most important factor was the availability of skilled labor; highway accessibility ranked third. The complete list of factors is presented in Table 1.

Site Selection magazine, https://siteselection.com/, also conducts an annual survey of site selectors. In the November 2022 issue, the most important location criteria were identified as follows:

- First, workforce skills.
- Tied for second: workforce development.
- Tied for second: state and local tax "scheme."
- Fourth, transportation infrastructure.
- Fifth, ease of permitting and regulatory procedures.
- Tied for sixth, land/building prices and supply.
- Tied for sixth, cost and reliability of utilities.
- Tied for eighth, incentives.
- Tied for eighth, higher education resources.
- Tied for eighth, quality of life.

These two sources agree that four categories of business location factors — that are under at least partial control of local economic development experts or other policymakers — are of prime importance to economic development in the 21st century:

- The quality and availability of the labor force. *Area Development* ranked the availability of skilled labor second; *Site Selection* ranked workforce skills first and workforce development tied for second. Educational attainment and achievement are key aspects of labor force quality. *Area Development* does not include any education-specific factor on its list, but *Site Selection* includes higher education resources among its 10 factors. The level of human capital in an area, typically measured by the share of the population with a bachelor's degree, has been shown in numerous studies to be a significant predictor of subsequent population growth and gains in prosperity in a region.[1]
- The quality and availability of the physical infrastructure. The transportation system is ranked fourth by *Site Selection* and highways are third on *Area Development*'s list. The cost and reliability of utilities tied for sixth by *Site Selection* and energy availability and costs are seventh on *Area Development*'s list.
- Business costs. Several types of costs are among the top half of the 28 factors listed by *Area Development*, including state and local government incentives (fourth) and tax exemptions (10th). *Site Selection* ranks incentives tied for eighth. The two sources disagree on the importance of tax rates, with *Site Selection* ranking the state and local tax "scheme" tied for second, but *Area Development* ranks the corporate tax rate only 23rd.
- Availability of land and buildings. *Area Development* ranks the availability of land fourth and the availability of buildings 10th. Land/building prices and supply was ranked tied for sixth by *Site Selection.* Expedited permitting was ranked eighth by *Area Development* and ease of permitting and regulatory procedures was ranked fifth by *Site Selection*.

[1] See the University Economist report *Determinants of Growth and Prosperity in U.S. Metropolitan Areas*, February 2021, https://ccpr.wpcarey.asu.edu/sites/default/files/determinantsmetrogrowth02-21.pdf.

These rankings of location factors do not differentiate the nature of a business. The relative importance of various location factors varies by industry cluster and by type of facility (for example, manufacturing or administrative). In particular, the factors important to high-paying, high-technology, innovative, knowledge-based activities are considerably different from those of other activities. Costs are less important, and the labor force more important, to knowledge-based activities.

TABLE 1
BUSINESS LOCATION FACTORS

	Rank	Rating*
Workforce		
Availability of Skilled Labor	2	98.2%
Labor Costs	13	85.9
Training Programs/Technical Schools	15	78.9
Availability of Unskilled Labor	17	76.8
Low Union Profile	21	70.2
Right-to-Work State	22	70.1
Infrastructure		
Highway Accessibility	3	94.8
Energy Availability and Costs	7	91.2
Accessibility to Major Airport	19	73.7
Water Availability	19	73.7
Railroad Service	25	43.9
Availability of Advanced Information & Communications Technology Services	26	42.1
Taxes		
State and Local Government Incentives	4	93.0
Tax Exemptions	10	86.0
Corporate Tax Rate	23	63.1
Other Costs		
Occupancy or Construction Costs	9	87.5
Inbound/Outbound Shipping Costs	10	86.0
Availability of Long-Term Financing	28	22.8
Other Real Estate		
Available Land	4	93.0
Expedited or “Fast-Track” Permitting	8	89.5
Available Buildings	10	86.0
Location		
Proximity to Major Markets	1	98.3
Proximity to Suppliers	4	93.0
Proximity to Innovation Commercialization/Research & Development Centers	24	53.6
Waterway or Oceanport Access	26	42.1
Other Factors		
Raw Materials Availability	14	79.0
Environmental Regulations	16	76.9
Quality of Life	18	75.4

* Percentage of respondents indicating this factor to be “very important” or “important.”

Source: *Area Development* magazine, Q1 2022 issue, available at https://www.areadevelopment.com/Corporate-Consultants-Survey-Results/q1-2022/18th-annual-consultants-survey.shtml.

COMPARING COMPETITIVENESS ACROSS STATES

Many difficulties exist in producing a study that compares states using a variety of indicators on a complex topic such as competitiveness. Among the studies produced by various organizations, the selection of indicators often is arbitrary and driven by the data that are readily available. Some of the data may be of a low quality. Some of the indicators may be highly correlated, effectively resulting in too much importance being placed on that group of indicators.

For those studies that combine indicators into categorical and overall scores, the weighting scheme employed is problematic, since little information on the relative importance of the various indicators is available. Frequently, equal weighting is used, which obviously does not reflect reality. In other cases, unequal weights are employed but these weights rarely have a firm empirical basis. Weighting alone can have a significant impact on the overall scores. As a result of these issues, the overall scores or ranks of states frequently are not highly correlated across studies.

Since the goal of economic development is to enhance the prosperity of the region's residents, the results of a competitiveness study should be correlated with measures of prosperity. This correlation will never be perfect for a variety of reasons, including the limitations noted above, but the results of some studies are not closely related to any objective measure.

Timing differences are another major reason for less-than-perfect correlations. Take the example of a state that makes significant improvements to its competitiveness. Conceptually, these actions should lead to improvements in prosperity, but advances in prosperity may lag years behind the changes in the competitiveness measures.

Per capita gross domestic product (GDP) or a similar measure, not the results of a competitiveness study, should be used to determine the relative prosperity of states. A well-done competitiveness study is useful to:

- Companies evaluating locations for a facility. The collection of multiple indicators in one place by an unbiased party is of value.
- Regional policymakers wanting to improve the region's prosperity. It may be possible to identify a region's relative strengths and weaknesses from competitiveness studies, allowing policymakers to focus on those components of competitiveness on which the region compares least favorably.

EVALUATIONS OF STATE BUSINESS COMPETITIVENESS

Various studies address competitiveness or the best place to do business at the level of U.S. states. For most of these studies, statements of methodology and other documentation are limited; the sources and timeframes of the data used frequently are not reported. Five recent studies provide a complete ranking of the 50 states.

Comparison of Five Studies of Business Competitiveness

Based on the ranks of the states, correlations were calculated between each of the five studies for which the ranks of all 50 states are available; these studies are described in following subsections. Three studies — by the Beacon Hill Institute (BHI), CNBC, and *Forbes* magazine — are reasonably broad in their measurement of competitiveness. The correlations between these studies are strong and significant. Two other studies, by *Chief Executive* magazine and the American Legislative Exchange Council (ALEC), are narrower in their focus. The correlation between these two studies also is strong and significant, as shown in Table 2. The correlations between the BHI, CNBC, and *Forbes* studies and each of the more-narrow studies are not as high.

Correlations also were calculated between the ranks from each of the five studies and various economic indicators, measured as the 2021 level and the change between 2011 and 2021. These two years are comparable in that each represents an early stage of an economic expansion following a recession. For those indicators measured in dollars, correlations were calculated both on an unadjusted basis and adjusted for the regional cost of living, as measured by the regional price parity figures produced by the U.S. Bureau of Economic Analysis. The economic indicators consist of three types:

- Productivity indicators: per worker GDP and per worker earnings, measured both in 2021 and as the 2011-to-2021 inflation-adjusted percent change (with inflation measured by the GDP implicit price deflator).
- Prosperity indicators: per capita GDP and per capita personal income, measured both in 2021 and as the 2011-to-2021 real percent change.

TABLE 2
CORRELATIONS OF STATE RANKS
IN STUDIES OF BUSINESS COMPETITIVENESS

	BHI	**CNBC**	***Forbes***	**ALEC**
Beacon Hill	-			
CNBC	0.71	-		
Forbes	0.66	0.80	-	
American Legislative Exchange Council	0.18	0.24	0.49	-
Chief Executive	0.30	0.43	0.63	0.79

Note: The following correlations are statistically significant: 0.28 at the 5 percent significance level, 0.36 at 1 percent, and 0.45 at 0.1 percent. For a discussion of these significance levels, and of correlation analysis more generally, see the first paper of this series.

Source: Calculated from the ranks of four studies: Beacon Hill Institute (BHI), CNBC, *Forbes* magazine, American Legislative Exchange Council (ALEC), and *Chief Executive* magazine.

- Aggregate growth indicators: the 2011-to-2021 percent change in real GDP, real personal income, real earnings, and employment.

Generally, the correlations between the ranks from the studies and the economic indicators are stronger using the cost-of-living-adjusted data, so that is the focus of the following discussion. Looking first at the correlations between the studies and the 2021 level of the prosperity and productivity indicators, the correlations are negative with the ALEC and *Chief Economist* rankings, but are positive with the BHI, CNBC, and *Forbes* studies (see Table 3).[2] However, most of the positive correlations are not significant. The exceptions are the two prosperity indicators with the BHI rankings and the per capita GDP indicator with the CNBC rankings.

The correlations between the prosperity and productivity indicators and the BHI, CNBC, and *Forbes* ranks are higher based on the percent change between 2011 and 2021. Nearly all are significant. In contrast, no correlation is present between the percent changes and the ranks from the ALEC and *Chief Economist* studies.

Each of the five studies have stronger correlations with the percent change in the aggregate economic indicators than the percent changes in productivity and prosperity. Except for employment, the correlations with the aggregate indicators are considerably stronger in the BHI, CNBC, and *Forbes* studies than the two more-narrow studies.

Of the various economic indicators examined, per capita GDP conceptually is the single best measure of competitiveness, since it is a prosperity measure not affected by income transfer receipts (such as income maintenance benefits from government), as is the per capita personal income indicator. Empirically, the correlation between the ranks of each of the BHI, CNBC, and *Forbes* studies is stronger with per capita GDP than with any of the other three productivity and prosperity indicators for 2021 and for the 2011-to-2021 percent change.

The rankings from the Beacon Hill Institute and CNBC studies have a similar correlation with per capita GDP in 2021 that is significant at the 1 percent level, while the correlation with the *Forbes* ranks is not significant even at the 5 percent level. However, the correlations of the 2011-to-2021 change in per capita GDP are nearly identical across these three studies. Thus, each of these three studies are examined in detail in the following subsections.

Though some of the correlations between the three broad studies and the prosperity and productivity indicators are highly significant, the maximum correlation is only 0.50. Thus, in some states, large differences can occur between the adjusted prosperity ranks and the ranks of the three studies. When the states are listed in order of per capita GDP or per capita personal income adjusted for the cost of living in 2021, large differences are seen at the top and bottom of the list in the ranks of the three studies versus the ranks of the adjusted prosperity indicators.

Of the 13 states with the highest per capita GDP adjusted for the cost of living, nine are ranked at least 10 places lower based on the average of the three studies. In contrast, nine of the 10 states

[2] The correlation coefficients between the output per hour and output per worker indicators produced by the U.S. Bureau of Labor Statistics and the per worker GDP indicator exceed 0.9; thus, the BLS measures are not included in Table 3.

TABLE 3
CORRELATIONS BETWEEN STATE RANKS IN STUDIES OF BUSINESS COMPETITIVENESS AND THE RANKS OF ECONOMIC INDICATORS

PROSPERITY AND PRODUCTIVITY

	Prosperity		Productivity	
	Per Capita Gross Domestic Product	Per Capita Personal Income	Per Worker Gross Domestic Product	Per Worker Earnings
2021 Level, Adjusted for Living Costs				
Beacon Hill Institute	0.40	0.32	0.09	0.20
Forbes	0.26	0.09	0.11	0.13
CNBC	0.38	0.18	0.22	0.24
American Legislative Exchange Council	-0.12	-0.21	-0.21	-0.28
Chief Executive	-0.14	-0.27	-0.24	-0.33
2011-to-2021 Percent Change*				
Beacon Hill Institute	0.49	0.29	0.49	0.42
Forbes	0.50	0.45	0.31	0.39
CNBC	0.49	0.32	0.42	0.38
American Legislative Exchange Council	-0.07	0.03	-0.22	-0.03
Chief Executive	0.08	0.07	-0.08	-0.03

AGGREGATE ECONOMIC GROWTH

	Gross Domestic Product	Personal Income	Earnings	Employment
2011-to-2021 Percent Change*				
Beacon Hill Institute	0.61	0.47	0.53	0.44
Forbes	0.69	0.66	0.69	0.76
CNBC	0.55	0.43	0.49	0.47
American Legislative Exchange Council	0.12	0.22	0.24	0.43
Chief Executive	0.27	0.29	0.30	0.52

* Adjusted for inflation and changes in the regional cost of living.

Note: The following correlations are statistically significant: 0.28 at the 5 percent significance level, 0.36 at 1 percent, and 0.45 at 0.1 percent.

Source: Calculated from data of the Beacon Hill Institute (BHI), CNBC, *Forbes* magazine, American Legislative Exchange Council (ALEC), *Chief Executive* magazine, and the U.S. Department of Commerce, Bureau of Economic Analysis.

with the lowest adjusted prosperity are ranked higher on average in the three studies. Among the middle 27 states, no relationship is present in the direction of the differences between the adjusted prosperity measures and the three studies.

In 12 of the 15 comparison states, the adjusted per capita GDP rank is lower than the average rank of the three studies, with a difference in rank of at least 10 in 10 of these states. California is the only state with a rank on per capita GDP considerably better than its average rank of the three studies.

In most of the 15 comparison states, the rank on adjusted per capita GDP did not change much between 2008 and 2021. Utah and California experienced a considerable improvement in rank — Utah was highly ranked by each of the three studies, but California was ranked among the middle of the states. Arizona experienced a lesser improvement in its adjusted per capita GDP rank; its rank among the three studies ranged from 18th to 34th. New Mexico was the only comparison state to slip in its adjusted per capita GDP rank; it ranked near the bottom in each of the three studies.

Beacon Hill Institute, "State Competitiveness Report"

The Beacon Hill Institute (BHI) at Suffolk University in Boston released its 18th annual report (https://www.beaconhill.org/Compete18/18thEd-BHI-SCI2018-0626.pdf) in June 2020. The report is labeled as "2018" since most of the data are for 2018. The study includes 45 indicators organized into eight categories. The indicators of each category are equally weighted as are the eight categories. Each indicator and category are expressed as a 0-to-10 index.

The Beacon Hill Institute's study reports a state's rank on each of the indicators if the state is in the top 20 or bottom 20 of the 50 states. The precise rank is not reported if a state is between 21st and 30th. The list of indicators and categories included by the Beacon Hill Institute is shown in Table 4, along with Arizona's ranks among the 50 states and among the 15 comparison states.

The BHI considers a state to be competitive "if it has in place the policies and conditions that ensure and sustain a high level of per capita income and its continued growth." It notes that the outcome of competitiveness is greater affluence, measured by higher levels of per capita gross domestic product or per capita personal income.

The shortcomings of the BHI's "State Competitiveness Report" are common to most studies of its type:

- The equal weighting of indicators is inconsistent with the relative importance of location factors as cited by companies. For example, the infrastructure and human resources categories, which encompass the most important location factors, are not weighted any heavier by the BHI than the other six categories.
- Some of the indicators, such as the infant mortality rate, are of questionable relevance and seem like odd inclusions in a competitiveness index.
- Other important location factors are not included. For example, the transportation infrastructure is not adequately measured and no indicator of the regulatory environment is included.
- Some of the data may be of questionable accuracy.

TABLE 4
BEACON HILL INSTITUTE'S "STATE COMPETITIVENESS REPORT"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

INDEXES and Indicators	Nation	Comparison
OVERALL	24	12
I. GOVERNMENT AND FISCAL POLICY	2	1
1. State and Local (S&L) Government Taxes Relative to Income	16	5
2. Workers' Compensation Premium Rates	11	6
3. Bond Rating	1	1
4. Budget Surplus or Deficit as Percentage of Gross Product	*	9 or 10
5. Average Weekly Unemployment Payment	4	1
6. Full-Time-Equivalent S&L Government Employment Per Capita	3	2
II. SECURITY	39	11
7. Crime Per Capita	41	11
8. Change in Crime Per Capita	18	6
9. Murders Per Capita	*	5 to 9
10. Integrity Index	49	14
III. INFRASTRUCTURE	27	9
11. Quality of Roads	*	9 to 12
12. High-Speed Lines Per Capita	16	8
13. Air Passengers Per Capita	10	7
14. Average Travel Time to Work	31	8
15. Electricity Prices	31	13
16. Average Apartment Rent	34	8
IV. HUMAN RESOURCES	36	10
17. Percentage of Residents Without Health Insurance	41	9
18. Percentage of Residents Age 25 or Older With a High School Diploma	40	11
19. Unemployment Rate	46	14
20. Higher Education Enrollment Per Capita	3	2
21. Labor Force Participation Rate	41	12
22. Infant Mortality Rate	20	6
23. Active Physicians Per Capita	33	10
24. Mathematics Fourth-Grade Test Scores	40	10
V. TECHNOLOGY	30	11
25. Academic Science & Engineering R&D Relative to Gross Product	*	5 to 7
26. National Institutes of Health Funding Per Capita	37	12
27. Patents Per Capita	*	9 to 13
28. Science & Engineering Graduate Students Per Capita	33	10
29. Science & Engineering Degrees Awarded Per Capita	31	11
30. Science & Engineering Occupational Employment Share	13	6
31. High-Tech Industry Employment Share	11	7
VI. BUSINESS INCUBATION	34	13
32. Deposits in Banks and Savings Institutions Per Capita	46	12
33. Venture Capital Investment Per Worker	*	11 to 13
34. Company Births Per Capita	35	15
35. Initial Public Offers Volume Per Capita	*	8 to 15
36. Percentage of Labor Force Represented by Unions	11	8
37. Minimum Wage	45	12
38. Tort Liability Index	16	6
39. Cost of Labor Adjusted for Educational Attainment	17	6
VII. OPENNESS	28	10
40. Exports Per Capita	*	7 to 10
41. Foreign Direct Investment Employment Share	34	9
42. Share of Population Born Abroad	14	6
VIII. ENVIRONMENTAL POLICY	19	8
43. Toxic Release Inventory, Pounds Per Square Mile	*	6 to 9
44. Greenhouse Gas Emissions Per Square Mile	15	8
45. Air Quality	*	7 to 10

* Rank not specified, but between 21 and 30; therefore, the precise rank among the comparison states cannot be computed.

Source: Beacon Hill Institute (https://www.beaconhill.org/Compete18/18thEd-BHI-SCI2018-0626.pdf).

Despite these shortcomings, the overall BHI ranks are significantly correlated with prosperity, measured both as the 2021 level and the 2011-to-2021 percent change.

The correlation with prosperity likely derives from the study's reasonably good coverage of the most important categories of location factors:

- Labor Force: The BHI study includes a "human resources" category.
- Infrastructure: The BHI study includes an "infrastructure" category.
- Business Costs: Though the BHI study does not include a category of business costs, some indicators in other categories address various business costs.
- Availability of Land and Buildings; Expedited Permitting. This difficult-to-measure category is not addressed in the BHI study.

Between 2006 and 2009, Arizona's overall BHI rank among the 50 states was between 16th and 22nd. Arizona has not ranked that high since then, with the 2010-to-2018 ranks ranging from 23rd to 40th; the 2018 rank was 24th. This is considerably higher than the state's rank on adjusted per capita GDP, which was 37th in 2021, an improvement from the ranks between 2008 and 2015, which ranged from 43rd to 49th. Among the 15 comparison states, Arizona ranked seventh or eighth on the overall competitiveness index in each year from 2006 through 2009. Since then, the rank was between 10th and 13th; it was 12th in 2018.

As seen in Table 4, Arizona had a high rank in 2018 only in the government and fiscal policy category. The state ranked below 35th in the human resources and security categories.

CNBC, "Top States for Business"

The CNBC study includes 88 metrics organized into 10 categories, which are not equally weighted (https://www.cnbc.com/2022/06/13/how-we-are-choosing-americas-top-states-for-business-in-2022.html). The weights (see Table 5) are based on how frequently states use these categories as a selling point in their economic development marketing. The highest possible number of points is 2,500. Grading is scaled, with the highest score equal to 100 percent and the lowest score equal to 50 percent. The latest report was released July 12, 2022.

CNBC does not specifically list and describe each of the 88 indicators, but does mention many of them in its discussion of methodology:

- Workforce: STEM (science, technology, engineering, and mathematics) concentration of workers; percentage of workers with college degrees; workers with associate degrees and industry-recognized certificates; net migration of educated workers; worker training programs; right-to-work laws; and economic output per job.
- Infrastructure: value and volume of goods shipped by air, waterways, roads, and rail; condition of highways and bridges; availability of air travel; time to commute to work; access to markets; availability of vacant land and office and industrial space; quality, availability, and price of broadband service; condition of drinking water and wastewater systems; reliability of the electrical grid; availability of renewable energy; and risk of flooding, wildfires, and extreme weather.
- Cost of Doing Business: business taxes; wages, utility costs, office and industrial space costs; and incentives and tax breaks.

TABLE 5
CNBC'S "AMERICA'S TOP STATES FOR BUSINESS"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Category Weight	Rank Nation	Rank Comparison States
OVERALL		34	12
Workforce	16%	7	6
Infrastructure	15	6	2
Cost of Doing Business	14	35	12
Economy	13	22	13
Life, Health, and Inclusion	13	50	15
Technology and Innovation	10	29	11
Business Friendliness	8	4	2
Education	7	42	12
Access to Capital	2	41	13
Cost of Living	2	33	10

Source: CNBC (https://www.cnbc.com/2022/06/13/how-we-are-choosing-americas-top-states-for-business-in-2022.html), July 12, 2022.

- Economy: GDP and job growth; state government credit ratings and budget; residential real estate; and number of major corporation headquarters.
- Life, Health, and Inclusion: per capita crimes rates; environmental quality; protections against discrimination; voting rights; health care quality, outcomes, and preparedness; and public health spending.
- Technology and Innovation: patents per capita; health, science, and agriculture research grants; and fostering emerging technologies.
- Business Friendliness: lawsuit and liability climates; regulatory framework; bureaucracy; and hospitability to emerging industries.
- Education: number of colleges and universities; state support for higher education; community college and career education systems; K-12 education test scores, class size, and spending; and life-long learning opportunities.
- Access to Capital: venture capital investments; traditional bank lending; and state-backed capital and loan guarantee programs.
- Cost of Living: index of costs for basic items.

The CNBC study has few significant shortcomings. The correlation with prosperity likely derives from the study's good coverage of the most important categories of location factors:

- Labor Force: The CNBC study includes a "workforce" category that has the greatest weight of any category. It also includes an "education" category.
- Infrastructure: The CNBC study includes an "infrastructure" category that has the second-greatest weight of any category.
- Business Costs: The CNBC study includes a "cost of doing business" category that has the third-greatest weight of any category.

- Availability of Land and Buildings; Expedited Permitting. The "business friendliness" category partially addresses these issues. There also is an indicator on the availability of land and buildings.

Between 2007 and 2010, Arizona's overall CNBC rank among the 50 states was between 10th and 18th. The rank was between 13th and 24th between 2011 and 2014. From 2015 through 2022 (there was no study in 2020), Arizona ranked from 20th to 34th; the 2022 rank was 34th. The latest rank is in line with the state's rank on adjusted per capita GDP, which was 37th in 2021. Among the 15 comparison states, Arizona ranked between eighth and 10th on overall competitiveness in each year from 2007 through 2014. Since then, the rank has been between 10th and 14th; it was 12th in 2022.

As seen in Table 5, Arizona compared favorably in the workforce, infrastructure, and business friendliness categories, but was rated mediocre or worse in each of the other seven categories.

Forbes, "Best States for Business"

Forbes magazine rates the 50 states in "The Best States for Business;" the latest report is from December 2019 (https://www.forbes.com/sites/samanthasharf/2019/12/19/the-best-states-for-business-2019-north-carolina-and-texas-utah-on-top/?sh=618fb64d541f). *Forbes* ranks the states based on 40 indicators that are grouped into six categories. *Forbes* provides little information regarding its study. Only ranks — not scores or indexes — are available; ranks on the individual indicators are not provided; and the category weights are not reported.

In the latest study, Arizona ranks above the middle of the 50 states overall, but it only ranks 12th among the 15 comparison states (see Table 6). Only in the growth prospects category does Arizona rank above the middle of the comparison states.

A summary of the indicators by category follows:

- Business Costs: This category largely consists of Moody's Cost of Doing Business Index (incorporating labor costs, utility costs, and taxes); it also includes the Tax Foundation's State Business Tax Climate Index.

TABLE 6
***FORBES*' "BEST STATES FOR BUSINESS"**
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	18	12
Business Costs	38	13
Labor Supply	12	9
Regulatory Environment	18	9
Economic Climate	12	10
Growth Prospects	3	3
Quality Of Life	35	11

Source: *Forbes* (https://www.forbes.com/sites/samanthasharf/2019/12/19/the-best-states-for-business-2019-north-carolina-and-texas-utah-on-top/?sh=618fb64d541f), December 19, 2019.

- Labor Supply: The measures include educational attainment, net migration, projected population change, percentage of the population between the ages of 25 and 34, and union membership.
- Regulatory Environment: The regulatory component of the Cato Institute's "Freedom in the 50 States" (which includes measures of liability property rights, health insurance, and the labor market), the legal climate, and antidiscrimination laws are included. The measures included in this category extend beyond its title to include the transportation infrastructure and measures of the state government's fiscal condition.
- Economic Climate: Economic growth, unemployment, and the number of major corporation headquarters comprise this category.
- Growth Prospects: This category is largely based on an economic forecast. Also included are entrepreneurial activity and venture capital.
- Quality of Life: Crime rates, cost of living, school test performance, cultural and recreational opportunities, climate, commute time, healthcare, and high-ranked colleges make up this measure.

This study has a variety of issues. In the business costs category, taxes are included twice: as part of Moody's Cost of Doing Business Index, and by the inclusion of the Tax Foundation's State Business Tax Climate Index. Thus, taxes may be overweighted in the *Forbes* study.

The emphasis on growth rates in the economic climate and growth prospects categories are a shortcoming of this study and likely explain in part why the results of the study are not correlated with prosperity in 2021. In the economic climate category, measures of economic growth and unemployment over the last five years are included. A state's performance on such measures relative to other states is not consistent over time and the fluctuations may have little to do with the business climate. For example, the real estate boom of the mid-2000s and the subsequent bust affected some states much more than others, causing significant variations in economic growth and unemployment measures. These fluctuations had little to do with a state's fundamental economic competitiveness. Economic growth and unemployment should be excluded, or weighted very lightly, in measures of competitiveness.

Economic growth also is included in the growth prospects category. Much of this category is based on a *forecast* of growth over the next five years by Moody's. Regardless of the group issuing the projections, large relative errors by state in five-year economic projections are likely. Such projections should not be included in an evaluation of competitiveness or of the best states for business. Similarly, one of the components of the labor supply category is a projection.

The inclusion of climate in quality-of-life evaluations always is problematic, given the many aspects of climate and that climatic preferences vary by individual. *Forbes* includes a simplistic mean temperature variable in its quality-of-life category.

Despite these shortcomings, the study's ranking is correlated with the change in prosperity and productivity measures. The correlations likely derive from the study's reasonably good coverage of the most important categories of location factors:

- Labor Force: The *Forbes*' study includes a "labor supply" category as well as a couple of indicators related to education.

- Infrastructure: The *Forbes*' study includes only a "transportation infrastructure" indicator.
- Business Costs: The *Forbes*' study includes a "business costs" category.
- Availability of Land and Buildings; Expedited Permitting. The *Forbes*' study includes a "regulatory environment" category.

Chief Executive, "Best and Worst States for Business"

Annually since 2005, *Chief Executive* magazine has asked chief executive officers and business owners to rank the states. The latest poll was conducted in early 2022 and included nearly 700 responses (https://chiefexecutive.net/best-worst-states-business/). No information is provided on the survey or methodology. However, the correlations provide insight into the thinking of the respondents. The ranks are negatively correlated with the cost of living and to each of the prosperity and productivity measures for 2021 and are not correlated with the 2011-to-2021 change in the prosperity and productivity measures. However, there is a positive correlation with the 2011-to-2021 change in each of the aggregate economic growth indicators, with a particularly significant relationship with employment growth. Thus, this study cannot be classified as a study of competitiveness, but rather a reflection of actual aggregate economic growth rates. However, the *Chief Executive* ranks are barely correlated with the aggregate growth indicators other than employment.

In the latest survey, Arizona ranked fourth overall (higher than in the prior year) and third among the comparison states, behind Texas, Florida, and Tennessee. Most of the other high-ranking states were comparison states. The lowest-ranked states were high-cost states: California, New York, Illinois, New Jersey, Washington, and Massachusetts.

ALEC, "State Economic Competitiveness Index"

The American Legislative Exchange Council (ALEC) annually issues the report "Rich States, Poor States," which includes the "ALEC-Laffer State Economic Competitiveness Index" (https://alec.org/publication/rich-states-poor-states-15th-edition/). The latest report was released in April 2022. The states are ranked on "Economic Performance" and on "Economic Outlook." The latter is their measure of competitiveness, consisting of 15 state policy variables, each of which can be influenced by legislators. Eight of the variables are measures of taxes. Others include tax/expenditure limits, government debt, per capita public employment, the state minimum wage, average workers' compensation, right-to-work status, and the quality of the state's legal system. The 15 variables are equally weighted.

The measure of competitiveness produced by ALEC is heavily tilted to taxes and government operations. It does a poor job of measuring the location factors of most importance:

- Labor Force: The ALEC study includes only a right-to-work indicator.
- Infrastructure: The ALEC study does not address this important category.
- Business Costs: Though the ALEC study includes several cost measures, nearly all are related to taxes.
- Availability of Land and Buildings; Expedited Permitting. This category is not directly addressed in the ALEC study.

The ALEC study therefore cannot be considered a comprehensive measure of competitiveness. Like the *Chief Executive* ranks, the ranks are negatively correlated with the cost of living and to each of the prosperity and productivity measures for 2021 and are not correlated with the 2011-to-2021 change in the prosperity and productivity measures. There is a positive, though weak, correlation with the 2011-to-2021 change in each of the aggregate economic growth indicators, with the strongest correlation with employment growth. However, the correlations of its ranks with the aggregate growth indicators generally are inferior to those of the BHI, CNBC, and Forbes studies.

In the latest report, Arizona ranked third among all states and the comparison states, behind Utah and North Carolina. Some of the other comparison states and some midwestern states also had high ranks. The lowest-ranked states were New York, New Jersey, California, Vermont, Minnesota, and Illinois.

Other Studies of Business Competitiveness

Other studies of business competitiveness include specialized analyses, such as of high technology, studies that examine many indicators without creating an overall ranking, and those that do not release results for each of the states. An example of the latter is U.S. News and World Report, which listed the 10 best states for business in March 2021. Arizona was not among the top 10, which consisted of comparison states and Northeastern states.

Massachusetts High-Technology Council

This organization maintains "The 50-State Competitiveness Dashboard" that consists of six competitiveness categories (https://www.mhtc.org/50-state-competitiveness-dashboard/). The metrics are weighted to produce category totals, but the categories are not combined into an overall value or ranking. Current results for Arizona are summarized in Table 7.

Arizona's high rank in the tax environment category results from its overall low state and local government per capita tax burden and its low corporate and individual income tax rates. The above average rank in the talent and workforce category largely results from a rank of second in the job openings and labor turnover survey. The middling rank in the cost-of-doing-business category results from a high rank in the health insurance premium indicator offset by below-average ranks in the retail price of electricity and unemployment insurance premium measures.

Milken Institute

Among the specialized studies is the Milken Institute's "State Technology and Science Index." It generally has been produced every two years since 2002; the 2022 report was released in November 2022 (https://milkeninstitute.org/report/state-technology-and-science-index-2022). It consists of more than 100 indicators, organized into five categories (see Table 8).

Overall and in three of the five categories, Arizona ranks above the middle of the 50 states, but it only ranks in the middle of the comparison states. The ranks from this study generally vary less from year to year than most studies. Among the 15 comparison states, Nevada and Oregon each improved their rank by seven places between 2010 and 2022; Arizona's rank dropped by one over this period.

TABLE 7
MASSACHUSETTS HIGH-TECHNOLOGY COUNCIL'S "50-STATE COMPETITIVENESS DASHBOARD"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
Fiscal Stability and Public Management	29	12
Talent and Workforce	18	10
Tax Environment	10	6
Growth and Innovation Climate	25	11
Cost of Doing Business	21	9
Quality of Life	33	8

Source: Massachusetts High-Technology Council (https://www.mhtc.org/50-state-competitiveness-dashboard/), accessed February 22, 2023.

TABLE 8
MILKEN INSTITUTE'S "STATE TECHNOLOGY AND SCIENCE INDEX 2022"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	16	8
Research and Development Inputs	18	8
Risk Capital and Entrepreneurial Infrastructure	14	8
Human Capital Investment	29	9
Technology and Science Workforce	31	11
Technology Concentration and Dynamism	8	6

Source: Milken Institute (https://milkeninstitute.org/report/state-technology-and-science-index-2022), November 29, 2022.

Information Technology and Innovation Foundation

Another specialized study is the "State New Economy Index" produced every few years since 1999 by the Information Technology and Innovation Foundation (ITIF). It was last updated in October 2020. The index includes 25 indicators organized into five categories; neither are equally weighted. The categories and indicators are shown in Table 9. Arizona ranks above the middle of the 50 states but below the middle of the comparison states.

The ITIF published a variant of the "State New Economy Index" in 2022, including Canadian provinces and Mexican states as well as U.S. states. This study includes 13 indicators in three categories. It is summarized in Table 10, with the ranks limited to the 50 U.S. states. Four of the 10 Canadian provinces ranked higher than Arizona. Arizona's overall rank is nearly identical to that of the "State New Economy Index."

TABLE 9
THE INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION'S "2020 STATE NEW ECONOMY INDEX"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	20	10
Knowledge Jobs	14	5
Information Technology Jobs	7	4
Managerial, Professional, and Technical Jobs	18	8
Workforce Education	30	9
Immigration of Knowledge Workers	29	10
Internal Migration of U.S. Knowledge Workers	39	12
Manufacturing Value Added	4	3
High-Wage Traded Services	21	7
Globalization	23	10
Foreign Direct Investment	32	9
Export Focus of Manufacturing and Services	13	8
High-Tech Exports	16	5
Economic Dynamism	10	8
Business Churning	8	7
Feast-Growing Firms	5	5
Initial Public Offerings	30	10
Inventor Patents	9	6
The Digital Economy	42	14
Online Agriculture	48	13
E-government	24	8
Broadband Communications	29	12
Health Information Technology	41	13
Innovation Capacity	20	10
High-Tech Jobs	16	10
Scientists and Engineers	19	9
Patents	15	6
Industry Investment in Research and Development	16	6
Nonindustry Investment in Research and Development	24	8
Movement Toward a Clean Energy Economy	22	10
Venture Capital	31	12

Source: Information Technology and Innovation Foundation (https://itif.org/publications/2020/10/19/2020-state-new-economy-index/), October 19, 2020.

TABLE 10
THE INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION'S "NORTH AMERICAN SUBNATIONAL INNOVATION COMPETITIVENESS INDEX"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	21	10
Knowledge Economy	14	9
Immigration of Knowledge Workers	17	8
Workforce Education	36	12
Scientific, Technical, and Professional Employment	10	6
Labor Productivity in Manufacturing	18	7
Globalization	19	6
Inward Foreign Direct Investment	29	6
High-Tech Exports	5	3
Innovation Capacity	20	9
Research and Development Intensity	22	7
Research and Development Personnel	23	9
Patents	19	7
Venture Capital	31	12
Business Creation	6	6
Broadband Subscribership Rate	13	6
Decarbonization	25	10

Source: Information Technology and Innovation Foundation (https://itif.org/publications/2022/06/21/north-american-subnational-innovation-competitiveness-index/), June 21, 2022.

State Ranks on Business Competitiveness

The overall state ranks from the BHI, CNBC, and Forbes studies are compared in Table 11 for each of the 50 states, listed by region of the country. Summing the ranks of the three studies, Texas has the best competitiveness, followed by North Carolina, Virginia, Utah, and Colorado. Seven of the top eight, and nine of the top 12, states are comparison states. Arizona ranks tied for 22nd among the 50 states and 11th among the 15 comparison states. Other than the Western and South Atlantic states, several states in the Plains region rank highly. The South region states, with the exception of Tennessee, rank well below the middle of the states.

The range in rank across the three studies was 11 or less in 26 of the 50 states. Large differences were present in the Northeastern and Great Lakes states. Tennessee had the greatest range at 32.

TABLE 11
OVERALL BUSINESS COMPETITIVENESS RANKS BY STATE

	Beacon Hill	*Forbes*	CNBC
WEST COMPARE			
Texas	3	2	5
Utah	8	3	8
Colorado	10	9	4
Washington	19	8	2
Idaho	5	10	20
Oregon	17	20	18
Arizona	24	18	34
California	20	31	29
Nevada	32	13	39
New Mexico	46	48	46
OTHER WEST			
Montana	23	30	30
Wyoming	30	32	32
Hawaii	43	47	46
Alaska	45	50	49
PLAINS			
Nebraska	6	11	7
Iowa	2	17	12
Minnesota	7	15	9
South Dakota	4	14	22
North Dakota	12	26	13
Kansas	13	36	21
Missouri	35	22	25
Oklahoma	47	24	38
GREAT LAKES			
Indiana	27	12	14
Wisconsin	18	21	23
Michigan	15	35	16
Ohio	34	29	15
Illinois	41	37	19

	Beacon Hill	*Forbes*	CNBC
NORTHEAST			
Massachusetts	1	19	24
New Hampshire	16	25	35
Vermont	21	45	31
Maine	28	44	43
Connecticut	33	43	39
Rhode Island	37	41	45
MID-ATLANTIC			
Pennsylvania	36	27	17
Maryland	26	34	27
New York	25	28	36
Delaware	42	23	28
New Jersey	50	39	42
SO. ATLANTIC			
North Carolina	11	1	1
Virginia	9	4	3
Georgia	14	6	10
Florida	22	5	11
South Carolina	29	16	37
SOUTH			
Tennessee	38	7	6
Kentucky	31	38	26
Alabama	40	40	33
Arkansas	39	33	41
Mississippi	44	42	50
West Virginia	48	49	44
Louisiana	49	46	48

Note: Ranks range from 1 to 50, with 1 indicating the greatest competitiveness.

Sources: Beacon Hill Institute (https://www.beaconhill.org/Compete18/18thEd-BHI-SCI2018-0626.pdf), *Forbes* (https://www.forbes.com/sites/samanthasharf/2019/12/19/the-best-states-for-business-2019-north-carolina-and-texas-utah-on-top/?sh=618fb64d541f), and CNBC (https://www.cnbc.com/2022/06/13/how-we-are-choosing-americas-top-states-for-business-in-2022.html).

INDIVIDUAL COMPETITIVENESS AND LOCATION FACTORS

Individual location factors were examined in detail in the October 2013 University Economist report "An Overview of the Household Location Decision Process, with a Focus on Arizona," which is available from https://economist.asu.edu/reports/an-overview-of-the-household-location-decision-process-with-a-focus-on-arizona. That report is summarized in this section. The focus is on individuals who migrate from one region to another, not those who move from one dwelling unit to another within the same region.

The location factors important to individuals are components of economic competitiveness in two ways:

- For businesses to attract and retain skilled workers, a region must be attractive to workers as a place to live.
- Tourists, seasonal residents, and migrating retirees represent a type of export economic activity dependent on individual, not business, location factors.

The location factors important to workers differ somewhat from the factors important to tourists and retirees.

The October 2013 paper placed individual location factors into three categories:

- Economic factors: employment opportunities and wages.
- Fiscal factors: state and local government taxes, and availability and quality of government services.
- Quality-of-place factors: housing, education, health care, transportation, cultural and recreational activities, environmental factors, crime, etc.

However, the October 2013 paper indicates that the attributes of a location as listed above may not be the only factors considered by individuals. For example, proximity to family and friends may also be important. Generally, among locations viewed as equally desirable, people prefer the one closest to their current location.

The typical person who migrates is of working age; in order to move, at least one member of the household must find employment in the destination. Thus, it is no surprise that the economic factors — particularly employment opportunities — are cited by such individuals as the most important location factors they considered. However, even for those individuals indicating that employment opportunities were the most important consideration, noneconomic factors — especially proximity to friends and family and climate — often were important components of the decision-making process.

For retirement-age migrants, the economic factors are of little or no consequence. For most retirees, the climate and the cost of living are the most important factors. Housing costs are the most significant of the cost considerations; taxes and other costs may also contribute to the decision. As with younger adults, the proximity to family and friends also can be important.

Young adults moving for educational reasons are another category of migrants. For these individuals, the educational institution is the primary location factor, but climate, recreation and many other factors may also be considered.

Evaluations of State Individual Competitiveness

A number of studies rank the states as "best states" or "best states to live in." While these studies do not focus on business competitiveness or prosperity, many include indicators related to the economy, infrastructure, and education that also are present in the business competitiveness studies reviewed in prior sections of this report.

U.S. News and World Report

This listing of "best states" is widely cited; it was published in March 2021 (https://www.usnews.com/news/best-states/rankings). The study consists of 67 indicators grouped into eight unequally weighted categories, with each category split into two or three equally weighted subcategories. Some of these categories are highly relevant to businesses, with many of the indicators included in one or more of the rankings of best states for business.

In the most recent study, Arizona ranked 39th on this list; it ranked between 34th and 39th in the prior three years of the study. Arizona ranked 13th among the 15 comparison states; it ranked between 10th and 13th in the prior three years. As seen in Table 12, Arizona ranked 38th or lower in five of eight categories and 11th or lower among the comparison states in six of the categories.

Arizona's highest rank was seventh in the economy category, with a rank of fourth in the growth subcategory. It ranked 21st in the health care category, ranking fourth in the quality subcategory but 43rd in the access subcategory. The opportunity category consists of affordability, economic opportunity, and equality subcategories; Arizona ranked below the middle of the states in each. The rank of 46th in the education category included a rank of 33rd in higher education and 47th in prekindergarten through the 12th grade. None of the education indicators reflect Arizona's low funding for education.

TABLE 12
U.S. NEWS AND WORLD REPORT'S "BEST STATES"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

		Arizona Rank	
Categories	Category Weight	Nation	Comparison States
OVERALL		39	13
Health Care	15.97%	21	7
Education	15.94	46	14
Economy	13.36	7	6
Infrastructure	12.93	23	11
Opportunity	12.29	40	11
Fiscal Stability	11.36	40	14
Crime and Corrections	9.16	38	11
Natural Environment	8.99	41	12

Source: U.S. News and World Report (https://www.usnews.com/news/best-states/rankings), March 2021.

Legatum Institute

The Legatum Institute, a London-based think tank, released "The American Dream Prosperity Index 2022" (https://li.com/reports/american-dream-prosperity-index-2022/) in November 2022, in conjunction with the Milken Center for Advancing the American Dream.[3] The study aggregates 230 measures into 49 themes, 11 "pillars," and three "domains." The themes consist of unequally weighted measures and the themes are unequally weighted to construct the pillars.

Each U.S. state and the District of Columbia are included. Results for Arizona in the 11 pillars are shown in Table 13. The first four pillars are included in the "Inclusive Societies" domain, the next three are part of the "Open Economies" domain, and the last four make up the "Empower People" domain.

Arizona ranked below the middle of the states on nine of the 11 pillars and at or below the middle of the 15 comparison states in all but one pillar. Of the pillars of particular significance to business competitiveness, Arizona ranked 39th on business environment, 41st on infrastructure, 29th on economic quality, and 43rd on education.

The business environment pillar consists of five themes, each of which consist of multiple measures. Arizona ranked first on the regulatory burden theme, but this makes up only 10 percent of the pillar. Arizona ranked in the middle of the states or lower on the other themes.

Arizona's low rank in the infrastructure pillar is due to low ranks in the communications theme, which consists of several measures related to Internet access, and in the transportation theme. Other than in the condition of bridges measure, Arizona ranked between the middle and bottom of the states on the other measures, which address roads, airports, railroads, and public transit.

TABLE 13
LEGATUM INSTITUTE'S "THE AMERICAN DREAM PROSPERITY INDEX 2022"
Arizona's Rank Among 51 States and 15 Comparison States (1 = Best)

Pillars	Nation	Comparison States
OVERALL	40	12
Safety and Security	37	10
Personal Freedom	31	8
Governance	25	8
Social Capital	49	13
Business Environment	39	11
Infrastructure	41	14
Economic Quality	29	12
Living Conditions	39	12
Health	31	10
Education	43	13
Natural Environment	12	5

Source: The Legatum Institute (https://li.com/reports/american-dream-prosperity-index-2022/), November 9, 2022.

[3] Prior versions of this report were titled "The U.S. Prosperity Index."

The economic quality pillar consists of four themes. Arizona ranked above the middle of the states on the dynamism and labor force engagement themes, but below the middle on the fiscal sustainability theme and the productivity and competitiveness theme.

Arizona compared poorly in each of the five themes in the education pillar. The measures largely consist of test scores of fourth-and-eighth graders, high school and college graduation rates, and educational attainment of the adult population. Funding for education is not among the measures, so Arizona's poor ranks do not reflect the state's low funding.

WalletHub

In August 2022, WalletHub released the "Best States to Live In" (https://wallethub.com/edu/best-states-to-live-in/62617). The study includes the 50 states ranked on 52 indicators that are not equally weighted into five categories, which are equally weighted (see Table 14).

As in most studies, Arizona compared unfavorably, more so relative to the 15 comparison states. The state's highest rank was in the economy category that is broad in nature, including measures of unemployment, poverty, aggregate growth, economic security, etc. It does not include any measures of productivity or prosperity.

Scholaroo

Scholaroo, a website aimed at students looking for scholarships, also produced a "Best States to Live In" (https://scholaroo.com/report/best-states-to-live-in/). Released in January 2023, the study includes 76 metrics organized into eight categories (see Table 15). The metrics and the categories are unequally weighted.

Arizona's highest rank was in the infrastructure category, which consists of eight diverse measures. Arizona also ranked above the middle of the states in the economy category, which consists of 10 diverse measures. In contrast, the state ranked last on education. This category includes seven metrics, none of which address funding.

TABLE 14
WALLETHUB'S "BEST STATES TO LIVE IN"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	38	12
Affordability	25	7
Economy	14	7
Education and Health	39	12
Quality of Life	21	11
Safety	40	9

Source: WalletHub (https://wallethub.com/edu/best-states-to-live-in/62617), August 15, 2022.

Other Evaluations, Using Fewer Indicators

HomeSnacks "combines recent data from the Census, FBI, OpenStreetMaps, and dozens of other sources into bite-sized studies to help you understand what it's like to live in different communities across the country." Among their reports is "The 10 Best States to Live in America for 2023" (https://www.homesnacks.com/these-are-the-10-best-states-to-live-in-america/), released in January 2023. This study relies on just nine equally weighted metrics, each collected from the 2017-to-2021 American Community Survey or the FBI crime data (see Table 16).

TABLE 15
SCHOLAROO'S "BEST STATES TO LIVE IN"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Categories	Nation	Comparison States
OVERALL	42	12
Affordability	32	10
Crime and Safety	30	5
Economy	21	11
Education	50	15
Health Care	30	9
Infrastructure	16	8
Quality of Life	21	8
Opportunity	22	11

Source: Scholaroo (https://scholaroo.com/report/best-states-to-live-in/), January 12, 2023.

TABLE 16
HOMESNACKS' "BEST STATES IN AMERICA"
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Indicators	Nation	Comparison States
OVERALL	42	13
Population Density	33	9
College Education	31	5
Unemployment Rate	36	12
Median Income	26	9
Home Value	19	9
Poverty Rate	37	10
Uninsured	41	10
Violent Crime	43	13
Property Crime	39	9

Source: HomeSnacks (https://www.homesnacks.com/these-are-the-10-best-states-to-live-in-america/), January 16, 2023.

MoneyRates.com released rankings in December 2022 (https://www.moneyrates.com/research-center/best-state-to-live-in/) that are based on six criteria: cost of living, median annual wage, state income tax, unemployment rate, change in the unemployment rate, and workplace safety. Arizona ranked 23rd in the nation and seventh among the comparison states.

Passport-photos.online released rankings in January 2023 (https://passport-photo.online/blog/most-and-least-livable-states-in-america/) that consist of four categories from the U.S. News' study — crime, economy, health care, and education — plus the average daily temperature. Arizona ranked 20th in the nation and 10th among the comparison states.

The United Nations' Human Development Index rates countries by three measures of well-being: education, standard of living, and life expectancy. 24/7WallSt.com followed this concept by ranking U.S. states on three measures: life expectancy at birth, percentage of the adult population who have earned at least a bachelor's degree, and the poverty rate. In this report released in January 2021 (https://247wallst.com/special-report/2021/01/15/all-50-states-ranked-by-livability/), Arizona ranked 30th in the nation and ninth among the comparison states.

ARIZONA'S BUSINESS COMPETITIVENESS

In this section, Arizona's competitiveness is assessed on each of several categories of location factors. In each category, a summary of the relevant data presented in the various studies of business and individual competitiveness is presented, largely in the form of Arizona's ranks. The ranks are presented among all states and among the 15 comparison states in the format xxth/xxth when each set of ranks is available. In some cases, additional data from other sources are presented. One such source is the five-year cumulation for 2017 through 2021 from the U.S. Census Bureau's American Community Survey (ACS).

Labor Force Quality and Availability

This discussion of labor force, the most important of the location factors, is divided into three parts — indicators related to educational quality and achievement, educational attainment, and other labor force indicators.

Labor Force Indicators Other Than Education

Several of the studies have categories related to the labor force and additional studies include some related indicators. One group of studies evaluates Arizona favorably in comparison to all states, while another group of studies rates Arizona as below average. Nearly all of the studies rank Arizona below the middle of the comparison states.

Arizona ranked 12th/ninth in *Forbes*' labor supply category, but two of the five indicators relate to simple population growth. The two studies by the ITIF also rated Arizona favorably relative to all states: Arizona ranked 14th/fifth in the State New Economy Index's knowledge jobs category and 14th/ninth in the more narrow-study's knowledge economy category. Each of these studies focus on the knowledge economy/high-tech workforce. Arizona compared favorably on the percentage of knowledge economy jobs, but less favorably on workforce education and the migration (both interstate and from other countries) of knowledge workers. The Massachusetts High-Technology Council ranked Arizona 18th/10th in its talent and workforce category. Arizona compared favorably on job openings and tech employment, but not as well on the education measures included in the category.

Arizona compared unfavorably in CNBC's workforce category (34th/12th). The category consists of a broad range of indicators. Arizona was rated similarly in BHI's human resources category (36th/10th). Arizona ranked quite low in the labor force participation, unemployment rate, and high school graduation rate indicators; the other indicators are related to health. The Milken Institute ranked Arizona 31st/11th in its technology and science workforce category, which consists of per capita employment in a large number of STEM occupations.

A few studies include measures of migration in their labor force categories. Using the ACS, which examines migration over the past year, Arizona ranked 13th/fourth on in-migrants from another state as a share of the population for the average of the 2017-to-2021 period. It ranked 25th/sixth on out-migration and third/third on net migration. From the perspective of the labor force, these ranks are somewhat overstated since Arizona's highest ranks occur in age groups 55 and older. Arizona ranked 16th/seventh on immigration from abroad, also with the highest ranks among those 55 and older.

The ACS also provides migration data by educational attainment. Arizona's strongest in-migration and net migration are among those whose maximum educational attainment is between a high school diploma and a bachelor's degree.

Several studies ranked Arizona quite low in its unemployment rate indicator, from 36th to 46th nationally. To verify this, the unemployment rate was calculated from the 2017-to-2021 ACS. Overall, Arizona ranked 36th/11th. The rank was similar using the five-year average of the unemployment rates produced by the U.S. Bureau of Labor Statistics: 39th/12th. Based on the ACS data, Arizona's national rank was 30th for men but 39th for women. Each sex ranked 11th among the comparison states. No significant relationship was seen with age.

Labor force participation measures also can be calculated from the ACS. For this paper, labor force participation is measured in two ways: the percentage of the population not in the labor force and the percentage of the population employed. On both measures, Arizona compared poorly. The percentage of the population aged 16 and older who were employed ranked 40th/12th among men and 44th/13th among women. Arizona ranked slightly above average among men 16-to-24 years old and among women 20-to-24 years old. Otherwise, Arizona's rank was considerably below average, especially among those of early retirement and traditional retirement age. Relative to the national average, the employment-to-population ratio in Arizona was between 1 and 5 percentage points less than the national average in each age group between 25 and 59, with a somewhat larger shortfall among women than men.

Educational Attainment

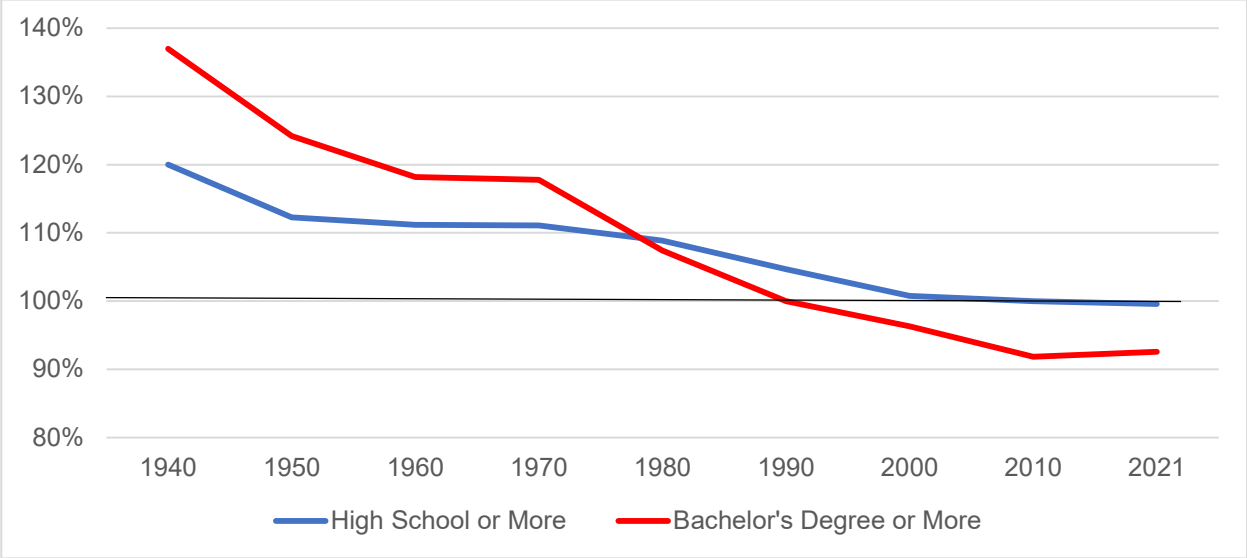
Educational attainment typically is reported for all adults of age 25 and older, generally expressed as the share with a high school diploma or the equivalent, and the share with at least a bachelor's degree. The share of those who are not a high school graduate was higher in Arizona than the national average, ranking 13th/sixth. The share who have earned at least a bachelor's degree was below average in Arizona, ranking 30th/11th.

For a long-term comparison of educational attainment, ACS single-year data are linked to decennial census data that were available from 1940 through 2000. As seen in Chart 1, Arizona has experienced a significant downtrend in educational attainment relative to the United States, particularly as measured by the share with at least a bachelor's degree.

More educational detail is available from the five-year ACS. The share of Arizonans 25 and older whose maximum attainment is some college or an associate degree was considerably above average, offset by lesser shares of maximum attainment of a high school diploma or equivalent, a bachelor's degree, and a graduate degree.

From the perspective of the labor force, looking at all individuals 25 and older is suboptimal, overstating Arizona's comparison to the U.S. average since the 65-or-older population in Arizona is better educated than their peers nationally, but have little participation in the workforce. There are two alternatives. The first is to look at educational attainment by age group; this provides a look at the attainment of the potential workforce. The second is to look at the attainment of those actually employed, expressed as those between 25-and-64 years of age. Each of these analyses use 2017-to-2021 ACS data.

CHART 1
EDUCATIONAL ATTAINMENT, AGE 25 OR OLDER,
ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau, 1940 through 2000 decennial census, https://www.census.gov/data/tables/2000/dec/phc-t-41.html, and 2010 and 2021 American Community Survey, https://www.census.gov/programs-surveys/acs/data.html.

By age group, Arizona's educational attainment is below average except among those 65 and older (see Table 17). The deficit is especially large among those younger than 45 as measured as the share with at least a bachelor's degree.

Among those employed between the ages of 25 and 64, the conclusion is similar. The share without a high school diploma was 18 percent higher than the U.S. average, ranking fifth/fifth. The share with at least a bachelor's degree was 11 percent less than the U.S. average, ranking 35th/11th.

The measures discussed so far are not useful to assessing Arizona's educational system since not quite 25 percent of those 25 and older were born in Arizona. Some of those not born in the state may have moved to Arizona as children and thus been the product of Arizona's educational system, but many moved to the state as adults. The educational attainment of Arizonans 25 and older varies widely by their place of birth, as seen in Table 18. The attainment of those born in Arizona was lower than the national average and substantially lower than those born in another state. The percentage not graduating from high school was 12.1 percent among those born in Arizona, but only 5.7 percent among those born in another state. The percentage earning at least a bachelor's degree was only 23.7 percent among those born in Arizona, but 36.2 percent among those born in another state.

The percentage not graduating from high school was much higher among those foreign born to parents without U.S. citizenship than to the other places of birth. However, the percentage with at least a bachelor's degree was somewhat higher among the foreign born than among those born in Arizona.

TABLE 17
EDUCATIONAL ATTAINMENT IN ARIZONA BY AGE GROUP

Age Group	Share as a Percentage of the U.S. Average	Rank Among the 51 States	Rank Among the 15 Comparison States
At Least a High School Graduate			
18 to 24	97%	47	13
25 to 34	98	45	12
35 to 44	98	47	11
45 to 64	99	44	11
65 and Older	103	21	6
At Least a Bachelor's Degree			
18 to 24	79	38	11
25 to 34	82	39	12
35 to 44	88	38	11
45 to 64	94	30	11
65 and Older	107	20	8

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Five-Year Estimates, 2017 through 2021.

TABLE 18
EDUCATIONAL ATTAINMENT IN ARIZONA BY PLACE OF BIRTH

Place of Birth	Share as a Percentage of the U.S. Average	Rank Among the 51 States	Rank Among the 15 Comparison States
Not a High School Graduate			
Arizona	136%	10	4
Different State	93	29	8
Outside United States to U.S. Parent	70	18	4
Outside United States	120	9	5
At Least a Bachelor's Degree			
Arizona	82	40	12
Different State	87	33	12
Outside United States to U.S. Parent	108	29	13
Outside United States	76	45	12

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Five-Year Estimates, 2017 through 2021.

Educational Quality and Achievement
Some studies have a category specific to education. Arizona compared poorly on each, with a national rank between 42nd and 50th and a rank among the comparison states between 12th and 15th.

In CNBC's education category, Arizona ranked 42nd/12th. The category includes a range of indicators, including test scores, class size, funding, and career education. The Legatum Institute ranked Arizona 43rd/13th on its education category. Arizona ranked in the 30s or 40s in nearly every measure, which include test scores, enrollment, graduation rates, and quality at each level of education. U.S. News ranked Arizona 46th, with below the middle ranks on each measure except higher education student debt. Scholaroo rated Arizona last, based on measures of student success, school quality, and student safety.

WalletHub has an education/health category, but health indicators account for more than two-thirds of the category's weight. Arizona ranked better (29th/ninth) on Milken's human capital investment category, which includes several education-related indicators, most of which are specific to science and engineering.

The publication *EducationWeek* produces the annual report "Quality Counts: Grading the States" (https://www.edweek.org/leadership/quality-counts-2021-grading-the-states). The latest report for 2021 was released in September 2021; the report was not produced in 2022 due to the pandemic's impact on data collection. The report compares the states on various K-12 educational measures. Arizona's ranks among the states from the latest report are displayed in Table 19.

According to *EducationWeek*, the "chance for success category" assesses "the role that education plays in promoting positive outcomes across an individual's lifetime." Arizona ranked quite low in this category and in each of its subcategories. Arizona also ranked near the bottom in the "school finance" category, including a second-lowest rank on spending. It was closer to the middle of the states on equity in the distribution of funding across school districts. The "K-12 achievement"

TABLE 19
EDUCATIONWEEK'S "QUALITY COUNTS"
Arizona's Rank Among 51 States and 15 Comparison States (1 = Best)

	Nation	Comparison States		Nation	Comparison States
OVERALL	46	13	School Finance	47	11
Chance for Success	43	13	Spending	50	14
Early Foundations	44	11	Equity	27	11
School Years	44	13	K-12 Achievement	22	10
Adult Outcomes	39	11	Status	40	13
			Change	11	5
			Equity	7	3

Source: *EducationWeek*, "Quality Counts: Grading the States," (https://www.edweek.org/leadership/quality-counts-2021-grading-the-states), September 2021.

category includes measures of student performance and high school graduation rates. Arizona compared favorably on the change in student achievement in recent years and in the equity subcategory, which looks at disparities between low-income students and others. Despite the high ranks in the "change" subcategory, Arizona still compared unfavorably in 2021 in the "status" subcategory.

Test Scores. Fourth and eighth grade students across the nation are tested every two-to-three years in mathematics and reading by the National Assessment of Educational Progress (NAEP), also known as "The Nation's Report Card." Scores are reported by state. The latest test was administered in 2022.

In fourth grade math, Arizona's score was less than the national average, ranking tied for 35th/11th. Eighth grade math scores in Arizona also were below the national average, ranking tied for 31st/tied for eighth. Arizona's reading scores were closer to the national average. In fourth grade reading, Arizona ranked tied for 28th/eighth. Arizona ranked tied for 23rd/tied for eighth in eighth grade reading.

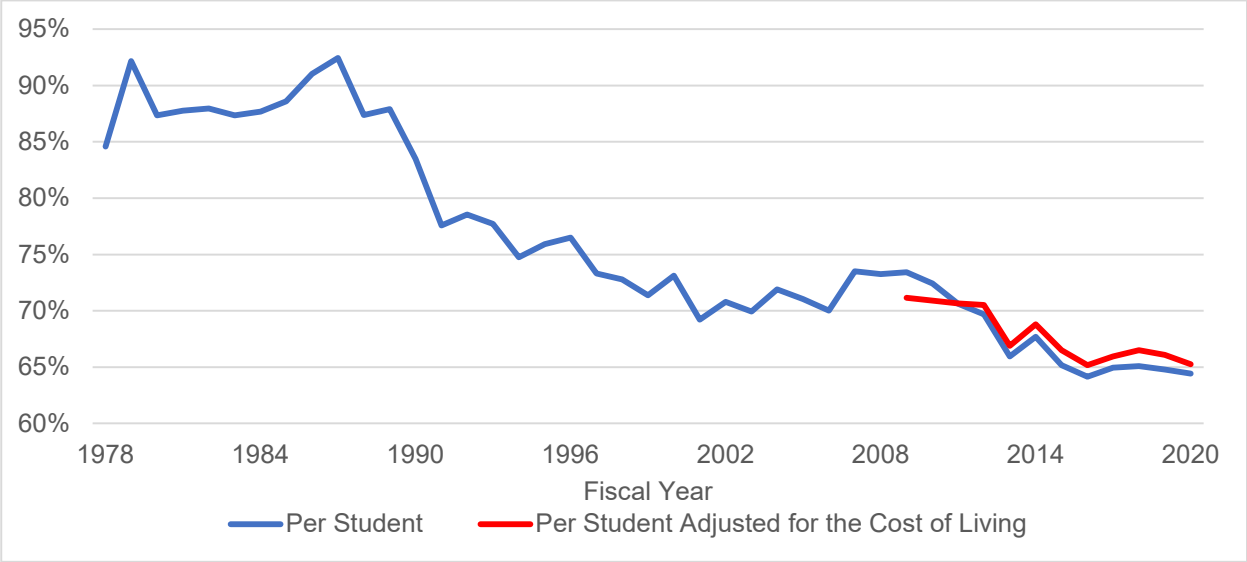
Additional subjects and 12th grade students also are tested, but most of these results are reported only for the nation. Science test results are sometimes reported by state, but the latest data are from 2015. Arizona's scores were below average in the fourth and eighth grades. Of the 46 states that participated, Arizona ranked 40th for the fourth grade and 41st for the eighth grade. Of the 14 participating comparison states, Arizona ranked 11th for the fourth grade and 12th for the eighth grade.

Funding: Elementary and Secondary Education. The Census Bureau produces an annual report on K-12 education finance by state, examining revenues and expenditures by category; the latest data are for FY 2020. Expenditures are split into current operations, capital outlays, and "other" (which consists primarily of interest payments). Expenditures for current operations is the focus in this analysis. On a per student basis, Arizona's spending has been below the U.S. average since the earliest data in FY 1978. However, as seen in Chart 2, spending relative to the nation dropped sharply in FYs 1990 and 1991 and has continued to decline since then. In FY 2020, Arizona's per student expenditure figure adjusted for the cost of living was 34.7 percent below the U.S. average, ranking 49th/13th, higher than only Idaho and Utah.

In FY 2020, Arizona's per pupil spending adjusted for the cost of living was considerably below average in each of the categories:

- Instruction: -41.6 percent, ranking last.
- Total support services: -25.1 percent, ranking 47th/11th.
- Pupil support: -10.6 percent, ranking 28th/sixth.
- Instructional staff support: -26.4 percent, ranking 39th/10th.
- General administration (school district): -41.0 percent, ranking 42nd/eighth.
- School administration: -44.0 percent, ranking last.
- Plant operations and maintenance: -15.3 percent, ranking 41st/seventh.
- Pupil transportation: -28.6 percent, ranking 42nd/ninth.
- Other support services: -31.4 percent, ranking 37th/11th.

CHART 2
CURRENT OPERATIONS EXPENDITURES PER STUDENT FOR ELEMENTARY AND SECONDARY EDUCATION, ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau, *Annual Survey of School System Finances*, https://www.census.gov/programs-surveys/school-finances.html (expenditures and enrollment) and U.S. Department of Commerce, Bureau of Economic Analysis, https://www.bea.gov/data/by-place-states-territories (cost of living).

Revenue for K-12 education from state and local government sources in Arizona in FY 2020 totaled $8.87 billion. The per FTE student figure after adjustment for the cost of living was $9,595 — 35.4 percent less than the national average of $14,859 and lower than in every state. In order to reach a rank of 26th among the 50 states and District of Columbia in FY 2020, an additional $4.45 billion in revenue would have been needed — an increase of 50 percent. To reach the national average per capita figure adjusted for the cost of living, the necessary increase in revenue would have been $4.96 billion — an increase of 56 percent.

Funding: Higher Education. As the world's economy has evolved, becoming more driven by ideas, information, and technology, the importance of education — particularly higher education (community colleges and universities) — has taken on increased significance. Higher education — in particular research universities — affect economic development in ways other than educating the future workforce. A research university imports money into its local area through its receipt of research funding from federal and other external sources. In this way, a public university is part of the region's economic base, as well as a support for the economic base. In turn, university research results in new private-sector economic activity. The presence of a research university and its world-class talent also helps to attract leading-edge, high-technology businesses to an area.

The State Higher Education Executive Officers Association annually produces a report on higher education revenue and full-time-equivalent (FTE) enrollment by state; data for community

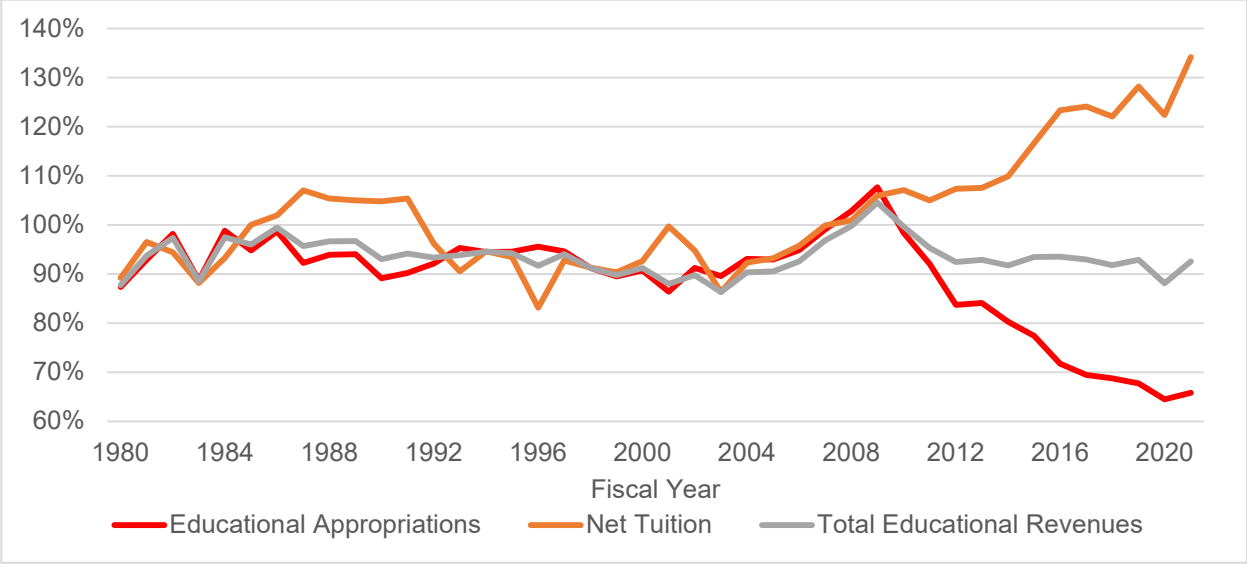
colleges and universities are combined. The revenue consists of educational appropriations from state and local governments and net tuition revenue. Education revenue per FTE student in Arizona expressed as a percentage of the national average is presented in Chart 3. From FY 1980 (the earliest data) through FY 2006, higher education revenue per FTE student in Arizona generally was somewhat below average on each component. In FYs 2007 through 2009, both components increased relative to the national average. Since FY 2009, educational appropriations per FTE student have dropped sharply while the tuition component rose further.

Appropriations for higher education from state and local government sources in Arizona in FY 2021 totaled $1.793 billion. The per FTE student figure after adjustment for the cost of living was $6,261 — 34.6 percent less than the national average of $9,327 and lower than in every state except Louisiana, Oklahoma, Colorado, and New Hampshire. In order to reach a rank of 26th among the 50 states and District of Columbia in FY 2021, an additional $693 million in revenue would have needed — an increase of 39 percent. To reach the national average per FTE student figure adjusted for the cost of living, the increase in revenue would have needed to be $903 million — an increase of 50 percent.

Physical Infrastructure

Like labor force quality and supply, measuring the physical infrastructure is difficult. Some of the business competitiveness and individual competitiveness studies include an infrastructure category. The results for Arizona range from good to bad.

CHART 3
HIGHER EDUCATION REVENUE PER FULL-TIME-EQUIVALENT STUDENT, ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Note: “Higher education revenue” is the sum of the revenue of community colleges and universities.

Source: Calculated from State Higher Education Executive Officers Association, *SHEF State Higher Education Finance, FY 2021*, https://shef.sheeo.org/report/.

Arizona compared most favorably (sixth/second) on CNBC's infrastructure category. It includes indicators addressing the shipment of goods, the condition of roads and bridges, the availability of air travel, commuting time, access to markets, the availability of land and buildings, and broadband services. Arizona ranked 16th/eighth on Scholaroo's infrastructure category. It includes measures of Internet speed, major airports, average road condition, electrical outages, structurally deficient bridges, hazardous dams, road maintenance budget, and park maintenance.

The infrastructure category produced by *U.S. News*, on which Arizona ranked 23rd/11th, includes several measures placed into three subcategories: energy (price, reliability, and renewable energy), Internet (access), and transportation (road quality, bridge quality, commute time, and public transit). The Beacon Hill Institute study's infrastructure category (27th/ninth) includes indicators addressing high-speed lines, air travel, travel time to work, electricity prices, and road quality.

Arizona's ranks (41st/14th) were much worse in the Legatum Institute's infrastructure pillar, which is split into three themes: communications (four measures related to Internet access and speed), resources (water usage and four measures related to electrical generation and reliability), and transportation (seven measures related to roads and bridges, airports, railroads, and public transit).

At the indicator level, Arizona's ranks are variable in each of the primary types of infrastructure: roads, air travel, Internet, and electricity. Due to this inconsistency, a more detailed look at Arizona's infrastructure is needed.

An Alternative Evaluation of Arizona's Infrastructure

The American Society of Civil Engineers (ASCE) periodically grades the nation and individual states on the quality of the infrastructure.[4] Table 20 summarizes the latest results. Arizona's overall grade was "C: mediocre: requires attention," barely higher than the national grade. ASCE identified a funding gap as Arizona's biggest issue.

Of the comparison states, ASCE report cards are available for eight of the nine western states — California, Colorado, Idaho, Nevada, Oregon, Texas, Utah, and Washington — and for four of the five South Atlantic states: Florida, Georgia, South Carolina, and Virginia. Arizona's overall grade was equal to the median of this group of 13 states; grades across the 13 states ranged from C+ to D+.

Arizona's lowest grade was in the "roads" category, one of the most important infrastructure categories for economic development. According to the ASCE:[5]

> "Local, state, and federal funding cannot adequately keep up with the expansion, modernization, and preservation required for safe and well-maintained roadway infrastructure. More money could be allocated to infrastructure by raising the gas tax and

[4] American Society of Civil Engineers, *2021 Report Card for America's Infrastructure*, https://infrastructurereportcard.org/ and *2020 Report Card for Arizona Infrastructure*, https://infrastructurereportcard.org/state-item/arizona/.
[5] American Society of Civil Engineers, *2020 Report Card for Arizona Infrastructure*, https://infrastructurereportcard.org/state-item/arizona/, page 56.

voting in favor of transportation initiatives. For Arizonans, the repair costs attributed to poorly maintained roads and bridges is reported to be more than three times what the cost of an increased gas tax would be."

The ASCE recommended the following actions to raise the infrastructure grades in Arizona:[6]

- "Develop a comprehensive, statewide asset database and an examination rubric to establish infrastructure priorities and improve coordination of asset management across all levels of agencies."
- "The current state gas tax does not keep pace with inflation and meet the needs of a growing population … implement additional measures such as a vehicle miles traveled charge or user fee for electric cars."
- "Develop outreach to highlight the current funding gap and the negative impacts experienced by Arizonans due to a lack of funding support."
- "Incorporate sustainability principles to mitigate irreversible impacts to the quality of life for Arizonans and the natural environment."

TABLE 20
INFRASTRUCTURE REPORT CARD

	Arizona	United States	Median of Comparison States*
Overall	C	C-	C
Aviation	B	D+	C+
Bridges	B+	C	C+
Dams	C-	D	C-
Drinking Water	C-	C-	C-
Levees	C-	D	D
Rail	C	B	C
Roads	D+	D	C-
Transit	C	D-	C
Wastewater	C-	D+	C-

* Median of the states reporting a grade in each category. Report cards are not available for New Mexico or North Carolina. Some categories are not available in each of the other 13 comparison states. The national report includes additional categories of infrastructure that contribute to its overall grade.

Note: The ASCE defines the grades as follows:
A: Exceptional: Fit for the Future
B: Good: Adequate for Now
C: Mediocre: Requires Attention
D: Poor: At Risk
F: Failing/Critical: Unfit for Purpose

Source: American Society of Civil Engineers, *2021 Report Card for America's Infrastructure*, https://infrastructurereportcard.org/ and *2020 Report Card for Arizona Infrastructure*, https://infrastructurereportcard.org/state-item/arizona/. Report cards for comparison states date from 2018 through 2022.

[6] American Society of Civil Engineers, *2020 Report Card for Arizona Infrastructure*, https://infrastructurereportcard.org/state-item/arizona/, page 10.

Public Infrastructure Investment in Arizona Relative to Other States

Both the public sector and private sector contribute to the provision of physical infrastructure. The public sector has a large role in the transportation infrastructure and in the physical infrastructure needed for education.

Most investment in infrastructure is made in the form of capital outlays.[7] The Census Bureau produces annual data by state of revenues and expenditures of state and local governments that include capital outlays by category. The latest data are for fiscal year (FY) 2020. Capital outlays can vary substantially from year to year due to the project orientation of the work — for example, a highway-widening project may boost capital outlays substantially for a couple of years. Thus, it is preferable to view capital outlays as a time series or as the average of multiple years. This analysis examines capital outlays overall and in the three largest categories: highways, elementary and secondary (K-12) education, and higher education.

Infrastructure expenditures are partially related to population growth. A fast-growing state needs to build infrastructure for new residents in addition to maintaining the existing infrastructure. Thus, infrastructure expenditures per capita in Arizona through the early 1990s generally were above the national average, as seen in Chart 4.

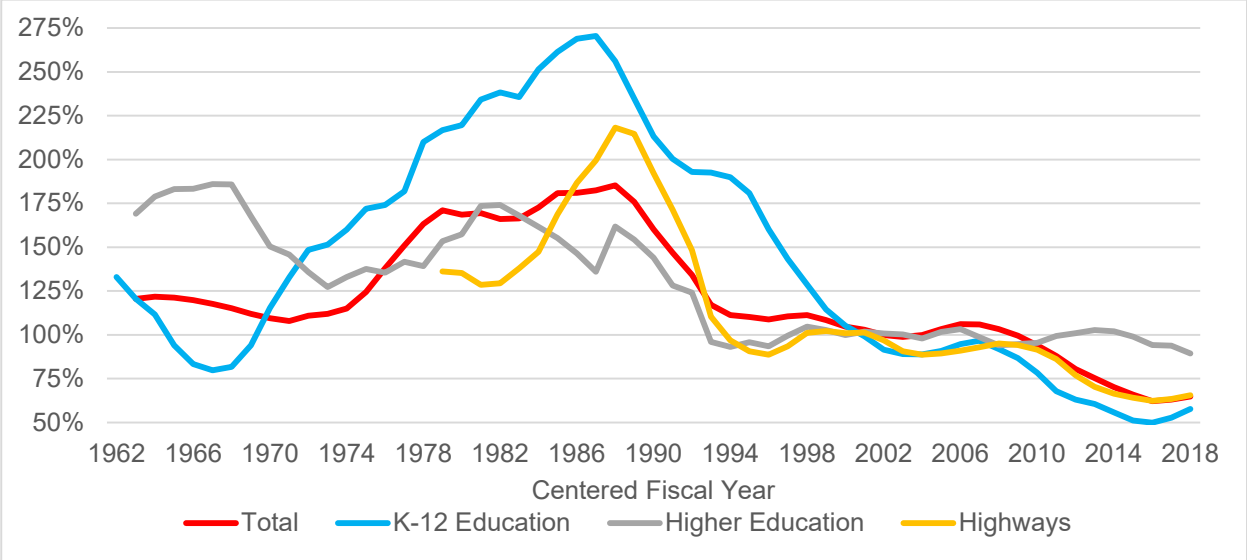
Since the 1980s, per capita capital outlays in Arizona relative to the national average have declined. From the mid-1990s through FY 2009, per capita total capital outlays in Arizona were not much different from the U.S. average. From FY 2010 through FY 2020, Arizona's figure was below average, by more than 25 percent beginning in FY 2014. This lowering of per capita capital outlays in Arizona relative to the national average has occurred in each of the three major categories, with the per capita figure considerably less than the national average in recent years for highways and for K-12 education.

Slowing population growth in Arizona somewhat contributes to this relative decline in investment. Based on both the percent change and numeric change in population between the decennial censuses, Arizona's rank slipped between 2010 and 2020. However, Arizona remains one of the fastest-growing states, while its per capita spending on capital outlays has fallen far below the national average. Thus, the conclusion is that Arizona is no longer adequately investing in infrastructure. An example is the I-10 freeway south of Chandler, which remains at just two lanes in each direction despite heavy traffic that includes many large trucks.

Using the sum of cost-of-living-adjusted per capita capital outlays over the 11 years from FY 2010 through FY 2020, the total in Arizona was 27.7 percent less than the national per capita average, ranking 47th/15th. In the highway category, Arizona ranked 48th/14th; the figure was 29.4 percent less than the U.S. average. Arizona ranked 44th/13th in the K-12 education category; the figure was 39.8 percent less than the U.S. average. In the higher education category, Arizona ranked 32nd/10th; the figure was 2.9 percent below average.

[7] Capital outlays are direct expenditures for the construction of buildings and other improvements; for additions, replacements, and major alterations to fixed works and structures; and for the purchase of equipment, land, and existing structures.

CHART 4
CAPITAL OUTLAYS PER CAPITA EXPRESSED AS A CENTERED FIVE-YEAR MOVING AVERAGE, ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from U.S. Department of Commerce, Census Bureau, *Annual Survey of State and Local Government Finances*, https://www.census.gov/programs-surveys/gov-finances.html (capital outlays) and U.S. Department of Commerce, Bureau of Economic Analysis, https://www.bea.gov/data/by-place-states-territories (population).

Business Costs

Some studies, including *Forbes*, use the Cost of Doing Business Index produced by Moody's Analytics. By state, the index consists of three components: labor costs (including wages, benefits, and productivity), commercial and industrial energy cost, and state and local government tax burden. The labor cost component is weighted most heavily. Moody's index is proprietary.

Forbes adds state tax information from the Tax Foundation to the Moody's index (which also includes taxes) to form its cost of doing business category. Arizona ranked 38th/13th. CNBC also has a cost of doing business category that is a little more broadly defined. Arizona ranked 35th/12th.

Arizona compared more favorably on two other indexes of the cost of doing business. The Massachusetts High-Technology Council produces a cost of doing business index on which Arizona ranked 21st/ninth. This index includes median household income as a proxy for labor costs, the employer-based health insurance premium, the retail price of electricity, and the employer contribution rate for unemployment insurance. Tipalti Approve produced "The 2021 Business Cost Index" based on the average annual wage, average electricity price, average Internet price, and the top corporate income tax rate (https://www.approve.com/business-cost-index/). Arizona ranked 18th/ninth.

At an indicator level, Arizona ranked near the middle of the states on labor costs except on its minimum wage. It had low costs for health insurance, workers compensation, and unemployment insurance, but above-average electricity costs.

Taxes

Much more information is available on taxes than on other business costs. Regardless of how the tax category is constructed, Arizona compares favorably.

The Massachusetts High-Technology Council has a tax environment category that includes the per capita state and local government tax burden, the top corporate and personal income tax rates, and a measure of the property tax. Arizona ranked 10th/sixth.

The Tax Foundation produces an annual "State Business Tax Climate Index" (https://taxfoundation.org/2023-state-business-tax-climate-index/). Arizona ranked 19th/seventh in the 2023 edition. The index consists of five unequally weighted components: corporate income tax (23rd/ninth), individual income tax (16th/seventh), sales tax (41st/12th), property tax (11th/fifth), and unemployment insurance tax (14th/fifth).

Ernst & Young annually produces the report "Total State and Local Business Taxes: State-by-State Estimates" (https://www.ey.com/en_us/tax/total-state-and-local-business-taxes-for-fy21). The latest report is for fiscal year 2021, released in October 2022. Rather than using the standard methodology that focuses on tax rates, this study measures actual tax collections as a percentage of the private-sector state gross product. Overall, Arizona ranked sixth/fourth (where a rank of first is given to the *lowest* tax burden). Arizona's ranks by category follow:

- Property Tax: 20th/eighth.
- Sales Tax: 35th/10th.
- Excise Tax (including public utilities and insurance): sixth/second.
- Corporate Income Tax: fourth/second.
- Unemployment Insurance Tax: 14th/ninth.
- Individual Income Tax on Business Income: 11th/sixth.
- License and Other Taxes: ninth/fourth.

Relative to the Tax Foundation's report, Arizona compared more favorably in the Ernst & Young report overall and in the corporate income tax, individual income tax, and sales tax categories, but worse on property taxes.

Another study by the Tax Foundation calculates the tax liability of a hypothetical company for each of eight types of businesses: "Location Matters 2021: The State Tax Costs of Doing Business" (https://taxfoundation.org/state-tax-costs-of-doing-business-2021/). Further, it shows the impact of tax incentives offered to a new business (in a state) relative to an existing business. Among the incentives considered in the study are tax credits for new jobs, research and development, and new investment; sales tax exemptions; property tax abatements; and payroll withholding tax rebates. The results for Arizona are shown in Table 21. Arizona compares less favorably for new businesses than existing businesses since it does not offer the range of tax incentives as many other states.

TABLE 21
TAX BURDEN OF HYPOTHETICAL COMPANIES, ARIZONA RANK

Type of Business	Rank Among All States		Rank Among Comparison States	
	Existing	New	Existing	New
Corporate Headquarters	15	23	6	6
Research and Development Facility	15	33	6	8
Technology Center	9	31	4	8
Data Center	5	22	2	6
Shared Services Center	5	17	3	5
Distribution Center	19	27	9	11
Capital-Intensive Manufacturing Operation	14	34	3	6
Labor-Intensive Manufacturing Operation	5	25	3	5

Note: A rank of 1 indicates the lowest tax burden.

Source: Tax Foundation, "Location Matters 2021: The State Tax Costs of Doing Business" (https://taxfoundation.org/state-tax-costs-of-doing-business-2021/).

Availability of Land and Buildings/Expedited Permitting

While the availability of land and buildings and expedited permitting rank relatively high among the business location factors, compiled data on these factors is almost entirely lacking. The CNBC study explicitly includes an indicator on land and building availability, but indicator-level data from the CNBC are not available. The CNBC's business friendliness category, on which Arizona ranked fourth/second, and Forbes' regulatory environment category (18th/ninth) may provide broad insight into these location factors.

Other Location Factors

While many other location factors may be important to certain types of businesses, the following factors are of lesser significance to the average company than the four categories of location factors discussed above.

Technology

Arizona ranked 16th/eighth on the Milken Institute's latest "State Technology and Science Index" and 20th/10th on the ITIF's latest "State New Economy Index" — somewhat above the middle of all states but in the middle of the comparison states. At the category level of the various studies, Arizona mostly ranked above the middle of all states and in the middle of the comparison states. However, Arizona ranked less favorably in the following categories: Milken Institute's technology and science workforce, BHI's technology, CNBC's technology and innovation, and ITIF's digital economy.

At the indicator level, Arizona generally ranked above the middle of all states and in the middle of the comparison states on measures of tech jobs. In the February 2021 report "STEM Economic Activity by State" (https://ccpr.wpcarey.asu.edu/sites/default/files/stemstates02-21.pdf), Arizona ranked 16th/seventh on the STEM share of employment in 2019 and 20th/ninth on the change in share between 2005 and 2019. However, Arizona compared less favorably when the distribution of each state's STEM activity by metro area is considered — like many economic variables, STEM concentration is higher in large metro areas than smaller metro

areas/nonmetro areas. Taking this into account, Arizona ranked 36th/12th in 2019 and 27th/ninth on the 2005-to-2019 change.

Arizona ranked in the middle of all states and the comparison states on most measures related to patents. For measures related to research and development, Arizona generally ranked above the middle of all states and in the middle of the comparison states. On measures of movement (immigration and internal migration) of knowledge workers, Arizona ranked from average to below average. Two areas in which Arizona compared poorly are science and engineering students and degrees, and funding from the National Institutes of Health.

As seen in the second paper of this series, Arizona's range of technology activities is narrow. The state compares favorably in semiconductors and aerospace, but is quite limited in other tech activities.

Access to Capital

In the access to capital category of the CNBC study, Arizona ranked 41st/13th. Beacon Hill Institute included three indicators related to financing in its study. Arizona ranked eighth/second on per capita IPO (initial public offering) volume, but only 34th/eighth on per worker venture capital and 47th/eighth on per capita deposits in commercial banks and savings institutions. On measures of venture capital included in other studies, Arizona generally ranked a little below the middle of all states and well below the middle of the comparison states.

Regulatory Environment

In the CNBC study, the regulatory framework is part of the "business friendly" category; Arizona ranked 16th/tied for third in this category. While the *Forbes* study has a category labeled "Regulatory Environment," the indicators included in this category go beyond regulations. Arizona ranked 18th/ninth in this category. The Legatum Institute's study includes a regulatory burden theme, on which Arizona ranked first in the country. Its "domestic market contestability" theme largely consists of measures related to occupational licensing; Arizona ranked 47th nationally.

Environmental Policy

Arizona's rank varied widely across the three studies that have categories addressing the natural environment:

- The Legatum Institute's natural environment category: 12th/fifth.
- The BHI's environmental policy category: 19th/eighth.
- U.S. News' natural environment category: 41st/12th.

Most of the indicators related to the natural environment measure air quality and emissions. Arizona generally ranked in the middle of the states, though U.S. News ranked Arizona last on urban air quality.

Globalization

Each of the ITIF's two reports include a globalization category. Arizona ranked 23rd/10th in the category of the State New Economy Index and 19th/sixth on the more narrow study. In the BHI's "openness" category, Arizona ranked 28th/10th.

Most of the indicators relate to either exports or foreign direct investment. In each, Arizona's ranks ranged from above-to-below average.

Government

Apart from the issue of taxes, various other aspects of government operations were included in some of the competitiveness studies. At the category level, Arizona's ranks ranged widely:

- BHI's government and fiscal policy: second/first.
- Legatum Institute's governance pillar: 25th/eighth.
- Massachusetts High-Technology Council's fiscal stability and public management: 29th/12th.
- U.S. News' fiscal stability: 40th/14th.

Differences in timing as well as in the indicators selected may explain the variation.

At the indicator level, the variation in Arizona's ranks continued across similar measures from different studies. Among the topics are government credit, bond rating, pension funds, debt, fiscal balances, and reserve funds.

Quality of Life

More accurately called the "quality of place," the quality of life has no generally accepted definition. It can incorporate a range of indicators on topics such as public safety and crime, educational system, health care, transportation system, cost of living, employment opportunities, cultural and recreational opportunities, environmental quality, and climate and lifestyle. The importance of the quality of place as a business location factor varies widely by study. While some aspects of the quality of place may not have much impact directly on a company's operations, they do impact the ability of a company to attract and retain a workforce.

Three of the business competitiveness studies include a quality-of-life category, though the indicators included in this category varied across the studies. Each study rates Arizona poorly. Arizona ranked 37th/11th in the *Forbes*' quality-of-life category that is broadly defined, including indicators related to climate, cost of living, crime, cultural and recreational opportunities, and education. CNBC ranked Arizona last in its life, health, and inclusion category, which includes measures related to health, environmental quality, crime, and inclusiveness laws. Other related CNBC categories are education (42nd/12th) and cost of living (33rd/10th). The Massachusetts High-Technology Council's quality of life category includes measures of educational quality, housing affordability, commute time, and health quality; Arizona ranked 33rd/eighth.

Quality of life and/or specific aspects of it are included in each of the primary studies of individual competitiveness. Arizona ranked in the middle of the states in a few of these categories, but in most categories, it ranked between 30th and 40th. On measures related to income, Arizona ranked in the middle, but was below the middle on poverty measures. On most measures of housing affordability, Arizona ranked below the middle. Based on the 2017-to-2021 ACS, Arizona ranked below the middle of all states, but in the middle of the comparison states, on rent. On homeowners' costs, Arizona ranked in the middle of all states and of the comparison

states. Arizona also ranked at or just below the middle of the states on various measures of earnings and income.

At the indicator level, Arizona ranked among the worst states on measures related to crime and security. On measures related to health and health care, Arizona generally ranked from the middle of the states to below the middle.

Summary of Arizona's Business Competitiveness

Arizona's rank among the middle of the states on the best studies of economic competitiveness are matched by its mediocre rating on most location factors. The primary exception is the state's poor evaluation on all aspects of education: test scores, graduation rates, attainment, and funding. On other aspects of the labor force — the top-rated location factor — Arizona receives mixed marks. The state has a strength in its high-tech workforce, but this is quite narrow in scope, limited to semiconductors and aerospace. The state's low labor force participation rate and high unemployment rate indicate that a portion of the state's current and potential workforce have serious limitations in educational attainment/job skills.

Infrastructure is the second-highest-rated category of location factors. While Arizona has some variability in its ratings, it generally rates in the middle on each type of infrastructure. However, the declining public-sector investment in infrastructure raises concerns that some types of infrastructure — particularly transportation — will join education as a serious drawback to economic development.

The third-most-important category of location factors is business costs. Again, Arizona generally rates in the middle. Business taxes are low, but electricity prices and the minimum wage are above average.

On other categories of location factors, Arizona's rating ranges from somewhat above average (e.g. its regulatory environment) to somewhat below average (e.g. its access to capital). The exception is its consistently low ratings on quality of life (quality of place). Despite the low quality-of-place ratings, the state experiences strong net migration, suggesting that newcomers either are unaware of the state's issues or highly value its climate, natural environment, and lifestyle. Net migration already has slowed from the pace of the 1990s through mid-2000s. It is unclear how much the state's quality-of-place shortcomings have contributed to this slowdown and whether quality of place will play a larger role in the future.

ARIZONA'S INDIVIDUAL COMPETITIVENESS

Most of the popular indexes and ratings related to the best states in which to live either use no weighting of the indicators and categories or else use surveys to gather information on relative importance that a sample of individuals assign to each of the factors (and in fact this survey approach is often also used to select the set of factors to be included in the index). The October 2013 paper on individual competitiveness described this as "traditional methodologies" of best-place/quality-of-life studies. On each of the five recent studies cited earlier in the "Individual Competitiveness and Location Factors" section, Arizona ranked between 38th and 42nd among all states and 12th or 13th among the 15 comparison states.

However, at least to many living outside Arizona, climate is of special importance. Individuals contemplating a move may not even be familiar with Arizona's poor rating on a variety of other measures. This helps to explain why Arizona has received such strong net in-migration despite its poor rankings on so many indicators.

The October 2013 paper presented an alternative approach to evaluating quality of place, whose results are more in line with actual migration flows. The state ranked high on these "statistical analyses." That paper gave a possible explanation for this contradiction between the ranks from the traditional methodology and from the statistical analyses as "for that subset of movers who chose Arizona, the state's employment opportunities, low taxes, the draw of family and friends who already live in the state, and the sunny climate were the most important factors, trumping its poorer showing on other issues." In other words, while Arizona may be viewed favorably by one set of workers, particularly young adults without technical skills who largely earn average wages, at the same time the state may be viewed unfavorably by another set of workers who take a broader view of the quality of place, particularly those with technical skills who are paid well.

Historically, Arizona's strong employment opportunities have been a major factor explaining the state's large number of net in-migrants. Only briefly during recessions have employment opportunities been limited. However, annual average employment growth over the last 20 years was less than during the prior 20 years, somewhat lessening employment opportunities in Arizona for potential working-age migrants.

Wages never have been a positive location factor for individuals considering a move to Arizona. The state's strong net in-migration has occurred despite wages below the national average. It appears that people are willing to accept a lower wage in Arizona due to the state's perceived strengths on noneconomic factors, particularly climate.

Among the fiscal factors, Arizona's low individual taxes are rated favorably. However, for some people, particularly those with higher educational attainments, this positive may be offset by the state's limited expenditures for public services, such as education and transportation. In-migrating retirees likely evaluate the state's fiscal factors more highly than working-age adults since they have no vested interest in education and they use the roads less frequently than those commuting to work.

Arizona policymakers historically have given little thought to the importance of those individual location factors that can be influenced by public policy, assuming that strong in-migration of

individuals to Arizona and the strong job creation that enables individuals to move to the state would simply continue due to the state's inherent natural attractions. There are various risks to this (lack of) strategy. Most importantly, those with more education are relatively more concerned with quality-of-place factors beyond the natural environment. Those with dependent children seem most likely to give these other factors extra scrutiny. This could make it difficult for the state to compete in a U.S. economy that is being driven by more educated and innovative individuals and may partially explain the state's slower growth over the last two decades. Other risks include the possibility of a warming climate, which could diminish the perceived climate advantage, given that most Arizonans live in the low, hot deserts.

COMPARISON OF BUSINESS AND INDIVIDUAL COMPETITIVENESS

Most location factors are considered similarly by businesses and individuals:

- The quality of place is an important factor for individuals and also is considered by businesses concerned with their ability to attract and retain workers.
- Taxes that are applied equally to individuals and businesses, such as the sales tax, are viewed similarly by the two groups: each desire low taxes, but this wish is constrained by the public services that each group expects to be available. The public services sought by the two groups are generally similar, including a transportation network and an educational system.
- Both groups desire low costs, such as for real estate and utilities.

Other location factors are of importance only to one of the groups. For example, businesses are concerned about regulations; proximity to family and friends only applies to individuals. A few factors are viewed in contradictory ways by the two groups. In particular, low wages are attractive to businesses, while high wages are a draw for individuals.

Few of the location factors that are under the influence of public policy benefit one group at the expense of the other. Some public actions may primarily benefit one of the groups, but in general, a public policy decision will benefit both groups. Improving the transportation system in order to improve business competitiveness also will benefit individuals. Improving the educational system to improve the lives of individuals also will benefit businesses. The primary exception is taxes that only apply to one or the other group.

A summary of Arizona's ranks across the various studies of business and individual competitiveness reviewed in this paper is presented in Table 22. Despite different methodologies and metrics, the studies of individual competitiveness are remarkably consistent at ranking Arizona around 40th among the 50 states and 12th or 13th among the 15 comparison states. More variation is present across the broad business competitiveness studies, with Arizona ranking from above to below the middle of the 50 states. However, Arizona generally ranked 12th among the 15 comparison states in each of these studies. Among the more narrowly defined business studies and across the business-related categories of the individual competitiveness studies, more variation is present.

Relative to the business ranks among the 50 states, Arizona's cost-of-living-adjusted prosperity in 2021 ranked lower – 36th on per capita GDP and 42nd on per capita personal income – but the adjusted percent change between 2011 and 2021 in the prosperity indicators ranked higher (sixth on per capita GDP and fourth on per capita personal income).

TABLE 22
COMPARISON OF RANKS
Arizona's Rank Among 50 States and 15 Comparison States (1 = Best)

Study/Metric	Nation	Comparison States
Prosperity, 2021 Adjusted for the Cost of Living		
Per Capita Gross Domestic Product	36	11
Per Capita Personal Income	42	12
Prosperity, 2011-t0-2021 Percent Change Adjusted for the Cost of Living		
Per Capita Gross Domestic Product	6	4
Per Capita Personal Income	4	4
Individual Competitiveness		
Legatum Institute	40	12
U.S. News and World Report	39	13
WalletHub	38	12
Scholaroo	42	12
HomeSnack	42	13
Business Competitiveness Broadly Defined		
Beacon Hill Institute	24	12
CNBC	34	12
Forbes	18	12
Business Competitiveness Less Broadly Defined		
American Legislative Exchange Council	3	3
Chief Executive	4	3
Milken Institute, State Technology and Science Index	16	8
Information Technology & Innovation Foundation, State New Economy Index	20	10
ITIF, North American Subnational Innovation Competitiveness Index	21	10
Business-Related Categories of Individual Competitiveness Studies		
Legatum Institute, Business Environment	39	11
Legatum Institute, Infrastructure	41	14
Legatum Institute, Economic Quality	29	12
Legatum Institute, Education	43	13
U.S. News, Economy	7	6
U.S. News, Infrastructure	23	11
U.S. News, Education	46	14
WalletHub, Economy	14	7
WalletHub, Education and Health	39	12
Scholaroo, Economy	21	11
Scholaroo, Infrastructure	16	8
Scholaroo, Education	50	15

Source: Compiled by authors.

IMPROVING ARIZONA'S COMPETITIVENESS

The first paper of this series documented that Arizona's productivity and prosperity are below the national average, by considerably more than during the 1970s, suggesting that the state's leaders should examine ways to improve the standard of living of the state's residents. Of course, not all of the state's shortcomings are equally amenable to public policy solutions, with the private sector/market forces heavily influencing some aspects. However, it is clear that over time the state has greatly reduced its investments in itself — particularly in public education and physical infrastructure. This trend started slowly in the late 1960s, with the pace of disinvestment increasing since the early 1990s.

In the second paper of this series, the state's traded clusters were examined. Traded clusters account for a below-average share of the state's total employment and total aggregate earnings, per capita employment is below average in the traded clusters, and average earnings per worker adjusted for the cost of living is below average in the traded clusters. In particular, adjusted average earnings is far below average in some industries within key, high-paying traded clusters. The much below-average earnings indicates that the nature of the work performed in Arizona in these industries is fundamentally different from the national norm for the industry, requiring fewer skills and therefore lower paying.

This third paper of the series provides insight into why Arizona has a shortage of jobs in most traded clusters and why the jobs that are present disproportionately consist of an industry's lower-paid occupations. Below-average educational attainment is the primary reason.

Key Factors in a High-Quality 21st-Century Economy

Enrico Moretti of the University of California at Berkeley has written a series of papers focusing on the increasing importance of education to the key traded industries that are driving the 21st-century economy. Among his publications is a 2012 book *The New Geography of Jobs* (Houghton Mifflin Harcourt). His May 2014 paper "Are Cities the New Growth Escalator?"[8] is reviewed in this subsection (available from the World Bank at http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2014/05/20/000158349_20140520115603/Rendered/PDF/WPS6881.pdf). In this paper, Moretti addresses (1) the factors that explain geographic differences in productivity and prosperity, and (2) the public actions that can be taken to enhance an area's competitiveness (what he terms "place-based economic policies"). His conclusions largely are based on sophisticated empirical analyses of relatively recent data on U.S. metro areas, but he looks at conditions in other countries as well.

Moretti arrays U.S. metropolitan areas based on the percentage of the workforce with at least a bachelor's degree. He then compares across the metro areas the salaries of workers with at least a bachelor's degree and the wages of those workers with a high school diploma as their maximum educational attainment. He finds that the salaries of both groups are substantially higher in those metro areas with the highest proportion of college graduates in the workforce than in the metros with the lowest share of college graduates. If Moretti's figures are adjusted for the cost of living, salaries of college graduates are 10 percent higher in the best-educated metros. However, the differential is 38 percent among high school graduates.

[8] Though Moretti uses the term "city," his research is based on metropolitan areas; he uses "city" and "metropolitan area" interchangeably.

The larger differential among high school graduates demonstrates the findings from one of Moretti's earlier papers — that less-educated workers benefit disproportionately if an area is successful at attracting high-wage jobs filled by individuals with substantial educational attainments and skills. The spillover of benefits to less-educated workers can be traced to improvements in productivity that result from the sharing of knowledge and skills across worker groups and from shifts in the industrial mix to knowledge-based activities. These productivity gains translate into higher output and earnings.

Moretti has found that geographical differences in the college-educated share of the workforce, in productivity, and in prosperity have been increasing. He attributes this to the increased importance of agglomeration (defined as gathering into a mass) in the knowledge economy that began to emerge in the latter part of the 20th century. Agglomeration in economics refers to the benefits that firms obtain by locating near each other and forming a cluster, due to economies of scale and network effects. The result is an increase in labor productivity and wages.

Moretti cites three forces of agglomeration:

- "Thick" Labor. In general, "thick" markets with many "sellers" and many "buyers" are efficient due to the ability to match supply and demand. In the case of the job market, the sellers are companies and the buyers are workers. A thick labor market matters more for highly skilled workers. An individual with a specialty is more likely to find a job that matches his skills in a large metro area with an existing cluster of possible employers; a company looking for a specific set of skills is more likely to find that in a large market.
- Thick Markets for Specialized Service Providers. Companies in traded clusters generally limit themselves to core functions; secondary, support functions are provided by other companies that specialize in a particular service. If a company locates in a large metro area that has a cluster of similar companies, it is more likely to find such specialized service providers.
- Knowledge Spillovers. A strong relationship exists between the percentage of the labor force with at least a bachelor's degree and the wages of those with lesser educational attainment, as noted above. Sharing knowledge and skills through formal and informal interactions generates significant knowledge spillovers. This largely occurs through face-to-face interactions. It has been found that geographical distance impedes the flow of ideas, even in today's world of easy electronic connections.

These forces of agglomeration generate efficiencies, or economies of scale. These increasing efficiencies apply to the entire cluster in a region.

The increased importance of agglomeration — of being close to other workers, other companies, service firms, etc. — is contrary to the predictions from the late 20th century that the new communications technologies would render location unimportant. With the new communications technologies, it was predicted that companies would seek out less-expensive places in which to operate. Instead, location is more important in the knowledge economy than it was in the past. Moreover, many of the most vibrant innovative clusters, such as in San Jose, Boston, and San Diego, are in areas with very high business and living costs.

Moretti contends that those metro areas with existing agglomerations in the knowledge economy are in a position to strengthen their position over time, while metro areas without these attributes will be severely challenged not to lose ground over time. He calls it a "tipping-point dynamic" — once an area has a core of innovative workers and companies, it becomes more attractive to other innovative workers and companies.

A shortage of leading-edge clusters presents a real challenge to economic development. According to Moretti, "It is a classic chicken-and-egg problem. Specialized workers will not move to a city that does not have a cluster because it will be hard to find an employer that values their unique skills. Innovative companies will not move there because finding specialized labor will be difficult."

Moretti evaluates three strategies of economic development:

- Building Clusters. In essence, this is defined by Moretti as when a community offers subsidies to attract a large company that is in the process of site selection, with the goal of using this company to seed a cluster. For those communities that attract such a company, rising productivity often results. However, whether this represents a net positive to the community depends on the size of the subsidies. In some cases, the subsidies have amounted to more than $100,000 per job.
- Leveraging Universities. The presence of a university sometimes is related to a better-educated workforce, higher wages, and higher productivity. These conditions result from knowledge spillovers generated by university research that foster innovation, and from start-up companies created from university research. However, there are many instances of large universities in metro areas that "rank low on the list of innovation hubs." Moretti includes the Phoenix area (Arizona State University) as ranking low on this list. Moretti concludes that a university by itself is not enough — even a strong research university needs to be part of a broader ecosystem of innovation that includes thick markets and specialized services.
- Making a "Big Push." Moretti defines this as a coordinated policy to address shortcomings in the labor supply, in innovative clusters, and in specialized service companies. Its goal is to build strong clusters that become self-supporting. Since the preceding discussion has noted the need to have multiple pieces in place in order to succeed, one would expect to find such a strategy to be successful, albeit expensive. Moretti, however, states that the track record of such big pushes is not good, especially in the United States. He says that none of the major high-tech centers in the United States was planned in this way. However, some of the success stories, such as San Diego's bio cluster, did involve some degree of planning and public support. The greatest challenge to the success of a big push is that policymakers must be able to pick promising technologies and promising companies, which is difficult even for professional venture capitalists.

Summary of Regional Location Factors

Regional economic development targets traded industries. To be moderately successful across a range of base activities, a region must be competitive on the traditional location factors, particularly the quality and availability of the workforce, the quality and availability of the physical infrastructure, and cost factors. A region that does not compare favorably on each of

these location factors but is competitive in some factors may still achieve some success, but in a smaller number of traded activities. For example, a region that compares favorably on cost factors but not on infrastructure or labor market conditions may fail completely on most types of economic development, but may succeed at attracting low-wage, low-skilled, cost-conscious traded activities (though lower-cost countries are strong competitors for such activities).

Recent analyses, however, suggest that competitiveness in the traditional location factors is not enough to truly succeed economically in the 21st century. The conditions that must be present are understood — clusters of key traded clusters, a highly skilled work force, and specialized service providers — but the actions that must be taken to produce these conditions in a region that is not already competitive — in order to overcome the advantages present in regions that already have strong agglomerations of knowledge-based activities — are less clear.

Arizona's economic competitiveness is hampered by the poor quality of its workforce. Overall educational attainment of the workforce is below the national average. A lower proportion of the adults who were educated in Arizona have completed high school. Despite some improvement in recent years, Arizona's elementary and high school students do not perform as well as their peers nationally on achievement tests.

These limited educational attainments and work skills are a particular disadvantage in the key traded clusters. Companies in those clusters require sophisticated technological skills, even among workers who are not required to have a college degree. Historically, companies located in Arizona have relied on in-migrants to fill many of their jobs, but it is more expensive for companies to import skilled workers from outside the state and considerable competition for these skilled workers exists across regions.

Even if attracting workers was not an issue for employers, the poor educational achievement and attainment of Arizona students is creating an underclass among its residents. The state's poverty rate is regularly higher than the national average and the workforce participation rate, even among those in the prime working ages of 25 to 54, is below average. Some of the struggling Arizonans are working, but in low-wage jobs, while others do not work, presumably due to an inability to compete for available jobs. Not only do people in this group not contribute much to Arizona's economy, they disproportionately use public services due to their low incomes.

While a number of factors contribute to the low educational achievement and attainment of the state's residents, the state's public education system is a significant concern. Arizona spends less per pupil on elementary and secondary education than nearly every other state, and public investment in higher education also is below average. Little support is provided for research.

The state's physical infrastructure is not perceived to be as much of an issue as its labor force, but could become a significant problem in the future. For a state that generally ranks among the national leaders in population growth, capital spending in Arizona, especially for transportation, has consistently been lower than would be expected relative to other states. With the limited investment in infrastructure in the state and with continuing tax cuts limiting the ability of the public sector to address issues, the state's physical infrastructure is at risk of becoming a negative factor on its economic competitiveness.

Through public education and job training programs, public policy can have a significant impact on labor force issues. The public sector is largely responsible for various types of physical infrastructure, particularly transportation. In contrast, public policy does not have much effect on most business costs. The primary exception is taxes, but the tax burden for businesses and individuals is low.

Among other business location factors, Arizona generally is rated favorably on the regulatory environment. The state does not compare as favorably on a broad assessment of the quality of place. The perceived quality of place often is high, particularly among outsiders, who concentrate largely on the state's climate. Lifestyle and physical environment also typically are perceived favorably. However, Arizona does not rate highly on other aspects of the quality of place, some of which are subject to public policy.

In terms of the other conditions that Moretti cites as necessary for a region to have success in the key traded clusters, Arizona has two large metropolitan areas, but these do not have a highly skilled workforce. The high-tech base always was narrow — aerospace and electronics — and its electronics cluster has narrowed to little more than semiconductors.

The assessment of Arizona's business competitiveness therefore is mixed, consistent with the middle-of-the-states rank of the most reliable business climate studies. Arizona's fast growth (other than during recessions) is an indication that its export base is growing quickly despite the state's economic competitiveness not being rated as a strength. It is likely that Arizona's natural attractions — including climate, open spaces, and lifestyle — and moderate costs continue to offset its weaknesses, at least for some types of base economic activities. However, the state's subpar job quality, with no improvement occurring over time, is a sign that these natural attributes are not enough to compensate for its shortcomings among the key traded clusters.

Recommendations for Arizona

The first action that needs to be taken to improve the state's economic competitiveness is to focus on the most important business location factors that can be influenced by public policy: (1) education and workforce skills, and (2) the quality and availability of the physical infrastructure. In order to boost Arizona's competitiveness on these two most-important business location factors, a substantial increase in investment is needed. After three decades of frequent and significant tax cuts, public revenue does not exist in Arizona to meaningfully increase investment in education and infrastructure. Since the tax burden for individuals and businesses in Arizona is low relative to other states, a significant increase in public revenue could be realized without deleterious effects on the economy. Similarly, if revenue increases were implemented in a progressive fashion, the standard of living of lower-income Arizonans would not suffer.

Investment in education could take various forms. In K-12 education, more teachers could be hired to reduce class size, teacher salaries could be increased to improve the retention of experienced teachers, spending on computers and other technology could be increased, etc. In higher education, scholarship funding could be increased in order to attract and retain students that might otherwise not graduate.

Without improving the quality of Arizona's labor force, improvements in other aspects of economic development are unlikely to have much effect. Even with a stronger labor force, Moretti notes the challenge any region that does not already have strong 21st-century traded clusters faces in building such clusters.

However, Arizona does have attributes on which it can build. Geographically, it has two large metro areas anchored by highly rated research universities. Industrially, it has several strong traded subclusters that might be made even stronger and from which attempts to diversify into related subclusters can be made.

The following summarizes key, high-paying traded clusters, subclusters, and industries in Arizona, identifying those with the potential for further development. Nationally, average earnings per worker in each of these clusters is much above the overall average and higher than the traded cluster total. When a cluster or subcluster is said to be growing, it means that per capita employment in Arizona is expanding at a pace greater than the U.S. average.

Aerospace Vehicles and Defense
This is the strongest traded cluster in Arizona, with per capita employment 2.5 times the national average and with adjusted average earnings per worker slightly higher than average. However, there has been some slippage in this cluster relative to the national average in per capita employment and adjusted per capita aggregate earnings.

Per capita employment in 2021 was considerably above average in each of the three subclusters. The missiles and space vehicles subcluster in Arizona is the strongest of the three subclusters, with per capita employment in 2021 nearly 8 times the national average; adjusted average earnings per worker was 7 percent less than the U.S. average. Most of this subcluster is located in Metro Tucson. The aircraft subcluster is disproportionately located in Metro Phoenix. After losing ground relative to the U.S. average, it has held steady in recent years. In 2021, per capita employment in the aircraft subcluster in Arizona was 1.6 times the national average and adjusted average earnings per worker was equal to the U.S. average. In the search and navigation equipment subcluster, per capita employment, adjusted average earnings per worker, and adjusted per capita aggregate earnings are falling relative to the nation, but per capita employment in 2021 still was 30 percent above average. This subcluster is disproportionately located in Metro Phoenix.

This cluster should continue to be targeted in economic development efforts.

Information Technology and Analytical Instruments
Nationally, average earnings per worker in this cluster is the second highest of any cluster. Arizona has suffered through declines in this cluster relative to the national average for approximately three decades. Per capita employment remained above average in 2021, but adjusted average earnings per worker was 16 percent below average. Per capita employment in Arizona in 2021 was below the U.S. average in seven of the eight subclusters, but was far above average in the semiconductors subcluster, which largely is located in Metro Phoenix. However, even this subcluster has experienced declines relative to the nation in per capita employment and adjusted average earnings per worker, which were 20 percent below average in Arizona in 2021.

Given recent announcements of new semiconductor firms and suppliers in Metro Phoenix, the downtrend appears about to reverse.

The semiconductor subcluster should continue to be targeted in economic development efforts and attempts should be made to widen the currently narrow focus of this cluster.

Communications Equipment and Services
This is a growing cluster in Arizona, largely in Metro Phoenix. Per capita employment in Arizona in 2021 was 40 percent above the U.S. average. However, adjusted average earnings per worker was 23 percent below the U.S. average, indicating that the work performed in Arizona is more routine than the national norm. Arizona's strength is in the services subcluster, with per capita employment above average in each industry, particularly in the satellite telecommunications industry, in which adjusted average earnings was nearly equal to the U.S. average. The wireless telecommunications carriers industry also is in this subcluster.

The services subcluster should be targeted in economic development efforts.

Medical Devices
This is a growing cluster in Arizona. A disproportionate share of the activity occurs in Metro Flagstaff. Per capita employment in Arizona in 2021 was 26 percent above the U.S. average. Unlike so many of the clusters, adjusted average earnings per worker in Arizona was nearly equal to the U.S. average. Arizona's strength is in the surgical and dental instruments and supplies subcluster, especially in the surgical appliance and supplies manufacturing industry. However, the optical instruments and ophthalmic goods subcluster also is expanding.

This cluster should be targeted in economic development efforts.

Financial Services
Nationally, average earnings per worker in financial services is the highest of any cluster. This is a growing cluster in Arizona. Per capita employment in the financial services cluster in Arizona is considerably above average, but adjusted average earnings per worker was a very significant 40 percent below average in 2021. The large shortfall in average earnings in Arizona largely is due to adjusted average earnings being substantially below average in most industries, but employment in Arizona also is disproportionately concentrated in the lower-paid industries.

The cluster consists of five subclusters, two of which are quite small. Per capita employment in Arizona is considerably above average in two of the three large subclusters, but adjusted average earnings in 2021 was 16 percent below average in the credit intermediation subcluster and 45 percent below average in the growing securities brokers, dealers, and exchanges subcluster. In the growing financial investment activities subcluster, per capita employment was 22 percent below average and adjusted average earnings was 54 percent below average in 2021.

This cluster should continue to be targeted in economic development efforts, but with a strong bias to higher-wage activities.

Insurance Services
This is a growing cluster in Arizona, almost entirely in Metro Phoenix. Though not as high paying as the other traded clusters discussed in this section, average earnings per worker nationally in 2021 was $118,000. Adjusted average earnings in Arizona was 16 percent below the U.S. average, indicating that the work performed in Arizona requires less education and fewer skills than the national norm. The two strongest industries in Arizona are title insurance carriers and property/casualty insurance carriers. Average earnings in the latter industry in Arizona is particularly far below average.

This cluster should be targeted in economic development efforts, focusing on attracting higher-paying jobs than currently exist.

Business Services
Business services is the largest of the traded clusters. Per capita employment in this cluster in Arizona is above average, but adjusted average earnings per worker was 26 percent below average in 2021. Two factors account for the large shortfall in average earnings in Arizona: employment in Arizona is disproportionately large in the lower-paid subclusters and industries, and adjusted average earnings is substantially below average in most industries, indicating a lower level of skills and education is required for employment.

The cluster consists of eight subclusters whose average earnings range from considerably below average to above the traded cluster average. Per capita employment in Arizona is above average in the three lowest-paying subclusters, particularly the large business support services subcluster that includes the especially low-paying telemarketing industry. In contrast in 2021, per capita employment in the corporate headquarters subcluster was 32 percent below average and adjusted average earnings was 17 percent below average. Similarly, the shortfalls were 12 percent/18 percent in the computer services subcluster and 15 percent/18 percent in the consulting services subcluster.

This cluster should continue to be targeted in economic development efforts, but with a strong bias to higher-wage activities in the computer services, engineering services, and consulting services subclusters.

Marketing, Design, and Publishing
Per capita employment in this cluster and in each of its four subclusters in 2021 was considerably below the U.S. average in Arizona. Adjusted average earnings per worker in 2021 also was much below the national average. Moreover, each of these measures is declining relative to the nation. A key industry is Internet publishing and Web search portals, but in 2021 in Arizona, per capita employment was 47 percent below average and adjusted average earnings per worker was 63 percent below average.

There is little prospect for developing this cluster in Arizona.

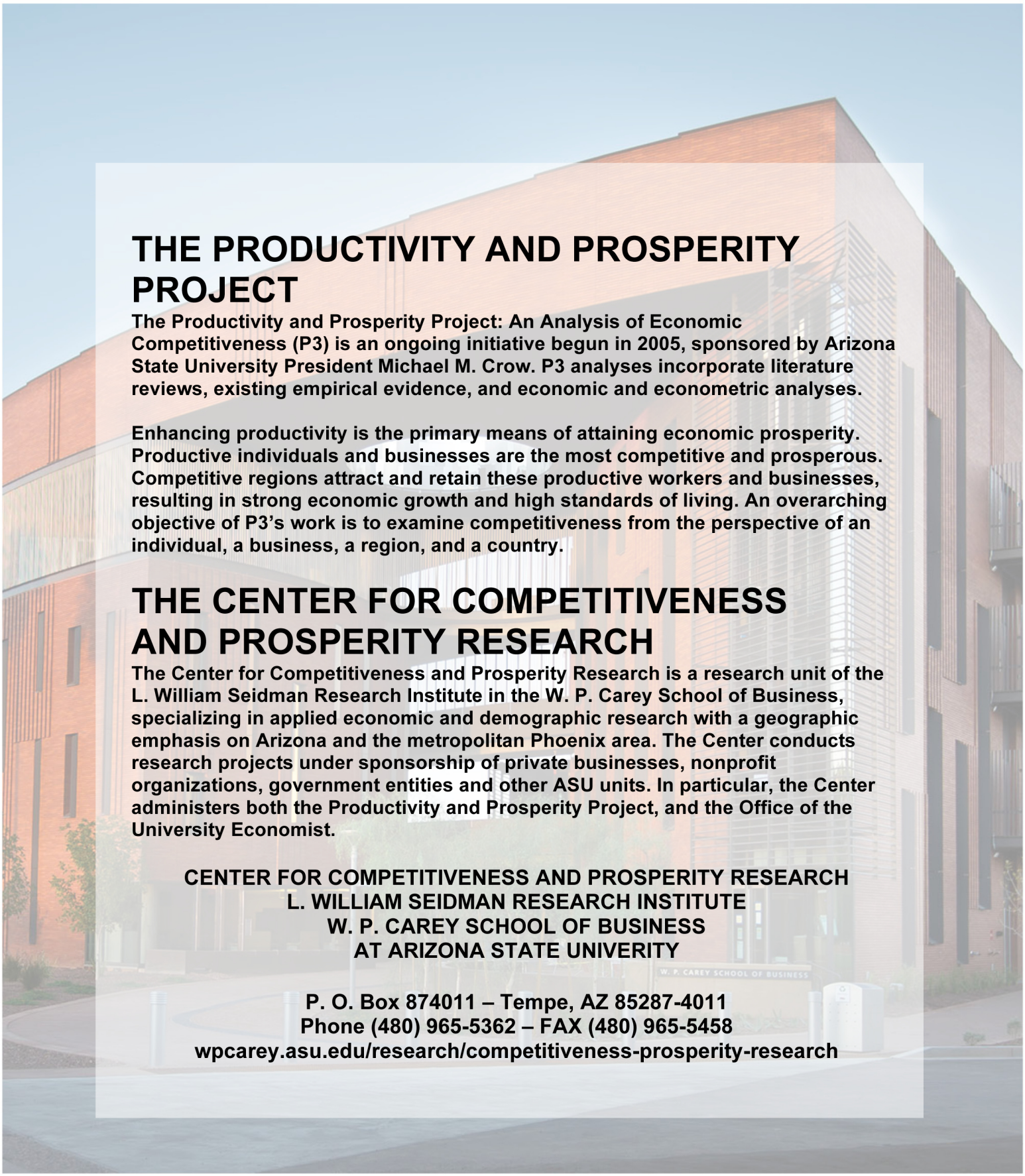
Education and Knowledge Creation
Just one of five subclusters — research organizations (research and development) — is the focus in this cluster. Metro Tucson accounts for a disproportionate share of the subcluster. The

subcluster is quite small in Arizona (per capita employment in 2021 was 65 percent below average) and gains have not been made relative to the nation. Still, the presence of two strong research universities suggests that this cluster could be grown.

Automotive
This is a growing cluster in Arizona, especially in Metro Phoenix (both Maricopa and Pinal counties), but per capita employment remains considerably below average. Even in 2022, it was 68 percent below the U.S. average. Most of the attention has been in electrical vehicle manufacturing, part of the motor vehicles subcluster. While increasing relative to the nation, per capita employment in Arizona in this subcluster was 63 percent below average in 2022. However, adjusted average earnings per worker was considerably above the U.S. average. Storage battery manufacturing also has garnered attention in Arizona, but as of 2022 there was no improvement in per capita employment relative to the nation, with a figure 75 percent below average.

While the electric vehicle portion of the automotive cluster should be targeted in economic development efforts, there is no guarantee of success, as illustrated by pullbacks in 2023 by various companies. Volatility is present in any new industry.

Biopharmaceuticals
This is a growing cluster in Arizona, almost entirely in Metro Phoenix. However, this cluster still is quite small in Arizona; per capita employment in 2021 was 44 percent less than the U.S. figure. Adjusted average earnings per worker was 43 percent below average. It seems unlikely that this cluster will become a significant portion of the state's traded economy.



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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