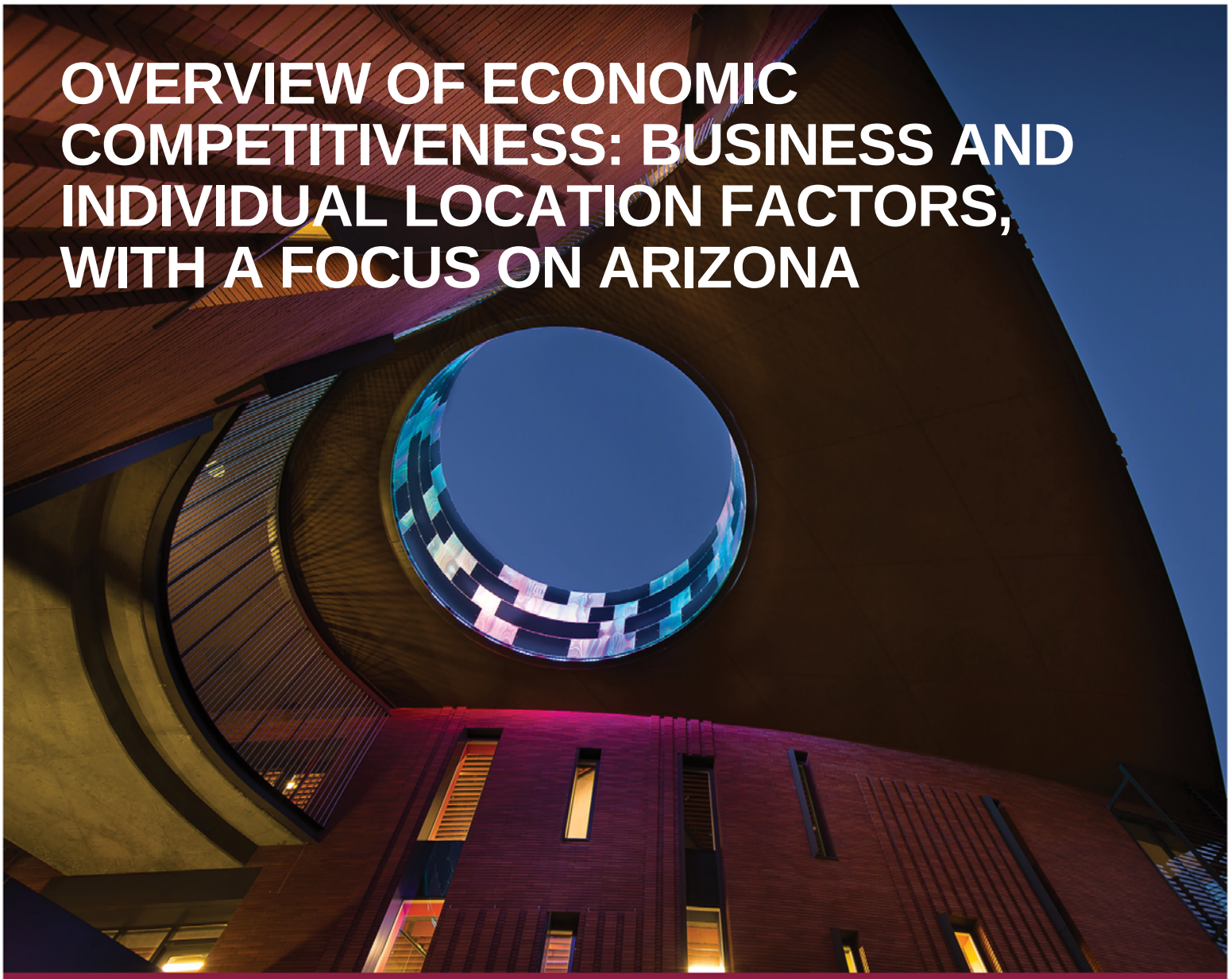
OVERVIEW OF ECONOMIC COMPETITIVENESS: BUSINESS AND INDIVIDUAL LOCATION FACTORS, WITH A FOCUS ON ARIZONA



November 2014

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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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SUMMARY

Economic Competitiveness: Background

- Regions compete for base economic activities.
  - A base economic activity, such as aerospace manufacturing, is one that brings money into a region by selling goods and services to customers outside the region.
  - Base economic activities drive the economy. In contrast, most economic activities, such as a grocery store, serve the region's residents. The growth of these population-serving activities depends on the growth of base activities.
- In a competitive region, economic productivity rises.
  - Increases in productivity lead to improvements in economic prosperity.
  - The end goal of economic development is to raise prosperity, not to simply create jobs.
    - Aggregate economic growth rates, measured for example by employment, are unrelated to improvements in productivity and prosperity, as measured for example by per employee gross domestic product (GDP) and per capita GDP.
- The economy in developed countries such as the United States continues to evolve from the industrial age to the information age.
  - Global competition has increased, particularly from low-cost countries such as India, for economic activities for which costs are a primary concern. Due to their higher costs, developed nations have a difficult time competing for such activities.
  - Instead, developed nations are competing based on innovation and technology development.
- Economic development has evolved with the economy.
  - In developed nations in the 21st century, regional economic development focuses on a subset of base economic activities: those that are highly productive, have long-term prospects for expansion, and for which the region has a comparative advantage.
  - The targeted activities employ a highly skilled and highly educated workforce and pay high wages.
- As a region's workforce becomes more highly skilled and highly educated, increases in productivity occur even among workers with lesser skills, due to "knowledge spillovers" that result from interactions between workers with varying skill levels.
  - The increases in productivity lead to increases in wages among all workers. Workers with lesser educational attainments and skills benefit the most.

Location Factors

- The components of economic competitiveness also are known as business location factors. To the average company engaged in base activities in the United States, three factors are of particular importance:
  - The quality and availability of the labor force. Educational attainment and achievement are key aspects of labor force quality.
  - The quality and availability of the physical infrastructure, including the transportation system, utilities, and telecommunications.
  - Costs. Labor costs are the most important. Taxes, real estate prices, and energy costs are other considerations.

- The relative importance of location factors is different for the base activities sought by modern economic development than for the average company.
  - Labor force quality and availability is more crucial to innovative and productive base activities, with education, particularly higher education, of much greater significance. Costs are of lesser importance.
  - The presence in the region of established clusters of innovative and high-technology activities also is critical.
- Some of the location factors, including education, transportation infrastructure, and taxes, can be influenced by public policy, but other factors, such as labor costs and real estate costs, are largely set by private-sector markets.
- Taxes are not of particular importance as a component of competitiveness, especially to innovative and productive base activities, but taxes receive disproportionate attention by the media and by most studies of competitiveness.
  - Taxes are evaluated by companies relative to the quality and availability of public services that are valued by businesses.
  - Even for the average company, taxes rank below labor force quality, infrastructure, and labor force costs among location factors.
  - To the extent that taxes are a consideration, business taxes — not individual taxes — are of primary relevance to competitiveness.
- Though taxes are not of particular significance in evaluating locations, once a region becomes a finalist for a business facility, the availability of incentives can sway the decision.
- Tax burdens are somewhat correlated to aggregate economic growth rates, but are not correlated to either the level or the growth rate of productivity and prosperity.
  - A correlation between tax burdens and aggregate economic growth does not indicate that low taxes are causing the faster growth.
    - Most fast-growing states are in the South or West, where climate or other factors may be the root cause of the faster growth.
    - Reductions in taxes often have occurred in response to strong economic growth, which creates a surplus in public-sector budgets.
- In order to attract and retain workers, a company also must consider location factors important to individuals:
  - Employment opportunities and wages are the most important considerations for those in the workforce.
  - Quality of life (better described as “quality of place”) is a broad term for many considerations — such as cost of living, crime, and cultural and recreational opportunities — that are important to individuals.
  - Fiscal factors also are considered by individuals — the level of personal taxes *and* the availability and quality of government services, including the transportation system and the education system.
- While the relative importance of location factors vary between businesses and individuals, most factors are relevant to both groups and are viewed similarly. For example, a strong transportation infrastructure is evaluated positively by each group.
  - Wages are the primary factor viewed inconsistently by the two groups, with workers desiring higher wages and businesses trying to control labor costs.

Competitiveness in Arizona

- For decades, Arizona was among the nation's leaders on aggregate economic growth, but its productivity and prosperity over the last four decades has fallen further behind other states and the national average.
  - Arizona currently ranks among the bottom 10 states on measures of prosperity and among the bottom 15 states on measures of productivity.
- Even in Arizona's large metropolitan areas — the Sun Corridor — productivity and prosperity measures are below average.
- Productivity in Arizona is lower than average largely because of the state's below-average job quality: the state's mix of jobs is tilted to low-wage jobs. Beyond the negative effects from low productivity, prosperity in Arizona is further below average due to the below-average share of the working-age population who are employed.
- Various studies evaluate business competitiveness — the "best places to do business" — by state but each study has significant limitations.
  - According to the two studies that show some correlation to measures of productivity and prosperity, Arizona ranks among the middle of the states.
  - Arizona ranks higher on other studies, but the factors measured in these studies are related only to aggregate economic growth, not to gains in productivity and prosperity.
- Labor force quality is difficult to assess. Generally, measures of educational attainment and achievement are used.
  - The educational attainment of those of working age who grew up in Arizona is considerably below average, relative both to migrants to the state and to those in other states who are working in the same state in which they were born.
  - Arizona students have scored below average on achievement tests over the two decades for which such measures are available.
  - Education spending per elementary and secondary student relative to other states has dropped significantly. Spending is now nearly the lowest in the nation.
    - The low figures extend across nearly all categories of spending. For example, the state ranks last in both the instructional category and the school administration category.
  - Because of the challenges posed by poorly educated parents, high poverty rates, and a disproportionate percentage of students learning English as a second language, education spending per student in Arizona needs to be above average in order to achieve average educational outcomes, assuming all other inputs are average.
- The physical infrastructure also is difficult to evaluate. Arizona likely rates as average to above average, but the state's rank is at risk of falling due to low funding over the last two decades, continued fiscal difficulties in state government, and substantial documented needs.
- Arizona compares favorably on most costs.
  - Wage levels are below average, even after considering the state's cost of living and employment mix.
  - Other business costs, including real estate and utilities, are moderate.
- However, business taxes are somewhat higher than the national norm.
  - Businesses in Arizona pay more than the national average for property taxes and sales taxes.
  - On each of the other categories of business taxes, Arizona's burden is low to very low.

    - The tax burden is moderate for unincorporated companies that do not own much property but is high for corporations that own considerable property.
- In contrast, the individual tax burden is very low in Arizona.
- Taxes have been reduced significantly by the Arizona Legislature since the early 1990s to levels well below the historical norm.
    - Most of the cuts have been applied to individual taxes instead of business taxes. These individual taxes were not higher than the national norm even in the early 1990s.
    - While reductions in taxes can spur economic growth under certain conditions, the tax cuts in Arizona have had no measureable effect on the state's economic growth.
    - The decreases in government revenue caused by the tax cuts have led to considerable reductions in state government funding for public programs that are important to businesses, including education and physical infrastructure. In particular, funding for education — from kindergarten through universities — has dropped considerably.
- Despite sharp reductions in spending, the state government's general fund has continued to have a structural deficit. The deficit is expected to become substantial in the current fiscal year and to become larger in the next year.
    - Thus, the state will be hard-pressed to make investments in education and infrastructure that would enhance economic competitiveness.
- Evaluations of the state's competitiveness for individuals are mixed.
    - Historically, Arizona ranked near the top of the states for employment opportunities, but this positive location factor was somewhat offset by below-average wage levels.
        - However, employment opportunities have not been a positive since 2007.
    - Arizona is not rated favorably on most measures of quality of place. However, for many individuals, favorable impressions of the climate and lifestyle have offset the state's poor ranks on quantifiable aspects of the quality of place.
        - More-highly educated individuals appear to place less emphasis on climate and more weight on the factors on which Arizona does not compare favorably.

Conclusion

- The assessment of Arizona's business competitiveness is mixed, consistent with the middle-of-the-states rank of the most reliable business climate studies.
    - The state generally compares favorably on costs, with the exception of business taxes, and on some of the less-important factors, such as business regulation and availability of land and buildings.
    - The assessment of the quality of place often is positive, being based on perceptions and qualitative factors such as climate, but in many of the measurable factors, the state compares poorly.
    - Limited information is available on how the state's infrastructure compares, but it may be fair to assess it as somewhat positive but at risk due to state government's finances.
    - In contrast, Arizona compares poorly on the quality of its labor force.
        - Despite the labor force issues, the state has grown historically due to its ability to attract better-qualified in-migrants. This dependence on outsiders is a risky strategy that likely will not work so well in the 21st century, especially among the more highly skilled.

    - Arizona does not have a highly skilled workforce. Its high-tech base always was narrow — aerospace and electronics — and its electronics cluster has been declining. While there are other clusters of base economic activities, such as financial services, tourism, and mining, these clusters either are not part of the innovative, knowledge economy, or are only tangentially connected.
- Given Arizona's below average and decreasing productivity and prosperity over the last 30+ years relative to earlier time periods, but rapid aggregate growth (at least until recent years), the following conclusions can be drawn:
    - Arizona's competitiveness is poor and declining in base industries that are highly productive and offer high wages.
    - The state's competitiveness is strong (or, was strong through 2007) among less productive and less well-paying base industries.
- Arizona has modernized its economic development efforts, but the state's investments in itself — in the factors that not only will enhance its economic competitiveness but improve the quality of life of all of its residents — have continued to deteriorate.
    - Funding for education and infrastructure have declined.
- Given the relatively slow aggregate economic growth of recent years, Arizona may no longer be as competitive as it was during the recent decades that featured rapid aggregate growth but somewhat subpar gains on productivity and prosperity.
    - Even if the state's competitiveness has not yet declined, it is at risk of doing so due to the reduced expenditures for education and the limited funding for physical infrastructure over the last two decades.
- If the state's competitiveness has declined, or soon will, then its ability to compete for higher-wage jobs will be compromised.
- The growth rate of lower-wage jobs also may be less than in the past.
    - Though Arizona's overall costs still are competitive relative to other U.S. states, much of the competition for cost-sensitive base industries — including services such as call centers and lower-wage manufacturing activities — now comes from other nations that have substantially lower costs.
- This analysis suggests that without changes, Arizona's economic future at best will be a continuation of the conditions of the last few decades: fast aggregate growth but slow declines in productivity and prosperity relative to the rest of the nation.
    - More likely, diminishing competitiveness in the labor force and the physical infrastructure will cause the rate of decline in productivity and prosperity relative to the rest of the nation to worsen.
- If the goal is to improve job quality, productivity, and prosperity by expanding highly productive and innovative base industries, then action needs to be taken to improve the state's competitiveness on the most important factors that can be influenced by public policy: (1) education and workforce skills, and (2) the quality and availability of the physical infrastructure.

INTRODUCTION TO ECONOMIC COMPETITIVENESS

As the United States and other developed countries transition from the industrial age to the information age/knowledge economy, the concept of economic competitiveness has evolved. At the same time, global competition has increased.

The concept of competitiveness is applicable to nations and to subnational regions, The list of factors defining competitiveness is more extensive for nations.

A subnational region may refer to a state, metropolitan area, or other geographic area. Economists largely focus on metro areas as economic engines, but analyses by state also make sense since so many policies are determined at the state rather than metropolitan level. Since data availability and quality are better by state than by metro area, many analyses use state data. This paper focuses primarily on states. Since the Phoenix metropolitan area accounts for 70-to-75 percent of Arizona's economic activity, conclusions for the Phoenix area or for Arizona largely are accurate for the other region.

In this introduction, the concepts of competitiveness, productivity, and prosperity are defined first. The remainder of this section discusses economic concepts that are helpful to understanding and evaluating competitiveness, with a focus on Arizona.

Definition of Terms

Productivity

From an economic perspective, productivity is the efficiency with which goods and services are produced by a given set of inputs, including capital, labor, and land and natural resources. Productivity can be measured at individual, company, industry, and geographic levels, but is most commonly expressed as output per unit of labor. Productivity often is considered to be an intermediate stage between the economic inputs and the outputs of economic performance and prosperity.

Empirical evidence across long time periods and many economies reveals a strong correlation between the productivity of an economy and prosperity. Economic success generally is seen as being highly dependent on productivity. According to Paul Krugman:

> Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker. [1]

True measures of productivity are not available at a subnational level.[2] Per employee measures are used as proxies for productivity for states and metro areas, but such measures as per

[1] Krugman, Paul. "Competitiveness: A Dangerous Obsession," *Foreign Affairs*, Vol. 73, No. 2, March/April 1994, pp. 2844, reproduced in Krugman, P. *Pop Internationalism*, 1996, pp. 324, MIT Press, Cambridge, MA.

[2] The U.S. Department of Labor produces two measures of productivity for the nation. Labor productivity is defined as output per hour of labor. Multifactor productivity is defined as output per unit of combined inputs, including labor, capital, and sometimes intermediate inputs such as fuel.

employee gross domestic product (GDP) and per employee earnings are only distantly related to true measures of productivity.

Regional productivity can be raised both by increasing the productivity within the existing economy and by shifting the industrial mix to more productive activities. According to Michael Porter of Harvard University's Institute for Strategy and Competitiveness (http://www.isc.hbs.edu/Pages/default.aspx), there are three major elements to the productivity of a region: the quality of the overall business environment, cluster development, and policy coordination among multiple levels of geography and government. Porter defines clusters as geographic concentrations of industries related by knowledge, skills, inputs, demand, and other linkages. Clusters appear to be becoming an even more important element of a region's economic success. While clusters are addressed in this paper, the main focus is the quality of the overall business environment. Also known as the "business climate," this consists of a multitude of business location factors.

Prosperity

Prosperity is defined as a successful, flourishing, or thriving condition, especially in financial respects. While most commonly defined as economic well-being, prosperity also can be interpreted more broadly to include all aspects of well-being, including social and environmental considerations (more generally, quality of life). Economic prosperity is the focus of this paper.

Though economic development historically was sometimes equated to aggregate economic growth, such as an increase in the number of jobs, increasing the aggregate growth rate is not the goal of economic development in developed countries. Instead, the goal is to increase prosperity by boosting productivity. The creation of quality jobs is a significant element to increasing productivity.

A distinction is made in this paper between regional economic prosperity and individual economic prosperity. Regional prosperity is measured by broad economic indicators, such as GDP and personal income, expressed on a per person (per capita) basis. The distribution of prosperity across individuals living in a region can differ from one region to another even if regional prosperity is identical in the two regions. Measures such as the poverty rate, income inequality, and the unemployment rate provide insight into the economic prosperity of individuals.

Competitiveness

To compete is to strive to outdo another. Individuals and companies engage in economic competition. Based on their educations and skills, individuals compete with others when they apply for a job. Unless a company is operating under monopolistic conditions, it has direct competitors. To be competitive, a company must be sufficiently low in price or high in quality to be successful against commercial rivals; a noncompetitive business will fail.

The concept of competitiveness also can be applied at a regional or national level. For example, Michael Porter indicates that the competitiveness of a region is the productivity with which it utilizes its human, capital, and natural endowments to create value. Metro areas, states, and countries compete with each other to offer the most productive environment for businesses.

Regional or national competitiveness really consists of the competitiveness of those individuals and companies that form the economic base that drives the economy (the economic base is discussed in the next subsection). Regions or nations do not compete against each other for activities that serve the local population (for example, for the siting of a grocery store), but do compete for economic base activities, such as an electronics manufacturing facility. This competition largely is indirect since regional or national competitiveness centers around an area's assets — its labor force, infrastructure, quality of place,[3] and other factors that are evaluated by companies when making business location decisions. The use of incentives to win a particular operation is the primary example of direct regional competition. But such incentives typically act only as tiebreakers between regions whose other characteristics are evaluated equally by companies.

In the past, economic development in the United States often consisted of attracting cost-sensitive operations, but that strategy cannot not lead to success in the 21st century. With competition now coming from low-cost countries such as India, a region in the United States can no longer compete on the basis of cost. Instead, the United States and regions within the country must compete based on innovation: inventing or applying something new, particularly related to technology. Because of this, education and research and development have become particularly important factors in determining the economic competitiveness of a region.

Job Quality

Improving job quality is a primary means of raising productivity and prosperity. References to job quality in this report refer to analyses conducted by the Office of the University Economist in 2005 and 2006, available at http://economist.asu.edu/p3/job-quality, with the latest data for 2004. The calculation of industrial job quality uses (1) the difference in the industrial mix (the share of employment by industry) between the United States and the local area, and (2) the ratio of the U.S. average wage by industry to the U.S. overall average wage. Occupational job quality is calculated similarly, then the industrial and occupational job qualities are combined into overall job quality. Job quality at a state or substate level is expressed relative to the national average.

Economic Drivers and Regional Economies

Regional economies are driven by economic activities that bring money into the region that would otherwise not be present, by selling goods and services to customers — individuals, companies, and governments — who are not residents of, or operate in, the region. Bringing money into a regional economy is a necessity since "leakages" of money from the regional economy inevitably occur — no region produces all of the goods desired by its residents and local companies. Similarly, money leaves the region when residents travel to other regions.

Activities that bring money into a region drive the regional economy. Such activities have been variously labeled as "tradable," "export" or "basic" — the latter term is used in this paper. Basic activities are responsible for the prosperity and growth of the regional economy, but represent a minority of a region's total economic activity; Porter estimates the basic share at around 30 percent.

[3] Quality of place — often referred to as the quality of life — does not have a standard definition, but can include many types of characteristics related to a place, such as the crime rate and recreational opportunities.

Basic activities fundamentally differ from "population-serving" activities, which sell to and support residents and businesses located within the region. While necessary to the functioning of a regional economy, population-serving activities respond to the growth occurring in basic activities; they do not bring money into the regional economy. Their presence in the region is due to the spending of businesses that sell goods and services to customers outside the region and to the spending of the employees of these businesses. Population-serving activities would not exist if basic activities were not present.

To illustrate the relationship between basic and population-serving activities, consider the case of a thriving mining community that becomes a ghost town. Few people lived in the vicinity before the mining deposit was discovered. When the mine opened, it hired workers, attracting individuals from outside of the area. While the mine was operating, a variety of economic activities sprang up to serve those employed at the mine, but the town remained wholly dependent on one basic activity: the sale of copper or other mined resources to businesses located outside the town.

When the ore deposit was exhausted and the mine closed, the flow of money into the town from outside ended. The mine's employees were laid off and left the town to seek work elsewhere. The businesses engaged in population-serving activities immediately lost many of their customers. A community cannot survive solely by selling goods and services to each other because of leakages. Without a means of bringing money into the community to offset these leakages, the remaining businesses in the former mining town eventually shut down, resulting in a ghost town. (In some cases, old mining towns have survived by developing other base industries, particularly tourism, which replace the mine as the source of outside monies.)

Basic and Population-Serving Economic Activities

The success of companies that export their products to customers outside the region (for example, aircraft manufacturers) depends both on company-specific traits and on characteristics of the community in which they are located, such as the quality of the labor force and the physical infrastructure. In contrast, companies that serve the local population (such as beauty salons and drug stores) all operate under the same set of regional conditions, making their competitiveness dependent only on the characteristics of their company.

Most companies that form the economic base can locate anywhere since their customers are geographically dispersed. Examples of mobile basic industries include manufacturing, insurance carriers, software producers, and call centers. Regions within the United States compete with one another and with the rest of the world for such basic activities through their business climate.

Unlike basic economic activities, population-serving activities are location specific since they sell their goods and services to regional customers, who may be individuals or businesses that engage in population-serving activities, such as a doctor's office. Economic activities whose market predominantly is the regional population include retail trade, many types of services, and local government. Construction and real estate also largely serve regional residents and companies.

A distinction can be made in population-serving activities between locally owned businesses and branch locations of national or international companies. The leakage of money from the regional economy is somewhat less if a population-serving business is locally owned.

Regional economic development efforts do not need to be concerned with attracting companies to serve regional residents and businesses. In a free enterprise, capitalist system, if an unmet demand is present, a company will fill the opening without any intervention from local governments or economic development agencies. Therefore, regional economic development focuses on basic activities since other regions — not only in other states, but in other nations as well — are competing to become the home of these basic activities.

In contrast, *local* economic development efforts sometimes do compete for population-serving activities. Cities within a metropolitan area compete with each other to attract companies serving the local population in order to receive the tax benefits that accrue from a development locating within one city instead of in the neighboring city. This tax revenue is important to a city because of restrictions on the ability to raise revenue that are placed on cities by state legislatures. To the extent that cities offer incentives to companies serving the regional population, this local competition is counterproductive from the perspective of the region.

Just as private-sector markets that work most effectively allocate resources freely across competing uses to the ones that are most likely to result in growth, public-sector policies need to distinguish between economic-base and population-serving industries to the extent possible in order to maximize economic competitiveness and growth. For example, providing tax cuts and incentives to population-serving companies serves no regional economic purpose.

While regional economic development efforts focus on basic activities, they do not give equal attention to each type of basic activity since the various types of basic industries do not have an equal effect on the regional economy. A low-paying basic industry such as tourism has a much lesser impact per employee than does a high-paying basic activity, such as high-technology manufacturing. An industry's prospects for growth also are considered in economic development, as are opportunities and threats (for example, strong competition for a particular activity from other regions). Moreover, in choosing the economic activities to focus on, regional economic development must consider the region's strengths and weaknesses. Thus, regional economic development needs a more finely tuned target than simply basic industries.

Classification of Sectors as Basic Activities

Many businesses can be classified as largely basic or population serving, but few economic activities sell wholly to customers outside the region or entirely to residents of the region. For example, a citrus grove may predominantly ship its fruit to regions of the country unable to grow citrus, but also may sell to a regional grocery store. Most retail operations primarily sell to residents of the region, but may also make sales to tourists.

Historically, basic activities largely were limited to agricultural, mining, and manufacturing activities in which goods produced in one region largely were sold to customers in other regions. With the evolution of the economy, a much broader range of basic economic activities have become important. In addition to goods, various services are now sold to customers outside the

region. For example, a mortgage loan customer support center that serves clients throughout multiple states may be located in Arizona.

Of special interest to Arizona are tourists, seasonal residents, and those who move permanently to Arizona at retirement age.[4] These individuals represent a different type of basic economic activity. They travel/move to Arizona, spending money in the state that was earned elsewhere; money that would not reach Arizona if not for their travels. Those retirees who permanently settle in Arizona are of particular importance since they generally bring with them wealth and assets earned elsewhere as well as their retirement income. The expenditures of tourists, seasonal residents, and in-migrating retirees occur across a large number of industries.

Since data are not available by company or by industry to indicate the percentage of sales that are made to local residents and companies versus the proportion made to out-of-state customers, there are no hard data by industry on how much of their output consists of basic activities. Some estimates of the shares of sales made to outside customers have been made by industry, but these estimates vary widely by source in many industries.

Manufacturing. For most of the 20th century, manufacturing was the most important basic activity in most regions of the country. It often still is viewed as the primary target of economic development. For most manufacturing operations, a company can choose a location among many regions.

About two-thirds of Arizona's manufacturing is considered to be basic. The percentage varies with the nature of the manufactured product. A high percentage of the aerospace and electronics goods manufactured in Arizona, for example, are sold to customers outside the state. The basic shares are considerably lower for food and beverages produced in the state.

Agriculture and Mining. Unlike manufacturing, agricultural and mining activities are not mobile. Their locations are dependent on local attributes of the land. While these activities are not targets of economic development, the companies in Arizona do compete with companies in other regions. Thus, regional business climate still plays a role in the success of a region's agricultural and mining enterprises.

The basic proportions of agriculture and mining are roughly between 80-and-90 percent. While a very high percentage of many agricultural and mining products, such as copper, is exported from Arizona, other products largely are sold within the state. For example, the construction sand and gravel mined in Arizona, and the milk produced in the state, are almost entirely sold to local customers.

Wholesale Trade and Transportation. Wholesale trade and transportation are inherently a blend of basic and population-serving components. For example, a trucking company may both (1) transport goods into Arizona that will be sold by local companies and ultimately consumed by Arizona households, and (2) transport goods manufactured, mined, or grown in Arizona to

[4] Seasonal residents, most of whom are retired, stay in the state longer than tourists and do not lodge in motels and hotels; many own second homes in Arizona.

out-of-state customers. Wholesale trade is a similar activity that brings goods (such as groceries) into Arizona and arranges for goods produced in Arizona to be sold outside the state.

Estimates of the basic shares of these sectors vary widely, with perhaps one-third of wholesale trade and one-half of transportation and warehousing being basic. The basic share is particularly high in air transportation, due to the number of tourists arriving by air.

Government. By definition, state and local (county, city, school district, and special district) governments serve their residents, who provide the vast bulk of funding for government operations. However, some funding does derive from tourists and other outsiders. Thus, estimates place the basic share of state and local government to be greater than zero, though less than 5 percent. At a local level, state government may be a significant driver of the economy due to decisions made by state government officials regarding the location of a state university or a state prison.

Since most of the federal government's revenues derive from U.S. residents and companies, the federal government often is not considered to be part of the economic base. However, some regions receive more federal funding than was contributed by regional residents and companies. In these regions, a portion of the federal government can be identified as a base activity.

Arizona receives considerable federal funding due to its disproportionate number of National Park Service sites (which attract tourists from outside the state) and its long international border. In addition, due to the size of the state's aerospace industry, their products are disproportionately purchased by the federal government. In local areas, the federal government can be a significant, or even primary, driver of the economy. Federal spending on border security and ports of entry is a major contributor to the economies of communities located near the Mexican border. A military base is a huge contributor to the economy of the local community.

Construction and Real Estate. Construction, real estate, and other activities tied to population and economic growth typically are not considered to be basic activities; estimates place their basic portion at about 20 percent. In the construction sector, the 20 percent derives from work done in Arizona by a local company for businesses that sell goods or services to outside customers and for employees of those businesses. Similarly, homes built for seasonal residents and in-migrating retirees can be considered to be part of the economic base.

The relatively large size of growth-related activities such as construction and real estate, and the very high cyclicality of those activities, have led some to declare that (1) these activities drive the economy and (2) Arizona's economy lacks diversity. In some cycles, the construction and real estate sectors have begun to recover from a recession before most other sectors, but it is a mistake to equate this timing to their being driving economic activities. The early recovery is simply due to pent-up demand and low interest rates. Construction and real estate are larger-than-average sectors in Arizona due to the state's above-average growth rate; as long as the state continues its fast growth, growth-related activities will remain disproportionately large. As discussed later in this section, the state's economy is reasonably diverse.

Retail Trade. Though largely serving the local population, many retail stores sell a portion of their goods to tourists and seasonal residents. Some retailers also utilize websites to make sales to outsiders. Estimates of the basic share of retail trade range from about 10-to-25 percent, depending on the nature of the retail activity.

Services. The estimated basic share of other service-related sectors, such as health care and entertainment, ranges from about 10-to-40 percent, but typically is around 20 percent. The shares are this high primarily for two reasons: the impact of tourists, seasonal residents and in-migrating retirees, and the basic nature of certain service activities, such as call centers, financial processing centers, and regional headquarters that serve a geographic area larger than Arizona.

The Development of Arizona's Economic Base

During the 19th century and the first few decades of the 20th century, Arizona's economy was dominated by the economic base activities of mining and agriculture, the latter consisting of farming and ranching. The relative importance of each of these activities has decreased sharply as other economic base activities have developed in Arizona. Mining began its relative decline in the early 1930s while agriculture's relative decline began in the 1950s.

Tourism was one of the earliest of the other economic base activities, but it was not until after World War II that it became a significant driver of Arizona's economy. Tourism continues to be one of Arizona's major economic drivers. Tourists impact many industries, including lodging places, passenger air transportation, golf courses and country clubs, travel agencies, and various retail trade industries.

The role of the federal government as a driver of the Arizona economy expanded substantially during World War II, as it spent heavily to develop physical infrastructure and military bases. Federal expenditures — particularly along the international border and at military bases — continue to boost the state's economy.

The modern Arizona economy began to emerge after the war, with the transition largely completed by the late 1960s. One key to the transition was the emergence of manufacturing industries after the war, particularly aircraft, electronics, and industrial machinery. Over time, the original aircraft industry expanded to incorporate space activities; aerospace manufacturing remains an important driver of the economy. In contrast, the relative importance of the electronics industry has declined since the 1980s, though it remains a driver of Arizona's economy. The industrial machinery industry helped fuel Arizona's growth during the 1950s and 1960s, but has shrunk substantially in importance since the 1980s.

In addition to the expansion of tourism after the war, Arizona also became a destination for seasonal residents. Starting in the late 1950s, a growing number of retirees permanently migrated to Arizona, bringing with them their assets and retirement incomes that were earned elsewhere.

Various service activities that have customers outside of Arizona have grown in importance as drivers of Arizona's economy, particularly since the 1980s. Telemarketing, various back-office financial operations such as customer support and credit card issuing, and insurance carriers are among the service activities contributing to Arizona's economic base. Associated with

manufacturing, particularly electronics, certain wholesale trade activities also are basic contributors to Arizona's economy.

The Current Economic Base in Arizona

Today, Arizona has a varied economic base. The economy is relatively diversified. However, given the state's below-average industrial job quality, the diversification has been attained by an overabundance of low-paying industries.

High-technology manufacturing — led by the guided missile and space vehicle, semiconductor, and search and navigation equipment industries — is the most important of the state's base activities as measured in dollars. These high-tech activities pay high wages and have a high value added. Of the base activities, tourism is the major employer, but its economic impact in dollars is not as large due to its low average wage and heavy use of part-time and/or seasonal workers. Other economic drivers include service activities such as telemarketing, back-office financial operations, and insurance carriers; seasonal residents and in-migrating retirees; mining; agriculture; and military bases and other federal government activities.

High-paying, high-technology, innovative, knowledge-based basic industries that are leading the nation's economic growth during the 21st century are referred to as the "key" base industries through the rest of this report. Some of the key activities, such as biomedical research and optics, make up only a very small part of the Arizona economy.

Economic Cycles

Nationally, the economy follows a cycle in which a period of aggregate economic growth that typically lasts from a few to several years is followed by a recession (a contraction in the size of the economy) that usually lasts from several months to a little more than a year. The growth phase frequently is split into two parts: (1) a recovery from the losses experienced during a recession, which generally takes only months to complete, and (2) an expansion. In the United States, the typical economic cycle through the 1950s had a length of only about four years. Since then, some cycles have been longer, up to 10 years in length.

Cyclicality is damaging to individuals, who experience economic dislocations during recessions, such as reduced work hours and loss of jobs. The cyclicality of the economy also affects the public sector, which in Arizona generally is either struggling to keep up with population growth or facing a significant cyclical deficit.

The economy of all regions is cyclical, though not all regional economic cycles coincide with the national cycle. Arizona's economic growth follows a cycle that is very close in timing to the national economic cycle. However, Arizona has one of the most cyclical economies in the nation. Aggregate growth is much faster in Arizona than the national average during economic expansions, but Arizona's economy may decline by as much or more than the U.S. average during recessions. Arizona's much more rapid aggregate economic growth during expansions results mostly from its much greater population growth rate, not from a better performance on per employee and per capita indicators.

All of the states with the most cyclical economies are in the South or West. The common link between these states is their rapid population growth. Nationwide, the construction and real estate sectors experience substantial cyclicality. In fast-growing states in which these sectors account for an above-average share of economic activity, the overall economy is relatively more cyclical.

Some industries are not as cyclical as others and some industrial cycles do not follow the national business cycle. Thus, economic diversification can help to reduce the overall cyclicality of a regional economy, but the effects of broadening the economic base of a large regional economy are modest. Slowing of the state's growth will have more effect on moderating the state's severe economic cycles than active steps to diversify the economy.

The economic cycle from the end of the recession in late 2001 through the end of the next recession in 2009 was unusually extreme, especially in Arizona. Following a slow start in 2002 and 2003, the economy boomed from 2004 through 2006. Arizona experienced its fastest aggregate growth in history during these years, though its gains in productivity and prosperity were only typical for an expansionary period. The boom turned into a recession that began at the end of 2007 and lasted into 2009 nationally and into 2010 in Arizona. This was the longest and deepest downturn since the Great Depression of the 1930s, as measured by both aggregate and prosperity measures.

The recovery from the last recession has been slow, especially as measured by employment and unemployment. A recovery back to prerecessionary levels of employment was not completed nationally until spring 2014, five years after the end of the recession. As of September 2014, the state had recovered only 65 percent of the jobs lost during the recession. Typically, by shortly after the end of a recession, the aggregate growth rate in Arizona is far higher than the national average. In the current cycle, Arizona lagged behind the nation until late 2010. Since then, its growth rate has roughly matched the national average.

Aggregate Growth Versus Per Capita and Per Employee Growth

Some economic indicators, such as employment or gross domestic product, measure the aggregate size and growth of the economy. Employment generally has been the most widely used economic indicator due to its simplicity and the timeliness of the release of its estimates. However, it is an inferior economic measure since hourly wages and the number of hours worked per year vary so much from one job to another. An aggregate economic measure that is expressed in dollars, such as gross product or earnings, is a better measure of aggregate economic growth. Arizona typically has been among the national leaders on measures of aggregate economic growth simply because of its rapid population growth, though this has not been the case since 2007.

The alternatives to measures of aggregate economic growth are indicators of productivity and prosperity. At a regional level, productivity is indirectly measured by per employee indicators, such as per employee gross product. Gains in productivity lead to improvements in prosperity. Prosperity typically is gauged by per capita measures, such as per capita income. Per capita and per employee indicators are appropriate to use to compare regions of widely varying sizes, and to

compare data for one region as it grows over time.[5] Unlike comparisons made on aggregate growth measures, which have shown Arizona to be one of the fastest-growing states, comparisons made on per employee and especially per capita indicators reveal the levels of productivity and prosperity in Arizona to be considerably below the national average, with the growth rates in the last few decades being a little below average. (Charts displaying the productivity and prosperity measures are included in the next section.)

Aggregate economic growth rates vary substantially over the course of an economic cycle. Per capita measures tend to be slightly less cyclical than aggregate measures, while per employee measures are the least cyclical.

Historically, the emphasis in Arizona has been on aggregate economic growth, particularly focused on employment. One might argue that a region has a responsibility to create enough jobs to meet the needs of its existing residents, but average job creation in Arizona has been far above that level. Except during economic recessions, the state has created far more jobs than needed by its existing residents, with the result being substantial net in-migration of working-age individuals to fill the jobs. With the focus on the number of jobs, the more important indicators of success — job quality, productivity, and prosperity — have all suffered.

In the early 1990s, the Arizona Strategic Planning for Economic Development (ASPED) effort was initiated by local leaders and employed an out-of-state consultant. This comprehensive statewide economic plan was lauded across the nation. The consultants recommended that Arizonans shift their focus from aggregate economic measures to productivity and prosperity measures, but Arizonans have been slow to adopt this recommendation.

Relationship Between Aggregate Growth and Gains in Prosperity and Productivity

The Office of the University Economist conducted two correlation analyses, using data from the U.S. Bureau of Economic Analysis (BEA), in order to determine the relationship between aggregate growth rates and the growth rates of prosperity and productivity measures. One analysis used state data (51 observations including the District of Columbia) and the other used data for the nation's 381 metropolitan areas. The indicators examined included the following, with the dollar measures adjusted for inflation:

- Population
- Employment
- Employment-to-Population Ratio
- Gross Domestic Product
- Earnings
- Personal Income
- Per Capita Personal Income
- Per Capita Gross Product
- Per Employee Gross Product
- Per Employee Earnings

[5] Any economic indicator measured in dollars must be adjusted for inflation if data for one time period are compared to another period. Analyses that compare regions should adjust the dollar figures for the regional cost of living.

The time series of available data varies by indicator, but most measures are available from 1969 through 2012.[6] This time period was divided into five shorter periods, measured from the peak of one economic cycle to the peak of the next cycle: 1969 to 1973, 1973 to 1981, 1981 to 1990, 1990 to 2001, and 2001 to 2007. In addition, to utilize the latest data, the period from 2004 to 2012 (similar points of two economic cycles) was examined.

The results — correlation coefficients — varied somewhat from one economic cycle to another.[7] The correlation coefficients using state data were similar to those using metro area data.

A correlation coefficient is a measure of the strength and direction of the relationship between two variables. It ranges from 1.0 (perfect positive correlation) to 0.0 (no correlation) to -1.0 (perfect negative correlation). The statistical significance of a given correlation at a given level of confidence can be determined. For example, at the standard 5 percent significance level, there is a 95 percent probability that the two variables are indeed correlated. Using the state data, a correlation of 0.28 or higher is significant at the 5 percent level. To be more confident that a true relationship exists, the correlation coefficient must be larger: 0.36 at the 1 percent level and 0.45 at the 0.1 percent level. Due to the larger number of observations, the correlation coefficients using the metro area data do not need to be as high to be statistically significant; for example, a coefficient of 0.15 is significant at the 0.3 percent level. Thus, it is possible for two variables to be significantly correlated despite a rather low correlation coefficient.

The inflation-adjusted percent changes in each of the per capita and per employee measures are unrelated to the percent change in population, with correlations ranging from slightly negative to slightly positive. Weak-to-moderate correlation — statistically significant in some economic cycles — is measured between the changes in the per capita measures and the percent change in total employment. Correlations are weaker between the per employee measures and employment, though occasionally significant.

The correlations with employment but not with population indicates that the correlations of the prosperity measures really are with the employment-to-population ratio. Indeed, the inflation-adjusted percent changes in each of the per capita measures are moderately-to-strongly correlated — generally significant at the 0.1 percent level — with percent changes in the employment-to-population ratio. Simply put, if the proportion of the population that is working rises, then per capita prosperity will rise as well.

This relationship between the prosperity measures and the employment-to-population ratio generally does not extend to per employee measures. On average, the per employee measures were slightly correlated with the employment-to-population ratio, but the correlations ranged from negative to positive. Increases in the percentage of the population at work do not logically have a relationship with changes in productivity.

[6] Data for 2013 are available by state but not yet by metropolitan area.

[7] This variation indicates that the time period utilized in a study must be carefully selected. Some of the inconsistent results across studies in the economic literature are due to the use of differing time periods, particularly periods that are too short and/or atypical.

The relationships between per capita/per employee measures and aggregate indicators that are measured in dollars, such as GDP, have fluctuated by economic cycle, but typically have ranged from moderate to strong, usually statistically significant. This correlation is the natural result of the overlap in the per capita/per employee measures and the aggregate measures, for example between GDP and per capita GDP.

The most important finding from this analysis is that the rate of growth of an area measured in people — population or employment — is unrelated to gains in productivity and prosperity. Thus, the analysis supports the ASPED recommendation that the state should shift its focus from growth to productivity and prosperity.

ARIZONA'S REGIONAL PRODUCTIVITY AND PROSPERITY

Arizona's regional productivity and prosperity was examined in comparison to the rest of the nation in the August 2014 University Economist report "Measures of Prosperity and Productivity Adjusted for the Cost of Living," available from http://economist.asu.edu/p3/job-quality. That report focused on the latest productivity and prosperity data available at that time (2012), adjusted for the 2012 cost of living as measured by the regional price parity (RPP).[8]

In addition to reporting Arizona's rank among the 50 states, Arizona's rank among 10 western and southwestern states — Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Texas, Utah, and Washington — is discussed in this and succeeding sections of this paper. A brief summary of the 2012 prosperity and productivity measures follows:

- Using measures of productivity,[9] Arizona compares unfavorably to the rest of the nation.
  - Per employee GDP in Arizona was 8 percent below the national average, ranking 40th among the 50 states and eighth among the 10 comparison states.
  - Arizona's figure for per employee earnings was 9 percent below the national average, ranking 36th nationally and fifth in the comparison group.
- Arizona's prosperity is further below the national average.
  - Per capita GDP was 18 percent below average, ranking 45th nationally and ninth in the comparison group.
  - Per capita personal income (PCPI) as measured by the BEA was 16 percent below average; Arizona ranked 48th nationally and eighth in the comparison group.

Historical Productivity and Prosperity in Arizona

Since the regional price parity estimates only go back five years, a historical perspective on Arizona's productivity and prosperity must use data not adjusted for the cost of living. Using unadjusted data, Arizona in 2012 was a little further below the national average on the productivity and prosperity measures than after adjusting for living costs since Arizona's cost of living was about 2 percent less than the U.S. average in 2012.

This historical analysis of productivity and prosperity focuses on the Arizona figure as a ratio to the national average. It uses revised data through 2013 released by the BEA at the end of September.

The time series for the measures of productivity start in 1969, the first year of employment estimates. As seen in Chart 1, year-to-year fluctuations in the ratio of Arizona to the U.S. average are common. The ups and downs are partially related to the economic cycle. The per employee measures in Arizona relative to the nation generally rise during periods of strong economic growth and drop during slumps.

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[8] The U.S. Department of Commerce, Bureau of Economic Analysis, has released a new measure of the cost of living — regional price parities — for states and metropolitan areas. See the August 2014 University Economist report "Measures of Prosperity and Productivity Adjusted for the Cost of Living," available at http://economist.asu.edu/p3/job-quality, for a discussion of this new cost-of-living measure.

[9] As noted in the definition of terms, the per employee measures are proxies for true measures of productivity.

CHART 1
PRODUCTIVITY IN ARIZONA
EXPRESSED AS A PERCENTAGE OF THE NATIONAL AVERAGE

Source: Calculated from data produced by the U.S. Department of Commerce, Bureau of Economic Analysis.

Productivity in Arizona was near the national average in the early 1970s: above average on per employee GDP and only slightly below average on per employee earnings. Each measure relative to the national average deteriorated substantially during the rest of the 1970s and particularly during the 1980s. The low point was reached around 1990.

Per employee GDP quickly rebounded, reaching 99 percent of the U.S. average in 1995, though this was lower than the ratios in each year from 1969 through 1980. The ratio has dropped since then; it was below the 1991 trough in each year from 2009 through 2013, reaching the lowest point on record in 2013 at 89.8 percent.[10] The per employee earnings ratio slowly rose after the 1990 trough, with its peak of 93 percent in 2006 below the 95-to-100 percent figures in each year from 1969 through 1983. The 2012 and 2013 ratios of 89.6 percent were higher than in only 1989 and 1990. Thus, the proxies for productivity were about as far below the U.S. average in recent years as the historical lows.

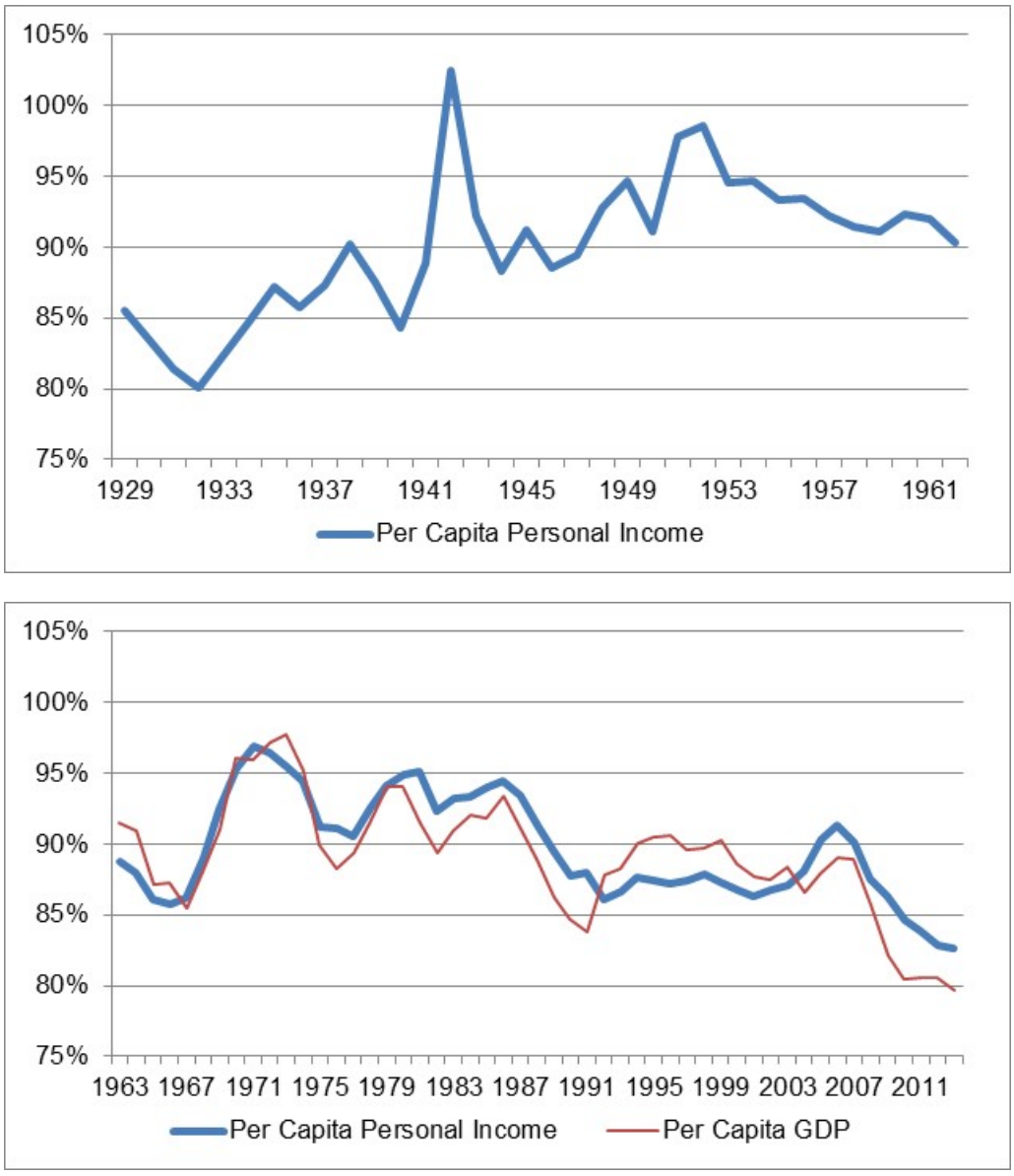
For the prosperity measures, historical data for per capita personal income go back to 1929, while 1963 data for GDP are the earliest. Relative to the nation, each measure is highly correlated to the economic cycle, with substantial declines during recessions and improvement during expansions. Except for one year during World War II, PCPI in Arizona has been less than the national average.

[10] A ratio of 89.8 indicates that GDP per employee in Arizona was 10.2 percent less than the U.S. average.

Beyond this cyclicality, Arizona has experienced two long periods of extensive losses in prosperity relative to the nation: from 1952 through 1966 and from 1982 through 1992. While Arizona largely recovered from the first downslide by 1982, it only partially recovered from the second decline before dropping further below the national average in recent years.

As seen in Chart 2, prosperity in Arizona was quite low relative to the national average during the Great Depression of the 1930s. From its low in 1932 of 20 percent below average, the per

CHART 2
PROSPERITY IN ARIZONA
EXPRESSED AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from data produced by the U.S. Department of Commerce, Bureau of Economic Analysis.

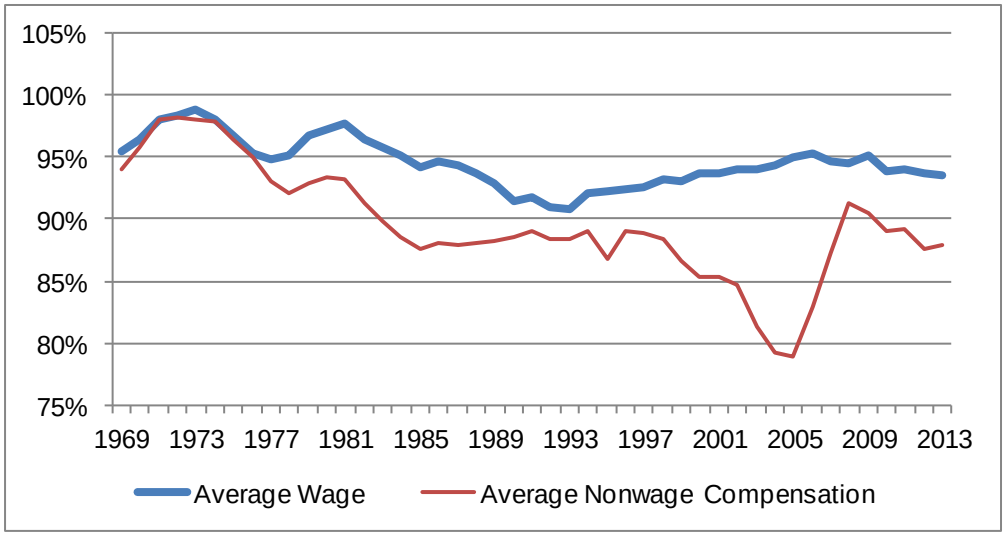
capita personal income ratio generally rose through 1952, when Arizona's figure was only 1 percent less than the national average. The ratio generally declined from 1952 to 1966, when Arizona's PCPI was 14 percent less than the national average. By 1971, Arizona's PCPI was only 3 percent less than the U.S. average. The ratio then generally fell slowly over the next 35 years before dropping more substantially during the last recession and on into the current economic recovery. Arizona's PCPI in recent years was more than 17 percent below the U.S. average, a differential almost as large as from 1930 through 1933.

The ratio of per capita GDP in Arizona to the U.S. average has been similar to the PCPI ratio since 1963, though the GDP ratio has been lower in recent years. In 2013, Arizona's per capita GDP was 20 percent less than the national average. The low ratios of per capita GDP and personal income in recent years clearly are at least in part due to cyclical factors, though it is unclear when and to what extent these ratios will rise in coming years.

Reasons for Arizona's Low Productivity and Prosperity

According to the February 2010 University Economist report "The Magnitude and Causes of Arizona's Low Per Capita Income," available from http://economist.asu.edu/p3/job-quality, a low average wage and low nonwage compensation are primarily responsible for the state being below average on the per employee measures. As seen in Chart 3, the average wage in Arizona has been below the national average since 1969, the first year of data. The ratio to the U.S. average was highest from 1969 through the early 1980s at between 1-and-5 percent lower. The ratio then fell through 1993 to 9 percent below average before recovering to 5 percent below average in the mid-2000s. The differential in 2012 and 2013 was 6.4 percent.

CHART 3
AVERAGE WAGE AND NONWAGE COMPENSATION IN ARIZONA EXPRESSED AS PERCENTAGES OF THE NATIONAL AVERAGE



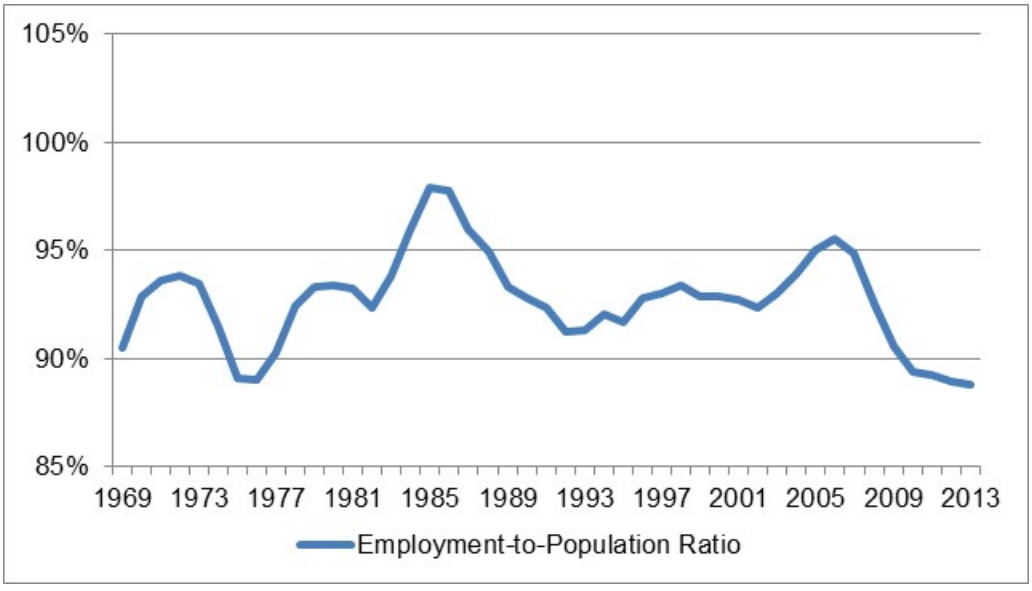
Source: Calculated from data produced by the U.S. Department of Commerce, Bureau of Economic Analysis.

Average nonwage compensation (benefits) in Arizona in the early-to-mid-1970s was about as close to the national average as wages. Since then, average nonwage compensation has been further below the national average; the differential in 2013 was 12 percent.

The below-average wages and other compensation in Arizona primarily are due to two factors. First, job quality is below average. In 2004, Arizona's job quality was about 2 percent less than the national average, but ranked among the middle of the states. Arizona's occupational mix was only marginally below the national average, but its industrial mix was nearly 2 percent below average.[11] The below-average industrial mix likely is tied to the state's poor economic competitiveness for the key base industries, which not only pay higher wages but also offer better nonwage compensation packages. Second, even after considering the cost of living and the employment mix, wages in Arizona are below average. This is apparently due to the willingness of individuals to work for lower wages in Arizona in exchange for perceived noneconomic advantages of living in the state, such as climate and lifestyle.

Arizona is further below average on per capita measures than on per employee measures. In addition to the low wages and other compensation, a number of other factors contribute to the low per capita figures. The major factor is the low workforce participation rate in Arizona. As seen in Chart 4, the employment-to-population (E-P) ratio in Arizona has been less than the

CHART 4
EMPLOYMENT-TO-POPULATION RATIO IN ARIZONA
EXPRESSED AS A PERCENTAGE OF THE NATIONAL AVERAGE



Source: Calculated from data produced by the U.S. Department of Commerce, Bureau of Economic Analysis.

[11] Since the state is further below average on nonwage compensation than on wages and salaries, according to BEA data, Arizona likely would compare less favorably on job quality if a broader measure of compensation was used.

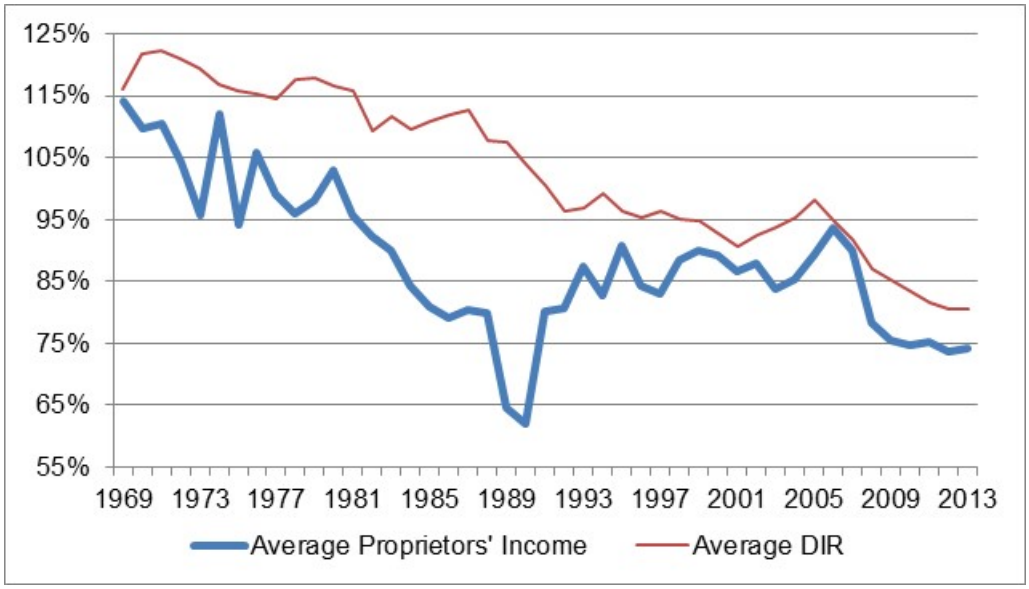
national average in every year since the time series began in 1969. As a percentage of the national average, Arizona's E-P ratio varies with the economic cycle, with the highest figures during the mid-1980s and mid-2000s boom periods. In recent years, Arizona's E-P ratio has been as far below the national average as during the mid-1970s recession. The 2012 and 2013 figures were 11 percent less than the U.S. average.

The below-average employment-to-population ratio is in part due to the state's slightly above-average shares of its residents who are children or senior citizens. Early retirees who move to the state when they retire also contribute to the low ratio. However, even among the prime working-age population of those 25-to-54 years of age, the workforce participation rate in Arizona is below average.

The low workforce participation rate even among those of prime working age may in part result from factors that cannot be influenced by public policy, such as cultural norms regarding the workforce participation of women. However, some of the low participation almost certainly is a result of the uncompetitive job skills of some individuals who grew up in Arizona. They are outcompeted for available jobs by in-migrants from other states with stronger skills and educational attainments.

Workforce participation rates are particularly low in some of Arizona's less-populous counties where educational attainments are the weakest. In certain rural parts of the state, including some of the American Indian reservations, weak job creation also contributes to the low workforce

CHART 5
AVERAGE PROPRIETORS' INCOME AND AVERAGE DIVIDENDS, INTEREST AND RENT IN ARIZONA EXPRESSED AS PERCENTAGES OF THE NATIONAL AVERAGE



Source: Calculated from data produced by the U.S. Department of Commerce, Bureau of Economic Analysis.

participation. Thus, while the state needs to concentrate on the key base industries, it must have a flexible plan that focuses on other base industries in some rural areas of the state.

Other factors contribute to Arizona's low per capita figures. Average self-employment (proprietors') income and average income from dividends, interest, and rent also are considerably below the national average (see Chart 5). Each of these measures has followed a downward trend in Arizona relative to the nation since the early 1970s. In 2013, average proprietors' income was 26 percent less than the U.S. average, and average dividends, interest, and rent was 19 percent below the national average.

Given Arizona's below average and decreasing productivity and prosperity over the last 30 years relative to earlier time periods, but rapid aggregate growth (at least until recent years), the following conclusions seem fair:

- Arizona's competitiveness is poor and declining in base industries that are productive and offer high wages.
- The state's competitiveness is strong (or, was strong through 2007) among less productive and less well-paying base industries.

ARIZONA'S INDIVIDUAL PROSPERITY

Regional prosperity, as measured by per capita personal income or per capita GDP, may be similar in two states, yet the distribution of prosperity among individuals living in each region may not be so similar. Take as an example two regions with an identical per person income:

- The average per capita income by quintile is $100,000/80,000/60,000/40,000/20,000 in the first region.
- The quintile averages are $80,000/70,000/60,000/50,000/40,000 in the other region.

While the first region has a higher share of highly prosperous individuals, it also has a higher share of residents living in poverty. As measured by the poverty rate, the first region is less prosperous. Thus, measures of individual economic well-being, including income inequality, poverty rate, and unemployment rate, provide additional insight on prosperity than the broad per person measures.

The primary source of the individual prosperity measures is the American Community Survey (ACS), which has been conducted annually since 2005 by the U.S. Census Bureau.[12] The Gini Index, a measure of income inequality, is reported in the ACS. In 2013, Arizona's income inequality was lower than the national average, but the state ranked only 31st. Among the 10 comparison states, Arizona ranked seventh. Income inequality is relatively low in the western half of the country, though California and Texas are exceptions. Income inequality is high in the South and in most states along the Atlantic Coast south of New Hampshire.

As measured by the ACS, the poverty rate in Arizona in 2013 was 18.6 percent, considerably higher than the U.S. figure of 15.8 percent. Arizona's poverty rate ranked 43rd nationally and ninth among the comparison states. The poverty rate has been higher than the U.S. average in Arizona for many years though the differential between Arizona and the nation in recent years has been greater than typical. Given that income inequality in Arizona is not out of line with the rest of the nation, the regional measures of prosperity provide a fair picture of the economic well-being of the state's residents. The relatively high poverty rate is consistent with the state's subpar regional prosperity.

An unemployment rate is reported monthly by the U.S. Department of Labor's Bureau of Labor Statistics (BLS).[13] The annual average in 2013 was 7.4 percent nationally and 8.0 percent in Arizona. Arizona ranked 39th nationally and eighth in the comparison group. The unemployment rate in Arizona has varied over time from higher to lower than the national average.

An unemployment rate also can be calculated from ACS data. In nearly all states, the unemployment rate calculated from the ACS was higher than the rate from the BLS in 2013. The 2013 ACS rate was 8.9 percent in Arizona, worse than the U.S. average of 8.0 percent. Arizona ranked 35th nationally and sixth among the comparison states. The relatively high unemployment rate of recent years is an indication of the severity of the last recession and the sluggishness of the economic recovery in Arizona, but the state's unemployment rate is unlikely to persistently remain higher than the national average.

[12] Survey error from single-year ACS data is significant for less populous areas, including the smaller states.

[13] These unemployment rate estimates have large margins of error, even for relatively populous states.

REGIONS WITHIN ARIZONA

The state sometimes is divided into three economic regions — the Phoenix metropolitan area, the Tucson metro area, and the balance of the state. Among the three regions, the Phoenix area has the most diverse economy with the largest number of driving economic activities. This is a natural outcome of its much larger employment size. Job quality, as measured by the industrial mix, also is highest in the Phoenix area, at about the national average. With existing high-tech manufacturing and higher-value basic service activities, any effort to diversify the Phoenix area's economy can and should focus on the key base industries.

On diversity and job quality, the Tucson area is between the Phoenix area and the balance of the state. Like the Phoenix area, the Tucson area has the potential to expand its existing high-tech manufacturing and higher-value basic service activities, so any effort to diversify the Tucson area's economy also should focus on the key base industries.

Unlike the two large metro areas, the balance of the state consists of multiple local economies, with the composition of the economies varying by town. Most of the local economies are driven by only one or a few economic activities, generally limited to agriculture, mining, the federal government, tourism, and seasonal residents/in-migrating retirees. Job quality also is quite low through much of the balance of the state.

Economic diversification would be of significant benefit to the portion of Arizona outside the two major metro areas, but opportunities for diversification are extremely limited in much of rural Arizona given such factors as geographic remoteness, small population size, and low levels of educational attainment among the residents. Most of the balance of the state cannot currently compete for high-wage, high-value base economic activities and will be severely challenged to do so in the future. Diversification efforts need to focus on those activities for which each local area can compete. Thus, while the economic development of the major metro areas needs to concentrate on the key base industries, a flexible plan that focuses on other base industries in some rural areas of the state is needed.

Prosperity and Productivity by Metropolitan Area

The August 2014 University Economist report "Measures of Prosperity and Productivity Adjusted for the Cost of Living" also examined conditions in Arizona's seven metropolitan areas. Prosperity in each of Arizona's metro areas is below average compared to metropolitan areas of a similar size. The largest differentials are in the Lake Havasu City-Kingman, Prescott, and Yuma metro areas, but even the Phoenix metro area's figures are substantially below the average of large metro areas. With the exception of Sierra Vista-Douglas, productivity in each of the metro areas also are below the average of similarly sized areas.

Taken together, Arizona's eight metropolitan counties in 2012 had a cost-of-living-adjusted per capita personal income 16 percent less than the national metro average. The differential ranged from 11 percent in Maricopa County to 44 percent in Pinal County. Earnings per employee after adjustment for living costs was 11 percent lower in Arizona's metro counties than the U.S. metro average. The differential ranged from 6 percent in Maricopa County to 37 percent in Yavapai County.

Arizona's seven nonmetropolitan counties taken together had a per capita personal income figure after adjustment for living costs 23 percent less than the national nonmetro average in 2012. The differential ranged from 8 percent in Gila County to 29 percent in Apache County. Earnings per employee after adjustment for living costs was only 4 percent lower in Arizona's nonmetro counties than the U.S. nonmetro average. The figure was considerably above average in Greenlee County and also above average in Santa Cruz County, but was 13 percent below average in Apache County.

Metropolitan Areas Versus Megapolitan Areas

A metropolitan area is one type of "core-based statistical area" defined by the federal government. A metropolitan area has a core urbanized area of at least 50,000 residents, while a micropolitan area has an urban core of 10,000-to-49,999 residents. Metro and micro areas are defined as the county containing the core plus any adjacent counties that are integrated with the core county, as measured by the percentage living in one county but commuting to work in another county. At least 25 percent of the workers in an outlying county must work in the core county, or at least 25 percent of the jobs in the outlying county must be filled by those living in the core county, for the outlying county to be included in the metro or micro area.

Adjacent metro or micro areas are combined by the federal government into a "combined statistical area" if 15 percent of the workers live in one metropolitan or micropolitan area but work in the other. In Arizona, the Tucson metro area is combined with the Nogales micropolitan area and the Lake Havasu City-Kingman metro area is combined with the Las Vegas, Nevada, metro area.

Some analysts (particularly Robert Lang of the Metropolitan Institute at Virginia Tech University and individuals at the Regional Plan Association) have suggested grouping metropolitan areas, micropolitan areas, and less populous counties together into "megapolitan" areas that are much more extensive geographically than the federal government's combined statistical areas. The definition of the megapolitan areas does not include a commuting requirement. Thus, the various pieces of a megapolitan area may have little economic connection to each other.

Nationally, the megapolitan proponents have identified 10 developing megapolitan areas that have been predicted to reach a population of at least 10 million people by 2040. The "Sun Corridor" in Arizona is one of the megapolitan areas. The geographic definition of the Sun Corridor varies, but the core is the Phoenix and Tucson metro areas (Maricopa, Pinal, and Pima counties). Other counties, particularly Yavapai (the Prescott metro area), but also Santa Cruz (the Nogales micropolitan area) and Cochise (the Sierra Vista-Douglas metro area), are included in the Sun Corridor by some analysts.[14]

The Sun Corridor accounts for a very high share of the state's economic activity. Using the narrow geographic definition, 88 percent of the state's GDP is generated in the Sun Corridor; the percentage is 91 using the broad definition that includes Cochise, Santa Cruz, and Yavapai

[14] Using the broadest geographic definition and the high scenario for population projections produced by the Arizona Department of Administration's Office of Employment and Population Statistics, the population of the Sun Corridor will not be quite 10 million in 2040 according to the latest projections.

counties. Thus, economic measures in the Sun Corridor are very similar to those of the state as a whole.

Productivity in the Sun Corridor, as measured by per employee earnings adjusted for the cost of living, was 8.8 percent lower than the U.S. metro average in 2012, using the narrow geographic definition of the Phoenix and Tucson metro areas. The figure was 9.5 percent lower than the metro average using the broadest geography. Prosperity in the Sun Corridor in 2012, as measured by per capita personal income adjusted for living costs, was 14.2 percent lower than the metro average using the narrow geographic definition and 14.7 percent lower using the broader geography.

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. This section focuses on the location factors important to businesses. Factors important to individuals are discussed in the last 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, anti-monopoly policy, suppliers
- Basic infrastructure: transportation and utilities
- Technological infrastructure/research and development: telecommunications, technological absorption and transfer, tech workers, R&D, 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 by nation. This discussion is limited to mobile base economic activities — excluding agriculture, mining, and tourism, which are tied to natural attributes.

Overview of Regional Location Factors

The most important factors considered by the *average* company when looking to move or to locate a new facility include:

- The quality and availability of the workforce, determined in part by educational achievement and attainment.
- The quality and availability of the physical infrastructure. Among the various types of infrastructure, transportation and utilities are most often mentioned by the average company as important considerations. The telecommunications infrastructure has become increasingly important.
- Cost factors. Labor costs are the most important of the cost factors, but taxes, real estate costs, and energy costs all are common considerations. Once a region has been selected

as a finalist in a company's site selection process, the availability and flexibility of incentives often makes a difference.

Other regional attributes of importance include the availability of land and buildings, the quality of place, and the regulatory environment.

Area Development magazine included lists of location factors, based on a survey of corporate executives, in their Q1 2014 issue, available at http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2014/28th-Corporate-Executive-RE-survey-results-6574981.shtml. Quality-of-life factors were listed separately from site selection factors — see Table 1.

A survey of site selectors by *Site Selection* magazine (see the January 2014 issue at http://www.siteselection.com/issues/2014/jan/ss-survey.cfm) also rated skilled labor as the top factor, followed by the transportation infrastructure. The site selectors noted that incentives never

TABLE 1
BUSINESS LOCATION FACTORS

Site Selection Factors	Rating*	Quality-of-Life Factors	Rating*
Availability of Skilled Labor	95	Low Crime Rate	81
Highway Accessibility	94	Health Care Facilities	80
Labor Costs	91	Housing Costs	75
Occupancy or Construction Costs	87	Ratings of Public Schools	73
Availability of Advanced ICT**	85	Housing Availability	72
Availability of Buildings	83	Recreational Opportunities	66
Corporate Tax Rate	82	Colleges and Universities in Area	60
State and Local Government Incentives	82	Climate	60
Low Union Profile	81	Cultural Opportunities	55
Energy Availability and Costs	81		
Tax Exemptions	81		
Right-to-Work State	81		
Availability of Land	80		
Expedited Permitting	76		
Proximity to Major Markets	76		
Availability of Long-Term Financing	75		
Environmental Regulations	72		
Shipping Costs	71		
Proximity to Suppliers	68		
Raw Materials Availability	61		
Access to Major Airports	59		
Proximity to Technical Colleges/Training	54		
Training Programs	52		
Availability of Unskilled Labor	49		

* Percentage of corporate executives selecting this factor
** Information and communications technology

Source: *Area Development* magazine, Q1 2014 issue, available at http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2014/28th-Corporate-Executive-RE-survey-results-6574981.shtml.

should be a driver of the site selection process, but can play a decisive role later in selecting among the locations that fulfill all of the requirements.

A Closer Look at Regional Location Factors

The regional factors deemed most important vary by industry, type of facility, and company. Yet most rankings of location factors do not distinguish between the many kinds of basic activities. In particular, the list of important location factors can be very different for the key base industries. Within these industries, the list of factors important in siting a headquarters or research and development (R&D) facility can be quite different from the most important factors in locating a manufacturing plant or some other type of facility.

In order to distinguish between the different industries and different types of facilities, economic development experts in the Phoenix area were polled regarding what they believed to be the most important factors.[15] They were asked to differentiate between the type of company facility and were asked to list the factors most important to each of eight basic industry clusters that either were already of particular significance in the Phoenix area or were a target for future growth. The selected clusters were aerospace, bioindustry, call centers, environmental technology, plastics, software, transportation, and "high tech" (electronics and other high-tech activities not included in one of the other clusters). Each of these clusters was selected either in the original Arizona Strategic Planning for Economic Development effort during the early 1990s or shortly thereafter. Several, but not all, of these clusters are high paying and are heavy users/producers of technology.

In general, the most important factors for both headquarters/R&D facilities and manufacturing/other types of company facilities were labor costs, the availability of a skilled workforce, and educational opportunities and quality. For manufacturing/other types of facilities, the cost of utilities and the airport infrastructure also were rated very highly, though neither of these even made the list of important factors for headquarters/R&D facilities.

Several other factors were considered to be important for both headquarters/R&D facilities and manufacturing/other facilities, including the availability of land and leased space, the telecommunications infrastructure, and the education infrastructure. The proximity to universities and research centers also was on the list for headquarters/R&D facilities. For manufacturing/other facilities, land costs and lease rates, power and water availability, and regulations also were considered to be important.

Notably lacking from the lists of important factors are business taxes and incentives. Each was considered to be important for certain types of facilities in some clusters, but overall was not deemed to be as significant as the factors mentioned above for the selected clusters. To the extent that taxes are a location factor, they must be evaluated in the broad context that they are the price paid for the public infrastructure and public services that are important to businesses.

Also notable is that two of the three most important factors to all types of facilities are related to education: the availability of a skilled workforce, and educational opportunities and quality (important to the company as a component of a skilled workforce and important to the

[15] "Site Selection Factors Vary Widely by Economic Cluster," *Arizona Business*, November 2000.

company's employees as a component of their quality of life). Two additional educational factors were considered to be important: the education infrastructure and proximity to universities and research centers.

Some of the location factors, such as labor costs and real estate costs, are largely beyond the purview of public policy. In contrast, the public sector is largely responsible for the transportation infrastructure and public education.

Key Regional Location Factors in the 21st Century

In the previous subsection, the relative importance of various location factors is shown to vary by cluster and by type of facility. In particular, the factors important to high-paying, high-technology, innovative, knowledge-based activities are considerably different from those of other activities. However, based on recent research, the discussion in the previous subsection does not go far enough to explain the conditions that are needed for a region to succeed economically in the 21st century.

Enrico Moretti of the University of California at Berkeley has written a series of papers over the last decade focusing on the increasing importance of education to the key base industries that are driving the 21st-century economy. Among his publications is a 2012 book *The New Geography of Jobs* (Houghton Mifflin Harcourt). His recent (May 2014) paper "Are Cities the New Growth Escalator?"[16] 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.

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.

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

Moretti has found that geographical differences in the college-educated share of the workforce, in productivity, and in prosperity have been increasing in recent years. He attributes this to the increased importance of agglomeration in the knowledge economy that began to emerge in the latter part of the 20th century. "Agglomeration" — gathering into a cluster or mass — in economics refers to the benefits that firms obtain by locating near each other, 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 and 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 the base economy 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 20 years ago 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 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," including the Phoenix area. Moretti concludes that a university by itself is not enough — even a strong research university such as Arizona State 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 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 base industries. To be moderately successful across a range of base activities, a region must be competitive on the traditional location factors of 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 base 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 activities (though such activities increasingly are locating in lower-cost countries).

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 base industries, 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 are less clear.

COMPARING COMPETITIVENESS ACROSS GEOGRAPHIC AREAS

Many difficulties exist in producing a study that compares nations or any other set of geographic areas, such as U.S. states, using a variety of indicators on a complex topic such as competitiveness or quality of place. 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 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 to 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.

To determine the relative prosperity of nations or of other geographic areas, GDP per capita or a similar measure, not the results of a competitiveness study, should be used. 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 NATIONAL COMPETITIVENESS

Many studies address at least some aspects of competitiveness at the national level, but two are acknowledged to be among the best broad measures of competitiveness:

- The World Economic Forum, a not-for-profit organization based in Geneva, Switzerland, annually produces the "Global Competitiveness Report" (http://www.weforum.org/issues/global-competitiveness). The latest report includes 144 nations.
- The International Institute for Management Development (IMD), a graduate business school in Lausanne, Switzerland, annually prepares the "World Competitiveness Yearbook" (http://www.imd.org/wcc/wcy-world-competitiveness-yearbook/). The latest report includes 60 nations.

Each study examines a large number of indicators that are assumed to be relevant to economic competitiveness. The indicators are divided into categories. Each nation is scored and ranked in each category, with one overall score and rank also calculated.

The World Economic Forum found that about two-thirds of the variation in GDP per capita[17] across its 144 countries can be explained by the 2014-15 results from its "Global Competitiveness Report." This is a strong relationship.

The correlation in the overall scores of the 60 nations that are included in both the "Global Competitiveness Report" and the "World Competitiveness Yearbook" is a very high 0.95, despite differences in methodology and data. In 27 of the 60 countries, the difference in the rank between the two studies is two or fewer. The national ranks of the 60 nations are compared in Table 2.[18] Given the very high correlation between the two studies, the correlation between the results of the "World Competitiveness Yearbook" and GDP per capita also must be high. Thus, users can be confident that each study is providing a reasonable ranking of national economic competitiveness.

"Global Competitiveness Report"

The latest report for 2014-15 represents the 35th edition of this report. It evaluates 144 countries on 114 competitiveness measures. Two-thirds of the indicators are derived from the World Economic Forum's executive opinion survey.

An overall Global Competitiveness Index (GCI) is calculated, consisting of three weighted subindexes — basic requirements, efficiency enhancers, and innovation and sophistication. The weights of the subindexes vary by country based on the country's stage of development, as seen in Table 3. The stage of development — the least-developed countries are in the "factor-driven" stage and the most-developed countries are in the "innovation-driven" stage — is largely determined by gross domestic product per capita, adjusted by purchasing power parity. The GCI is highly related to a country's stage of development.

[17] GDP per capita, a measure of prosperity, is the most widely used measure to compare nations.
[18] In Table 2, the ranks from the "Global Competitiveness Report" have been modified so that the countries are ranked from 1 through 60, in order to match the ranks from the "World Competitiveness Yearbook."

TABLE 2
COMPARISON OF COUNTRY RANKS FROM COMPETITIVENESS REPORTS

	WCY*	GCR**		WCY*	GCR**
Europe			**Americas**		
Switzerland	2	1	United States	1	3
Germany	6	5	Canada	7	15
Sweden	5	10	Chile	31	31
Norway	10	11	Mexico	41	49
Netherlands	14	8	Brazil	54	46
Denmark	9	13	Peru	50	51
Finland	18	4	Columbia	51	52
United Kingdom	16	9	Argentina	58	59
Luxembourg	11	19	Venezuela	60	60
Ireland	15	24	**Asia**		
Austria	22	21	Singapore	3	2
Belgium	28	18	Hong Kong	4	7
France	27	23	United Arab Emirates	8	12
Iceland	25	29	Taiwan	13	14
Estonia	30	28	Japan	21	6
Czech Republic	33	35	Malaysia	12	20
Lithuania	34	36	Qatar	19	16
Latvia	35	37	Israel	24	26
Spain	39	33	China	23	27
Poland	36	38	South Korea	26	25
Portugal	43	34	Thailand	29	30
Russia	38	43	Indonesia	37	32
Italy	46	40	Kazakhstan	32	41
Romania	47	47	Turkey	40	39
Hungary	48	48	Philippines	42	42
Slovak Republic	45	55	India	44	54
Bulgaria	56	44	Jordan	53	50
Ukraine	49	56	**Other**		
Slovenia	55	53	New Zealand	20	17
Greece	57	58	Australia	17	22
Croatia	59	57	South Africa	52	45

Sources:
* "World Competitiveness Yearbook," 2014, International Institute for Management Development (http://www.imd.org/wcc/wcy-world-competitiveness-yearbook/).
** "Global Competitiveness Report," 2014-15, World Economic Forum (http://www.weforum.org/issues/global-competitiveness).

The three subindexes are divided into 12 "pillars," with many of the pillars further subdivided, as shown in Table 4. The relative importance of each category is shown in Table 4 as a percentage of the next-highest category level; in most cases, the pillars and their subdivisions are equally weighted.

The United States has one of the most developed economies in the world, with its GDP per capita ranked ninth. On the overall GCI, the United States ranks third behind Switzerland and Singapore. European nations, Japan, and Hong Kong complete the list of top 10 nations. The United States ranks in the top 10 in the efficiency enhancers and innovation and sophistication

TABLE 3
WEIGHTING USED IN "GLOBAL COMPETITIVENESS REPORT," 2014-15

Stage of Development	Number of Countries	Subindexes: Basic Requirements	Subindexes: Efficiency Enhancers	Subindexes: Innovation and Sophistication
1. Factor Driven	37	60%	35%	5%
Transition From 1 to 2	16	40 to 60	35 to 50	5 to 10
2. Efficiency Driven	30	40	50	10
Transition From 2 to 3	24	20 to 40	50	10 to 30
3. Innovation Driven	37	20	50	30

Source: World Economic Forum (http://www.weforum.org/issues/global-competitiveness).

subindexes, and in the top 20 on each of the pillars within these two subindexes. The United States does not compare as favorably in the basic requirements subindex with a rank of 33rd. It ranks only 113th in the macroeconomic environment pillar, including ranks of 134th on general government debt as a share of GDP, 130th on the government budget balance as a share of GDP, and 87th on gross national savings as a share of GDP. The U.S. rank is 49th on the health and primary education pillar.

"World Competitiveness Yearbook"

The intent of the yearbook, which has been published since 1989, is to measure the "ability of nations to create and maintain an environment in which enterprises can compete." Enterprises can be either private or state owned. The latest report for 2014 evaluates 60 countries on 338 competitiveness measures, though the overall ranks are based on 253 indicators. Nearly two-thirds of the criteria, but only a little more than half of those used to determine the ranks, are based on hard data. The remaining indicators are based on an annual survey of executives regarding their perceptions of competitiveness.

The indicators are aggregated into four categories, each of which is subdivided into five subcategories, and then into an overall index, as shown in Table 5. Equal weighting is applied to the 20 subcategories. While this organization is considerably different from that used in the "Global Competitiveness Report," many of the same measures are used.

The United States compares quite favorably, ranked first on the overall index and on three of the four factors: economic performance, business efficiency, and infrastructure. In contrast, it ranks outside of the top third of nations on the government efficiency factor.

TABLE 4
"GLOBAL COMPETITIVENESS REPORT," 2014-15

Category	Weight *	U.S. Rank	Examples of Indicators
TOTAL	**100%**	**3**	
I. BASIC REQUIREMENTS	**20**	**33**	
1. Institutions	**25**	**30**	
A. Public	75		Property rights, corruption, undue influence, government efficiency, security
B. Private	25		Corporate ethics, accountability
2. Infrastructure	**25**	**12**	
A. Transport	50		Roads, railroads, ports, air
B. Electricity & Telephony	50		Electrical supply, fixed and mobile phones
3. Macroeconomic Environment	**25**	**113**	Government budget balance, debt and credit rating; savings rate, inflation
4. Health & Primary Education	**25**	**49**	
A. Health	50		Diseases, infant mortality, life expectancy
B. Primary Education	50		Quality, enrollment rate
II. EFFICIENCY ENHANCERS	**50**	**1**	
5. Higher Education & Training	**17**	**7**	
A. Quantity of Education	33		Enrollment rates: secondary and higher
B. Quality of Education	33		Quality of system, math & science, and management schools; Internet access
C. On-the-Job Training	33		Availability/use of specialized training
6. Goods Market Efficiency	**17**	**16**	
A. Competition	67		Domestic: taxation, anti-monopoly policy, business starts; foreign: trade barriers and tariffs, foreign direct investment, imports
B. Quality of Demand Conditions	33		Customer orientation, buyer sophistication
7. Labor Market Efficiency	**17**	**4**	
A. Flexibility	50		Labor-employer relations, hiring & firing
B. Efficient Use of Talent	50		Pay & productivity, brain drain, female participation rate
8. Financial Market Development	**17**	**9**	
A. Efficiency	50		Availability & affordability of services, access to loans and venture capital
B. Trustworthiness & Confidence	50		Bank soundness, regulation of securities
9. Technological Readiness	**17**	**16**	
A. Technological Adoption	50		Technology absorption and transfer
B. Use of Information & Communications Technologies	50		Internet users and bandwidth, mobile subscriptions, fixed telephone lines
10. Market Size	**17**	**1**	
A. Domestic	75		Index
B. Foreign	25		Index
III. INNOVATION & SOPHISTICATION	**30**	**5**	
11. Business Sophistication	**50**	**4**	Local suppliers, clusters, value chain
12. Research & Development Innovation	**50**	**5**	Company R&D, university-industry collaboration, patents, scientists & engineers

* Relative to next highest level; the subindex weights are those used for the United States and other highly developed nations

Source: World Economic Forum (http://www.weforum.org/issues/global-competitiveness).

TABLE 5
"WORLD COMPETITIVENESS YEARBOOK," 2014

Category	U.S. Rank	Examples of Indicators
TOTAL	1	
I. ECONOMIC PERFORMANCE	1	
1. Domestic Economy		GDP, GDP per capita, diversification, growth
2. International Trade		Current balance, trade balance, exports and imports
3. International Investment		Direct foreign investment, relocation threat, portfolio investment
4. Employment		Employment by sector, growth, unemployment
5. Prices		Inflation, cost-of-living index, rents
II. GOVERNMENT EFFICIENCY	22	
6. Public Finance		Government budget surplus, debt, expenditures
7. Fiscal Policy		Revenues, tax rates and burdens
8. Institutional Framework		Central bank interest rate, credit rating, regulations
9. Business Legislation		Tariffs, subsidies, business starts, labor regulations
10. Societal Framework		Income inequality, justice system, gender inequality
III. BUSINESS EFFICIENCY	1	
11. Productivity and Efficiency		Overall productivity, labor productivity, company productivity
12. Labor Market		Costs, labor relations, labor force skills, brain drain
13. Finance		Bank and stock market efficiency, credit and venture capital
14. Management Practices		Adaptability, ethics, auditing, entrepreneurship
15. Attitudes and Values		Globalization, national culture, corporate values
IV. INFRASTRUCTURE	1	
16. Basic Infrastructure		Roads, railroads, air and water transportation, energy
17. Technological Infrastructure		Telecommunications, engineers, high-tech exports
18. Scientific Infrastructure		R&D personnel and expenditures, patents, knowledge transfer
19. Health and Environment		Health expenditures and infrastructure, pollution, renewables
20. Education		Expenditures, test results, language skills, foreign students

Source: International Institute for Management Development (http://www.imd.org/wcc/wcy-world-competitiveness-yearbook/).

EVALUATIONS OF STATE COMPETITIVENESS

Various studies address competitiveness or the "best place to do business" at the level of U.S. states. Six studies released since mid-2013 that provide information on each of the 50 states are the focus in this section. Unlike the two studies of nations examined in the prior section, the ratings of competitiveness by state vary considerably across the six state studies. Because of this variation, it is important to evaluate the strengths and weaknesses of each study to determine which ratings are most reliable. For most of these studies, however, a thorough evaluation cannot be made. Documentation is limited, with statements of methodology and descriptions of the sources and timeframes of the data generally not reported.

Each of the studies of competitiveness by state appears to have significant limitations. Only the Beacon Hill Institute and *Forbes* studies are significantly correlated to prosperity, but the correlations are considerably lower than those of the two national studies examined in the previous section. These two studies are consistent in their evaluation of Arizona's competitiveness. Arizona ranks 23rd nationally and fifth in the comparison group in the Beacon Hill Institute study and 24th nationally and sixth in the comparison group on the *Forbes* study.

Comparison of Six Studies of Competitiveness

Correlations were calculated between each of the six studies for which the ranks of all 50 states are available. The correlations use the ranks of the states, since this is the only measure available from some of the studies. Three studies — by the Beacon Hill Institute (BHI), CNBC, and *Forbes* — are reasonably broad in their measurement of competitiveness. The correlations between these studies are moderately strong and significant. Three other studies, by *Chief Executive* magazine, Pollina Corporate Real Estate, and the American Legislative Exchange Council (ALEC), are narrower in their focus. The correlations between these studies also are moderately strong and significant, as shown in Table 6. The correlations between the CNBC and *Forbes* studies and each of the more narrow studies are not as high but still are significant. In contrast, the ranks from the Beacon Hill Institute study are not significantly correlated to those of the narrower studies.

TABLE 6
CORRELATIONS OF STATE RANKS IN STUDIES OF COMPETITIVENESS

	Beacon Hill	**CNBC**	***Forbes***	***Chief Executive***	**ALEC**
Beacon Hill	-				
CNBC	0.57	-			
Forbes	0.63	0.79	-		
Chief Executive	0.15	0.60	0.45	-	
American Legislative Exchange Council	0.15	0.55	0.37	0.70	-
Pollina	0.18	0.56	0.49	0.67	0.72

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: Office of the University Economist, Arizona State University.

Correlations also were calculated between the ranks from each of the six studies and various economic measures:

- The 2013 dollar value for two measures of prosperity: per capita GDP and per capita personal income. The dollar value was adjusted for living costs using the 2012 RPP.
- The 2013 dollar value, adjusted for living costs, for two measures of productivity: per employee GDP and per employee earnings.
- The inflation-adjusted (real) percent change over time in the two measures of prosperity.
- The real percent change over time in the two measures of productivity.
- The percent change over time in four measures of aggregate economic growth: real GDP, real personal income, real earnings, and employment.

Determining the time period to use for such an analysis is challenging. First, because of the cyclicality of most of the economic measures, the beginning and end of the time period should represent similar years of two economic cycles. Since annual data are used and because no two cycles are identical, the similarity of the years, in this case 2003 and 2013, can only be approximate. Second, because of the extreme cyclicality of the economy since the end of the 2001 recession, largely caused by a real estate boom and bust that affected the states differentially, economic performance during the 2003-to-2013 period may not be a good indicator of the underlying competitiveness of the states. Because of this, the 1993-to-2003 period also was included in the analysis, along with the entire 1993-to-2013 period.

None of the correlations between the state competitiveness studies and the measures of economic performance are as strong as those between the two national competitiveness studies and national GDP per capita. Various factors may contribute to the weaker performance of the state studies:

- Due to data limitations at a subnational level, the studies of state competitiveness include far fewer indicators than the national studies.
- The national studies have been done for many years, with improvements implemented along the way. Each study appears to be a substantial and thoughtful effort. In contrast, none of the state studies have been done for nearly as long. Only the Beacon Hill Institute study appears to have incorporated the rigor and effort of the two national studies.
- The variation in GDP per capita is much greater across the nations than across the U.S. states, making it easier for the national studies to achieve a high correlation with prosperity.

As seen in Table 7, the correlations between the state ranks in the competitiveness studies and the 2013 level of the prosperity and productivity measures are moderate at best. The ranks from the Beacon Hill Institute and *Forbes* studies are moderately correlated to the per capita (prosperity) measures but results are only very weakly correlated to the productivity measures, while the ranks from the CNBC, *Chief Executive*, ALEC, and Pollina studies are not significantly correlated with prosperity. At most, 20 percent of the variation across states in the prosperity values is explained by the ranks of any of these studies.[19] Correlations with the productivity measures are not significant except for the *Forbes* ranks with per employee employment.

[19] The percentage explained is equal to the square of the correlation coefficient. For example, the correlation of 0.45 between the Beacon Hill Institute's rankings and per capita personal income equates to 20 percent (0.45*0.45 = 0.20) of the variation across states in per capita personal income being explained by the BHI's competitiveness rankings.

TABLE 7
CORRELATIONS BETWEEN STATE RANKS IN STUDIES OF COMPETITIVENESS AND ECONOMIC MEASURES

PROSPERITY AND PRODUCTIVITY

	Prosperity		Productivity	
	Per Capita Gross Domestic Product	Per Capita Personal Income	Per Employee Gross Domestic Product	Per Employee Earnings
2013 Level, Adjusted for Living Costs				
Beacon Hill Institute	0.34	0.45	0.03	0.19
Forbes	0.39	0.36	0.22	0.34
CNBC	0.14	0.11	0.02	0.13
Chief Executive	0.02	-0.12	0.02	-0.10
American Legislative Exchange Council	0.08	-0.07	0.05	-0.04
Pollina	0.13	0.02	0.03	-0.06
1993-to-2013 Real Percent Change				
Beacon Hill Institute	0.49	0.38	0.50	0.50
Forbes	0.39	0.28	0.46	0.51
CNBC	0.29	0.15	0.40	0.35
Chief Executive	0.01	0.05	0.07	0.21
American Legislative Exchange Council	0.07	0.05	0.11	0.15
Pollina	0.13	0.18	0.15	0.27

AGGREGATE ECONOMIC GROWTH

	Gross Domestic Product	Personal Income	Earnings	Employment
1993-to-2013 Real Percent Change				
Beacon Hill Institute	0.54	0.43	0.52	0.27
Forbes	0.58	0.55	0.63	0.39
CNBC	0.57	0.56	0.58	0.44
Chief Executive	0.38	0.57	0.55	0.52
American Legislative Exchange Council	0.39	0.49	0.48	0.46
Pollina	0.33	0.44	0.44	0.35

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: Office of the University Economist, Arizona State University.

As expected, the correlations of the competitiveness ranks and the real percent changes in the prosperity and productivity measures are lower for the 2003-to-2013 period than for the 1993-to-2003 period. The ranks from CNBC, *Forbes*, and especially BHI generally are significantly correlated to the changes between 1993 and 2003 in the four per capita and per employee measures, but are not correlated to the changes between 2003 and 2013. The ranks of the *Chief Executive*, ALEC, and Pollina studies are not correlated to changes in productivity or prosperity in either of the time periods. The strengths of the correlations over the 20-year period, shown in Table 7, are between those of the two 10-year periods.

In contrast, the ranks from each of the six studies generally are significantly correlated to the aggregate growth measures. For the three dollar measures, the correlations generally are stronger with the 1993-to-2003 period than the 2003-to-2013 period, with the strongest correlations to the 20-year changes. For employment, the strongest correlations generally are with the 2003-to-2013 period.

The BHI, Forbes, and CNBC studies have the highest correlations with the real GDP change, but have generally weaker correlations with employment than the other three studies. The correlations with the real changes in personal income and earnings are relatively equal across the six studies.

Thus, the narrower studies by ALEC, Pollina, and *Chief Executive* magazine, which focus on taxes and other government-related measures, do as well at explaining the variations across states in aggregate economic growth as the broader studies, but unlike the broader studies, are not correlated to prosperity or productivity, measured either as a level or as a change over time. This suggests that states that narrowly focus on taxes, incentives, regulations, and keeping government small do as well on aggregate growth as states that take a broader view of competitiveness, but the quality of the growth in the states that emphasize government-related issues is weaker than that of the other states, accounting for the lack of correlation with prosperity and productivity. The relationships between taxes and productivity, prosperity, and aggregate growth are explored in the next section.

The two best studies of state competitiveness are those from Beacon Hill Institute and *Forbes*, a conclusion based primarily on the correlations with prosperity, but a conclusion that also holds over a broad range of economic measures. The overall state ranks from these two studies are compared in Table 8.

Within the comparison group, California, Nevada, and New Mexico rank relatively low on each of these measures of competitiveness. In contrast, Texas and the northern states of the comparison group score relatively well. Most of the Plains states also get high marks for competitiveness. Some of the states along the East Coast — Massachusetts, Virginia, North Carolina, and Georgia — also compare favorably. Most of the states receiving the lowest evaluation on competitiveness are in the South, particularly Alabama, Arkansas, Louisiana, Mississippi, and West Virginia. However, Alaska, Hawaii, and Illinois also received low marks from each study.

While the difference in rank between the two studies was two or less in 17 of the 50 states, it exceeded 10 in 12 states. Large differences were present in the northeastern and Great Lakes states.

Beacon Hill Institute, "State Competitiveness Report"

The Beacon Hill Institute at Suffolk University in Boston has annually produced a "State Competitiveness Report" since 2001 that is designed to measure long-term competitiveness (www.beaconhill.org/CompetitivenessHomePage.html). The latest BHI report, released in April 2014, is labeled as "2013."

TABLE 8
OVERALL COMPETITIVENESS RANKS BY STATE, 2013

	Beacon Hill	*Forbes*
COMPARISON STATES		
Washington	15	9
Oregon	19	19
Idaho	13	25
Utah	8	3
Colorado	7	5
California	29	39
Nevada	34	36
Arizona	23	24
New Mexico	44	45
Texas	9	7
OTHER WEST		
Hawaii	49	42
Alaska	40	37
Montana	36	26
Wyoming	25	23
PLAINS		
North Dakota	2	2
South Dakota	11	11
Nebraska	4	6
Kansas	14	17
Oklahoma	47	14
Minnesota	5	8
Iowa	6	12
Missouri	28	30
GREAT LAKES		
Wisconsin	22	41
Illinois	45	38
Indiana	37	16
Ohio	33	29
Michigan	32	47
NORTHEAST		
Maine	24	50
Vermont	12	43
New Hampshire	3	31
Massachusetts	1	13
Rhode Island	17	48
Connecticut	27	33
MIDDLE ATLANTIC		
New York	26	21
New Jersey	41	32
Pennsylvania	31	27
Maryland	21	18
Delaware	20	20
SOUTH ATLANTIC		
Virginia	10	1
North Carolina	16	4
South Carolina	38	28
Georgia	18	10
Florida	30	22
SOUTH		
West Virginia	48	46
Kentucky	35	34
Tennessee	43	15
Alabama	46	44
Mississippi	50	49
Louisiana	39	40
Arkansas	42	35

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

Sources: Beacon Hill Institute (www.beaconhill.org/CompetitivenessHomePage.html) and *Forbes* (http://www.forbes.com/best-states-for-business/).

The BHI cites Michael Porter, who defines competitiveness as "the microeconomic foundations of prosperity." 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." In terms of economic development, the BHI believes that a state needs to be successful in all three forms — attracting businesses, incubating new businesses, and retaining and growing existing companies — in order to achieve prosperity.

An overall competitiveness index by state is produced by the BHI from 45 indicators that are grouped into eight categories (see Table 9). A state's rank on each of the 45 indicators is reported

TABLE 9
BEACON HILL INSTITUTE'S "STATE COMPETITIVENESS REPORT," 2013
Arizona's Rank Among 50 States and 10 Comparison States (1 = Best)

INDEXES and Indicators	Nation	Comparison
OVERALL	23	7
I. GOVERNMENT AND FISCAL POLICY	9	1
1. State and Local (S&L) Government Taxes Relative to Income	14	3
2. Workers' Compensation Premium Rates	14	6
3. Bond Rating	47	9
4. Budget Surplus or Deficit as Percentage of Gross Product	*	4 or 5
5. Average Weekly Unemployment Payment	4	1
6. Full-Time-Equivalent S&L Government Employment Per Capita	2	2
II. SECURITY	37	8
7. Crime Per Capita	36	7
8. Change in Crime Per Capita	31	3
9. Murders Per Capita	36	9
10. Integrity Index	*	5 or 6
III. INFRASTRUCTURE	38	8
11. Mobile Phones Per Capita	44	9
12. High-Speed Lines Per Capita	32	7
13. Air Passengers Per Capita	7	3
14. Average Travel Time to Work	33	7
15. Electricity Prices	*	8
16. Average Apartment Rent	35	6
IV. HUMAN RESOURCES	26	5
17. Percentage of Residents Without Health Insurance	36	5 tie
18. Percentage of Residents Age 25 or Older With a High School Diploma	33	6
19. Unemployment Rate	35	7
20. Higher Education Enrollment Per Capita	1	1
21. Labor Force Participation Rate	41	9
22. Infant Mortality Rate	*	8 thru 10
23. Active Physicians Per Capita	35	6
24. Mathematics Fourth-Grade Test Scores	*	3 thru 7
V. TECHNOLOGY	17	5
25. Academic Science & Engineering R&D Relative to Gross Product	*	4 thru 6
26. National Institutes of Health Funding Per Capita	39	8
27. Patents Per Capita	18	7
28. Science & Engineering Graduate Students Per Capita	35	6
29. Science & Engineering Degrees Awarded Per Capita	3	1
30. Science & Engineering Occupational Employment Share	11	4
31. High-Tech Industry Employment Share	14	8
VI. BUSINESS INCUBATION	16	5
32. Deposits in Banks and Savings Institutions Per Capita	47	8
33. Venture Capital Investment Per Worker	34	8
34. Company Births Per Capita	*	6 or 7
35. Initial Public Offers Volume Per Capita	8	2
36. Percentage of Labor Force Represented by Unions	9	2
37. Minimum Wage	38	6
38. Tort Liability Index	16	3
39. Cost of Labor Adjusted for Educational Attainment	*	6 or 7
VII. OPENNESS	28	6
40. Exports Per Capita	36	8
41. Foreign Direct Investment Employment Share	35	6
42. Share of Population Born Abroad	11	4
VIII. ENVIRONMENTAL POLICY	31	7
43. Toxic Release Inventory, Pounds Per Square Mile	*	7 or 8
44. Greenhouse Gas Emissions Per Square Mile	14	6
45. Air Quality	47	8

* Rank not specified, but between 21 and 30; the rank among the comparison states is approximate

Source: Beacon Hill Institute (www.beaconhill.org/CompetitivenessHomePage.html).

if the state is in the top 20 or bottom 20. The precise rank is not reported if a state is between 21st and 30th.

Each indicator is equally weighted, as is each category, with an index produced for each state for each of the eight categories as well as for the overall total. The indexes are placed on a 0-to-10 scale, with the average of the states set equal to 5 in each year. The overall index from the latest report ranges across the states from a value of 3.5 (less competitive) to more than 7.5 (more competitive).

Overall, Arizona ranked 23rd nationally and seventh among the 10 comparison states. The top-rated states were Massachusetts, North Dakota, New Hampshire, Nebraska, and Minnesota. The lowest-ranked states were Mississippi, Hawaii, West Virginia, Oklahoma, and Alabama.

Equal weighting of the categories is inconsistent with the relative importance of the various business location factors; too much importance is given to several of the categories. A discussion of each category follows:

- Government and Fiscal Policy. A state with a small government and low taxes, but with solid finances, is rated most highly. Arizona's budget deficit has worsened considerably since this study was done; it would not rank as high now. This category is overweighted.
- Security. Three of the four indicators are measures of crime. The fourth indicator, the Integrity Index produced by the Better Government Association, measures the strength of laws that promote integrity in government. Five categories of laws are included: freedom of information, whistle-blower protection, campaign finance, open meetings, and conflict of interest. This category is considerably overweighted.
- Infrastructure. In this difficult-to-measure category, the BHI includes six measures, but none are ideal and the apartment rent indicator seems out of place.
- Human Resources. This is one of two categories related to labor supply and quality. Due to the inclusion of questionable indicators (infant mortality rate and physicians) and data limitations, the category's rank is of limited value. In particular, Arizona ranked highest on the per capita number of students enrolled in higher-education degree-granting institutions, but this high rank is misleading for two reasons:
    - All students enrolled at the University of Phoenix, regardless of their physical location, are counted in Arizona, thus substantially overstating enrollment in Arizona.
    - The availability and affordability of the state's community colleges, combined with a relatively high proportion of young adults among its population, results in considerable college enrollment, but the percentage graduating is low.
- Technology. This is the other category related to labor supply and quality.
- Business Incubation. Most of the indicators in this category are related to labor costs or financing.
- Openness. This category refers to global connections, measuring exports, foreign domestic investment, and share of immigrants. It is overweighted.
- Environmental Policy. Measures of air quality and toxic releases are included. It is overweighted.

The BHI notes that its overall competitiveness index is correlated to 2013 per capita personal income, adjusted for variations by state in the cost of living, using regional price parity data.[20] The BHI reports the results of a regression analysis in which the overall competitiveness index is used to explain the variation across states in PCPI adjusted for the cost of living. The regression equation is

- $30,736 plus $2,841 times the competitiveness index

For example, Arizona's competitiveness index score was 5.00, yielding a predicted PCPI value of $44,941 (5.00 times $2,841, plus $30,736). While the results of this regression are significant, the R-squared value is only 0.29 — only 29 percent of the observed state-to-state variation in adjusted PCPI is explained by the competitiveness index. (In contrast, the Global Competitiveness Report explains 67 percent of the nation-to-nation variation in GDP per capita.)

The Office of the University Economist updated the BHI statistical analysis using more recent estimates of 2013 PCPI and the 2012 regional price parities. The correlation between the overall competitiveness index and PCPI was 0.51, with a R-squared value of 0.26. The regression equation is $32,476 plus $2,515 times the competitiveness index.

The correlations of each of the BHI category indexes with the overall index and with 2013 PCPI adjusted for the cost of living were calculated. While each of the categories is positively correlated to the overall index, the correlation is very low (0.15 or less) and insignificant in the government and fiscal policy category and in the openness category. The highest correlations with the overall index are in the human resources (0.70) and technology (0.61) categories. The only category closely associated with PCPI is human resources at 0.60; the next-highest correlation is 0.38. The correlations with PCPI are insignificant at less than 0.20 in the business incubation, openness, and environmental policy categories and the correlation is negative (-0.35) with the government and fiscal policy category. These generally low correlations raise concerns regarding the construction of the competitiveness index by BHI, helping to explain why the correlations with prosperity are not higher in this study.

In fact, the error between the PCPI estimated from the regression equation using the overall competitiveness index as the explanatory variable and the actual PCPI is significant in some states and the errors are not randomly distributed geographically. The model — that is, BHI's competitiveness index — overestimates PCPI in each of the 10 comparison states. The estimate also is too high in states along the South Atlantic Coast. In contrast, the model underestimates PCPI in the Plains states and in states along the Atlantic Coast from Massachusetts through New Jersey. Arizona is among the states for which the BHI index does not closely predict the actual PCPI, with an overestimate of 20 percent (more than $7,000). The error exceeds 20 percent in Idaho and Utah.

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.

[20] The BHI used a preliminary estimate of PCPI and 2011 RPP data.

- 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.

Using the 2005-through-2013 time series provided in the latest "State Competitiveness Report," the relative competitiveness of the states does not appear to have changed appreciably, but the year-to-year fluctuations in the index complicate the determination of whether a state is making progress or losing ground to other states.

Between 2005 and 2010, Arizona's overall BHI competitiveness index fluctuated from 5.04 to 5.62 — a little above average — and its rank among the 50 states was between 16th and 24th. The index dropped to only 4.49 in 2011 (a rank of 32nd). By 2013, the index had climbed to 5.00 (a rank of 23rd). In contrast to these generally slightly favorable competitiveness ratings, Arizona's per capita personal income has consistently been considerably below the national average and has lost ground over time.

Among the 10 comparison states, Arizona ranked sixth or seventh on the overall competitiveness index in each year from 2005 through 2010. After a lower rank in 2011 and 2012, the rank returned to seventh in 2013. In 2013, six of the comparison states — Colorado, Utah, Texas, Idaho, Washington, and Oregon — ranked among the top 20 states in the nation. Colorado and Utah consistently ranked among the top 10 from 2005 through 2013. In each year between 2005 and 2013, New Mexico was rated the lowest of the comparison states; California and Nevada also frequently ranked lower than Arizona.

Forbes, "Best States for Business"

Forbes magazine rates the 50 states in "The Best States for Business;" the 2013 report is available at http://www.forbes.com/best-states-for-business/. *Forbes* ranks the states based on 35 measures, but does not disclose all 35. The measures are grouped into six categories that are not equally weighted (see Table 10). *Forbes* provides less information than BHI regarding its competitiveness study. Only ranks — not scores or indexes — are available; ranks on the individual indicators are not provided; and the category weights are not reported.

Overall, Arizona ranked 24th nationally and sixth among the 10 comparison states. The top-rated states were Virginia, North Dakota, Utah, North Carolina, and Colorado. The lowest-ranked states were Maine, Mississippi, Rhode Island, Michigan, and West Virginia.

The selection of the indicators used in the Forbes study raises a variety of concerns. A summary of the 2013 results follows:

- Business Costs. This is the most heavily weighted category — inconsistent with its rank among business location factors. Taxes are included twice: as part of Moody's Cost of Doing Business Index (which incorporates labor costs, utility costs, and taxes), and by the inclusion of the Tax Foundation's State Business Tax Climate Index (http://taxfoundation.org/article/2014-state-business-tax-climate-index).Thus, taxes are

TABLE 10
FORBES' "BEST STATES FOR BUSINESS," 2013
Arizona's Rank Among 50 States and 10 Comparison States (1 = Best)

CATEGORIES and Indicators (Incomplete List)	Nation	Comparison
OVERALL	24	6
BUSINESS COSTS	33	9
Moody's Cost of Doing Business Index (labor, energy, and taxes)		
Tax Foundation's State Business Tax Climate Index		
LABOR SUPPLY	14	5
Educational Attainment: High School & College		
Net Migration		
Projected Population Change		
Union Representation		
REGULATORY ENVIRONMENT	19	4
Regulatory Component From *Freedom in the 50 States*		
Tax Incentive and Economic Development Index From Pollina		
Bond Rating (on state's general obligation debt)		
Transportation Infrastructure (air, highway and rail)		
ECONOMIC CLIMATE	48	9
Economic Growth: GDP, Income & Employment		
Unemployment: Average and 2012		
Number of Headquarters (of large businesses)		
GROWTH PROSPECTS	1	1
Projected Economic Growth: GDP, Income & Employment		
Business Openings & Closings		
Venture Capital Investments		
QUALITY OF LIFE	42	8
Poverty Rates		
Crime Rates		
Cost of Living		
School Test Performance		
Health of Residents		
Cultural and Recreational Opportunities Index		
Mean Temperature		
Top-Ranked Four-Year Colleges		

Source: *Forbes* (http://www.forbes.com/best-states-for-business/).

overweighted in the *Forbes* study. Moreover, each tax study has shortcomings, particularly as a gauge of business taxes, as discussed in the next section.

- Labor Supply. One of the four indicators is a projection. Forecasts should never be included because of their inherent lack of reliability. Arizona's rank is considerably higher than indicated by other research.
- Regulatory Environment. Misnamed, this category includes factors influenced by government. The regulatory indicator includes labor regulations, health insurance requirements, occupational licensing, the tort system, and right-to-work laws.
- Economic Climate. 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.

- Growth Prospects. 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 a near certainty. Such projections should not be included in an evaluation of competitiveness.
- Quality of Life. 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.

The correlations between each of the *Forbes* category indexes and the overall index and the 2013 PCPI adjusted for the cost of living were calculated. A regression — in which 2013 PCPI adjusted for the cost of living is the dependent variable and the overall *Forbes* rank is the explanatory variable — also was run. In order to directly compare the correlations and regression results to those of the BHI study, the BHI results were recalculated using the ranks instead of the scores (indexes). The use of ranks lowers the BHI correlations a little and make the regression a little less robust.

The regression using the overall *Forbes* rank does not explain as much of the variation in PCPI by state as the regression using the overall BHI rank. However, the results are similar, in terms of the specification of the regression equation and the nature of the errors in the estimated versus actual PCPI by state. The same geographic pattern of the errors described earlier for the BHI study is found using the *Forbes* ranks. In most states, the magnitude of the error in the estimated value is comparable between the two studies.

As in the BHI study, each of the categories of the *Forbes* study is positively correlated to the overall rank, with the highest correlations in the labor supply (0.67), regulatory environment (0.64), and economic climate (0.58) categories. The lowest correlation is in the quality of life category (0.29), still significant at the 5 percent level. On average, these internal correlations in the *Forbes* study are somewhat higher than those in the Beacon Hill study.

Only two of the six *Forbes* categories are significantly correlated to PCPI: quality of life at 0.57 and economic climate at 0.53. Just as the overall rank from *Forbes* is less highly correlated with PCPI than is the BHI's overall rank, the average categorical correlation with PCPI is a bit lower in the *Forbes* study. As with the Beacon Hill Institute study, these low correlations raise questions regarding the relevance to prosperity of some of the competitiveness indicators and categories included in the *Forbes* study.

CNBC, "Top States for Business"

CNBC rates the 50 states in "America's Top States for Business;" the 2014 report is available at http://www.cnbc.com/id/101767549. CNBC uses "input from business groups, economic development experts, companies and the states themselves" to create its annual ranking of the states, which is designed to match the criteria that states "use to sell themselves."

The states are ranked based on 56 measures of competitiveness grouped into 10 categories that are not equally weighted. Instead, the categories are weighted "based on how frequently they are cited in state economic development marketing materials." Additional detail on the study is not provided.

A summary of the 2014 results follows, with the points indicating the relative importance of each category:

- Overall (2,500 points). Arizona ranked 13th nationally and fifth among the 10 comparison states. The top-rated states were Georgia, Texas, Utah, Nebraska, and North Carolina. The lowest-ranked states were Rhode Island, Hawaii, West Virginia, Alaska, and Connecticut.
- Cost of Doing Business (450 points). This category includes measures on taxes, utility costs, wages, and rental costs. Arizona ranked 28th nationally and sixth among the comparison states. This category is overweighted relative to its rank among business location factors.
- Economy (375 points). Including indicators on economic growth, job creation, residential real estate, number of major corporation headquarters, and government credit ratings and revenue, state ranks in this category vary substantially from year to year due to the focus on short-term growth. Since short-term economic growth rates have little to do with the evaluation of a state's competitiveness, this category is substantially overweighted. Arizona ranked 15th nationally in 2014, but only seventh among the comparison states. It had ranked only 44th two years earlier.
- Infrastructure (350 points). Measures of the value of goods shipped, the availability of air travel, road quality, commute time, and water safety are included. Arizona ranked eighth nationally and second among the comparison states on infrastructure, considerably higher than in other studies.
- Workforce (300 points). The indicators include educational attainment, availability of workers, worker training programs, union membership, and right-to-work status. Though the workforce generally is not perceived to be a positive in Arizona, CNBC ranked the state second nationally and first among the comparison states. This category is underweighted.
- Technology and Innovation (300 points). Support for innovation, the number of patents issued, high-tech business formation, and federal research grants are included. Arizona ranked 19th nationally and sixth among the comparison states.
- Quality of Life (300 points). CNBC notes that "the best places to do business are also the best places to live." The states are evaluated on crime rate, health care and the percent of the population with health insurance, local attractions, parks and recreation, and environmental quality. Arizona ranked 27th nationally and seventh among the comparison states. This category is overweighted.
- Business Friendliness (200 points). The states are graded on the freedom their regulatory frameworks provide, as well as the perceived friendliness of their legal and tort liability systems. Arizona ranked 16th nationally and tied for third among the comparison states.
- Education (150 points). Indicators of K–12 education include test scores, class size, and spending. The number of higher-education institutions in each state and trends for funding higher education also are included. Arizona ranked last in the nation. Given the

relationship between education and the quality of the workforce, this category seems to be underweighted.

- Cost of Living (50 points). Arizona ranked 27th nationally and fifth in the comparison group.
- Access to Capital (25 points). Venture capital investments and small-business lending are included. Arizona ranked tied for fifth nationally and tied for fourth among the comparison states. This high rank is inconsistent with other data related to the availability of financing.

Chief Executive, "Best and Worst States for Business"

Annually since 2005, *Chief Executive* magazine has asked chief executive officers to rank the states based on the tax and regulatory regime, the quality of the workforce, and the quality of the living environment. In each of these three categories, each state is scored on a five-point scale. The means with which these scores are combined to produce an overall ranking of "The Best & Worst States for Business" is unclear; no statement of methodology is included (http://chiefexecutive.net/the-best-worst-states-for-business).

In 2014, Arizona ranked second among the comparison states and seventh overall on the *Chief Executive* list, behind Texas, Florida, Tennessee, North Carolina, South Carolina, and Indiana. The lowest-ranked states were California, New York, Illinois, New Jersey, and Massachusetts.

ALEC, "State Economic Competitiveness Index"

The American Legislative Exchange Council annually issues the report "Rich States, Poor States," which includes the "ALEC-Laffer State Economic Competitiveness Index" (http://www.alec.org/publications/rich-states-poor-states/). 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 therefore cannot be considered a comprehensive measure of competitiveness.

In the latest report released in 2014, Arizona ranked third among the comparison states, behind Utah and Idaho, and just ahead of Nevada. Nationally, Arizona ranked seventh, with South Dakota, Indiana, North Dakota, and North Carolina also ranked ahead of it. The lowest-ranked states were New York, Vermont, Illinois, California, and Minnesota.

Pollina, "Corporate Top 10 Pro-Business States"

Pollina Corporate Real Estate, in conjunction with the American Economic Development Institute, released their 11th annual "Pollina Corporate Top 10 Pro-Business States" report in 2014 (http://www.aedi.us/top-business-states-2014/). They examine 32 indicators, which are grouped into two categories: (1) labor, taxes, and other factors, and (2) incentives and state economic development agency factors. Subjective weighting is applied, with the 19 indicators included in the first category receiving 68 percent of the total weight. Somewhat like the ALEC

report, the focus is on factors over which state governments have control, but the list of factors is not as limited as in the ALEC report, including, for example, four education-related indicators.

Arizona ranked 19th nationally and fourth among the comparison states in the Pollina study in 2014. Arizona received high scores for being a right-to-work state and for low taxes in certain categories: unemployment insurance premiums, business inventory tax, and property tax. The state compared most unfavorably for its unemployment rate, sales tax, and crime rate.

Other Studies of Competitiveness

Other studies are more specialized and do not release results for each of the states. *The Economist* magazine included an article "These Are the Best and Worst States for Small Business" in its 5 July 2014 issue (http://www.economist.com/news/united-states/21606293-small-businesses-fret-less-about-taxes-over-regulation-red-tape-blues). Based on the results of a survey of small businesses, this is another narrow look at competitiveness. Not only is the study limited to small businesses, the topics were limited to the tax code, regulations, and licenses. According to the article, "One surprising finding is how little local tax rates matter. Nearly two-thirds of respondents say they pay their 'fair share' of taxes, which the survey-takers reckon means they don't feel over- or undertaxed. But many complain about the difficulty of complying with complex regulations."

The states were given a letter grade. Of the 45 states graded, 14 — including Colorado, Idaho, Nevada, Texas, and Utah — received a higher grade than Arizona's "B." Four other states also received a "B."

Area Development magazine carried the article "Top States for Doing Business" in its Summer 2013 issue (http://www.areadevelopment.com/Top-States-for-Doing-Business/Q3-2013/survey-results-landing-page-142378.shtml). Based on a survey of site consultants, 17 factors in the categories of business environment, labor climate, and infrastructure/global access were included. The indicators are reasonably broad, but only the top 10 states are listed online. Arizona was not among them, but Texas ranked first and California 10th. All of the other top 10 states are in the South, including Georgia, South Carolina, Alabama, and North Carolina.

Site Selection magazine produces two measures of competitiveness. Its November 2013 issue included "Top U.S. Business Climates" (http://www.siteselection.com/issues/2013/Nov/Cover.cfm). This ranking is based on eight components, four relating to new plants and two to taxes. An executive survey and a competitiveness measure are the other two components. The website shows only the top 25 states. Arizona ranked 17th nationally and third among the comparison states, behind Texas and Utah. Other than Texas, the highest-ranked states were Georgia, North Carolina, Virginia, and South Carolina. On the competitiveness component, Arizona ranked 19th.

The May 2014 issue of *Site Selection* included the article "Top 10 Competitive States of 2013" (http://www.siteselection.com/issues/2014/may/top-states.cfm). Focusing on "state economic development success," this ranking is based on 10 components, six of which are related to new and expanded facilities. Arizona was not among the top 10; Texas was the one comparison state to make the list.

TAXES

State and local government taxes are not an especially significant business cost — combined, they account for less than 2 percent of operating income for the average corporation,[21] according to the *Almanac of Business and Industrial Financial Ratios* — but the state competitiveness studies provide more information on state and local taxes than on any of the other costs. Due to the amount of attention given to taxes, they are discussed in more detail in this section.

In order to calculate changes in taxes over time, or to compare taxes across geographic areas, the amount of taxes paid is divided by a measure such as population or personal income. Taxes paid relative to personal income is preferred to the per capita tax measure since the former considers the "ability to pay." For example, since the average income in Arizona is considerably below average, the average Arizonan cannot afford to pay as much in taxes as the average American.

The tax burden in Arizona is constantly changing. Voters approved a temporary increase in the sales tax rate of 1 percentage point that was in effect from June 2010 through May 2013. Each year, the Arizona Legislature passes laws that affect the amount of taxes levied, with the changes frequently phased in over a period of more than one year. Substantial decreases in taxes were passed in 2011 and 2012, with a smaller decrease passed in 2013, but these reductions largely did not begin to take effect until fiscal year 2014 and continue to phase in through fiscal year 2019.

According to the Arizona Joint Legislative Budget Committee (JLBC), once the reductions are fully implemented in fiscal year 2019, the result will be to lower revenue to the general fund by an additional $668 million per year (in nominal terms). Businesses are the major beneficiary, with more than $400 million in reductions to the corporate income tax, upwards of $100 million in reductions to individual income taxes paid by businesses, and small property tax reductions.

The studies of taxes discussed in this section have varying dates of reference between 2010 and 2013. The temporary sales tax increase generally is reflected in these studies while little of the tax reductions passed since 2011 are included. Thus, Arizona's tax burden currently is below the level reported in these studies and will fall further in coming years.

As in earlier sections of this report, the most competitive state on taxes is given a rank of 1 in this section. Thus, the state with the lowest taxes is ranked number 1 while the state with the highest taxes is ranked 50th.

Measures of Taxes Included in Competitiveness Studies

In Moody's Cost of Doing Business Index, the effective tax rate index is calculated as total tax revenue as a percentage of personal income. Thus, the measure is not specific to taxes paid by businesses. Arizona's tax burden ranked 28th/seventh in 2010 at 4 percent below average. *Forbes* uses the Tax Foundation's State Business Tax Climate Index from 2014, which ranks Arizona 22nd/eighth. Despite the title of this index, it too is not exclusive to business taxes. Arizona compares more favorably at 14th/third on the BHI's measure of state and local government taxes relative to income. *Chief Executive* gives Arizona a better-than-average score in its combined taxes and regulations category.

[21] In contrast, federal tax payments are considerably higher.

In addition to these overall evaluations, specific taxes are considered in some of the studies. Arizona's national ranks/grades are as follows:

- Corporate income tax: 26th by Tax Foundation, 21st by ALEC, "C" by Pollina
- Personal income tax: 18th by Tax Foundation, 13th by ALEC, "B" by Pollina
- Property tax: sixth by Tax Foundation, 27th by ALEC, "A" by Pollina
- Sales tax: 49th by Tax Foundation, 45th by ALEC, "F" by Pollina
- Unemployment insurance: first by Tax Foundation, fourth by BHI, "A" by Pollina
- Workers' compensation: 14th by both BHI and ALEC, "B" by Pollina

ALEC gives Arizona high scores for its lack of estate/inheritance tax, for taxes not specifically identified, for its recent tax changes, and for its tax and expenditure limits. Related to government revenue is the number of state and local government workers per capita; BHI and ALEC each rank Arizona second best for its low number of government employees.

The availability of incentives is related to taxes. Only Pollina rates the states on this basis, with Arizona receiving a "D" though the state received a "B" on other economic development efforts.

In the rest of this subsection, additional sources of tax information are considered. A distinction is made between those sources looking at the total tax burden (individual and business taxes combined), those measuring only individual taxes, and those measuring only business taxes. The relationship between taxes and various measures of economic performance also is addressed.

Total Taxes

The latest data from the U.S. Census Bureau, which are for fiscal year 2011 (July 2010 through June 2011), indicate that state and local government taxes collected per $1,000 of personal income in Arizona ranked 14th lowest among the 50 states and third in the comparison group, at 7.4 percent less than the U.S. average. With the exception of the general sales tax, collections in each of the major tax categories were lower than average in Arizona in 2011 relative to the state's personal income. Differentials from the national average include -43 percent for the individual income tax (rank of 10th/fourth), -34 percent for the corporate income tax (20th/fifth), -44 percent for motor vehicle license taxes (fifth/first), -26 percent for selective sales taxes, such as motor fuel and tobacco (eighth/third), -9 percent for property taxes (27th/sixth), and -54 percent for other taxes (sixth/first). In contrast, the general sales tax figure was 56 percent higher than the U.S. average (44th/eighth).

Excluding the temporary sales tax, Arizona's rank per $1,000 of personal income is one better in both the general sales tax and total tax categories. Total taxes per $1,000 of personal income were 11 percent below the national average, with the sales tax 40 percent above average.

The Tax Foundation's "Annual State-Local Tax Burden Ranking" (http://taxfoundation.org/article/annual-state-local-tax-burden-ranking-fy-2011) provides a comparison of total state and local government taxes by state from 1977 through 2011 using a methodology different from that of the Census Bureau. In 2011, including the temporary sales tax, the total amount of taxes collected in Arizona was 8.9 percent of per capita income, 9 percent less than the national average of 9.8 percent. Arizona ranked 17th among the states. It ranked fourth in the comparison group, behind Texas, Nevada, and New Mexico. These ranks are similar to those using the Census Bureau's data.

Based on the datasets provided by the Census Bureau and the Tax Foundation, the amount of state and local government taxes paid by individuals and businesses combined — relative to the ability to pay — is below the average of the states in Arizona. As discussed below, this overall evaluation is the result of a low individual tax burden and of an overall business tax burden that is higher than average.

Individual Taxes

An annual study of state and local government taxes paid by individuals is produced by the government of the District of Columbia. Its methodology differs from that of the other tax studies. For a hypothetical family of three living in the largest city in each state and the District of Columbia,[22] the amount of state and local government taxes paid are calculated based on the applicable tax laws for four types of taxes at each of five income levels, ranging from $25,000 to $150,000.

Among households earning $50,000 and $75,000 in Phoenix, the amount paid in taxes was greatest for the sales tax, followed by the property tax. At the $25,000, $100,000, and $150,000 income levels, the tax payment was greatest for the property tax, followed by the sales tax. At each income level, the income tax payment was considerably lower than the payments for the sales tax and property tax. The amount paid in automotive taxes was even lower except at the lowest income level.

Compared to the other cities nationwide, total tax payments in Phoenix ranged from substantially below average at higher household income levels to average for households with income of $50,000 to above average for incomes at the lowest income level (see Table 11). The figures at the $25,000 income level need to be interpreted cautiously. Income tax payments are extremely low at this income level in most states. Households at this income level are assumed to be renters, so property tax payments cannot be directly measured.

TABLE 11
TAXES PAID BY INDIVIDUALS IN PHOENIX, 2012

	Tax Payment as a Percentage of the Median of 50 Cities (Rank*)				
Household Income	Income Tax	Property Tax	Sales Tax	Automotive Taxes	Total
$25,000	80.4% (34/9)	101.9% (28/6)	182.1% (51/10)	92.6% (22/3)	122.6% (46/10)
$50,000	40.3 (13/6)	81.6 (15/5)	190.4 (51/10)	97.0 (24/4)	100.0% (27/8)
$75,000	40.7 (12/5)	80.0 (15/5)	190.8 (51/10)	92.4 (20/3)	92.6 (21/6)
$100,000	40.0 (12/5)	78.5 (14/4)	189.2 (51/10)	92.5 (20/3)	85.9 (17/5)
$150,000	41.3 (12/5)	73.8 (13/4)	185.0 (51/10)	139.2 (34/8)	82.4 (15/5)

* Rank among 51 cities/10 cities in comparison group, where a rank of 1 indicates the lowest tax payments.

Source: Government of the District of Columbia, *Tax Rates and Tax Burdens in the District of Columbia — A Nationwide Comparison*, 2012, http://cfo.dc.gov/node/215912.

[22] To be consistent with the state studies that exclude the District of Columbia in the rankings, the District also was excluded in this analysis.

Relative to the median of the cities, individual income tax payments were very low in Phoenix at incomes of $50,000 or more and below average at $25,000. Property tax payments were considerably below average except at the lowest income level. In contrast, the amount of sales tax paid was very high in Phoenix.

If the temporary sales tax is removed from the data, the sales tax figure in Phoenix across the income levels is roughly 70 percent above the median of the cities instead of 90 percent. However, Phoenix remains the highest of the 50 cities. The effect on total taxes paid is smaller, lowering the percentage of the median city by 3 percentage points at the highest income level to 6 points at the lowest level. The rank does not change at the two highest income levels and improves slightly at the other levels.

The individual tax reductions that have been passed in Arizona since 2011 but were not reflected in the 2012 District of Columbia study include a very small decrease in the individual income tax and a small decline in property taxes. The latter would improve the rank of Phoenix by one place at some income levels for the property tax and/or total tax payment.

Business Taxes

Tax Foundation

The Tax Foundation's State Business Tax Climate Index includes five taxes: corporate income, individual income, sales, property, and unemployment insurance. Each tax is evaluated based on criteria organized into two subcategories: the tax rate or the tax base. The actual amount of taxes paid by businesses is not included, which is a serious shortcoming of this study. Rather than a specific look at business taxes, this study is a blend of a business tax measure and an overall tax measure. Some taxes incurred by businesses are not included in the study and the weighting of the taxes that are included in order to produce an overall measure is questionable.

For most of the taxes, the tax rate is directly measured; if more than one rate applies, as in the income tax, the top rate and the number of tax brackets are included as separate criteria. The criteria used to measure the base vary by tax. In the 2015 study, released in October 2014, the criteria are based on the tax code in place as of July 1, 2014. Thus, little of the phased-in tax reductions already passed by the Arizona Legislature are included.

The weighting of the criteria varies, but the rate and base subcategories of each tax are equally weighted. The five tax categories are unconventionally weighted based on the variability of the scores by state. The *individual* income tax is most-heavily weighted, followed by the corporate income tax, the sales tax, property taxes, and the unemployment insurance tax.

Overall, business taxes in Arizona ranked 23rd nationally but only eighth among the comparison states. Information by tax follows:

- Corporate income tax, 20.6 percent of the total. Arizona ranked 24th/fifth. Among the considerations in the tax base portion are tax credits and treatment of net operating losses.
- Individual income tax, 32.1 percent of the total. Arizona ranked 19th/sixth. This tax is included since it is paid by sole proprietors, partnerships, and S corporations (closely held business corporations that elect to pass corporate income, losses, deductions, and credit

through to their shareholders for federal tax purposes). The Tax Foundation also suggests that the individual income tax affects a company's labor pool. Among the criteria included in the tax base subcategory are rates for married versus single taxpayers and double taxation as it affects S corps and LLCs (limited liability companies, a flexible form that blends elements of partnership and corporate structures).

- Sales tax, 21.6 percent of the total. Arizona ranked 49th/10th. This category includes the general sales tax and excise taxes, for example on alcoholic beverages or motor fuel. Tax base criteria include business-to-business transactions.
- Property tax, 14.6 percent of the total. Arizona ranked sixth/fourth. Due to the complexity of the property tax code, instead of directly measuring rates, an effective rate is calculated based on tax collections per capita and collections relative to personal income. Residential and commercial payments are combined.
- Unemployment insurance tax, 11.1 percent of the total. Arizona ranked fourth/first.

Ernst & Young

Unlike the measures of taxes included in the various competitiveness studies — including the Tax Foundation and Moody's — that are not exclusive to business taxes, the annual study of "Total State and Local Business Taxes," produced by Ernst & Young for the Council on State Taxation (http://www.cost.org/WorkArea/DownloadAsset.aspx?id=87982), is limited to payments made by businesses. The amount of effort and sophistication in the Ernst & Young study greatly exceeds that of other business tax studies.

Unlike the Tax Foundation study, all taxes paid by businesses are included in the Ernst & Young study, organized into seven categories of business taxes: property, sales, excise, corporate income, individual income, unemployment insurance, and license and other taxes, such as severance taxes. The amount of taxes paid by businesses during fiscal year 2013 was determined through a combination of detailed data collection and modeling. The total amount of taxes paid is divided by private-sector gross domestic product, with the result called the total effective business tax rate (TEBTR).

Ernst & Young warns that the TEBTR is only a starting point and is not sufficient to assess competitiveness:

- The TEBTR measures the average tax burden of existing businesses, not the marginal tax that would be borne by a company investing in a new facility.
- TEBTRs do not indicate economic incidence — the ability to pass the tax to consumers outside the state. This is of particular importance to severance taxes in states with oil reserves.
- Two states with equal TEBTRs may vary in their taxation by industry. For example, one state may have high taxes on capital-intensive manufacturers and low taxes on labor-intensive service industries.
- A state with a below-average TEBTR that derives most of its business tax revenue from origin taxes — such as property and sales — may not be as competitive as a state with a higher TEBTR that relies on taxes that have a larger impact on out-of-state businesses.

The total business tax payment in Arizona relative to the state's private-sector GDP was higher than the national average in fiscal year 2013. Business taxes amounted to 5.1 percent of private

GDP, a figure 8 percent higher than the national average, ranking 35th among the 50 states. As seen in Table 12, in four of the categories — excise, unemployment, individual income, and license and other taxes — the amount of taxes collected in Arizona relative to private-sector GDP ranged from 27-to-63 percent less than the national average, with ranks ranging from third to 14th nationally and first to fourth among the comparison states. Relative to private-sector GDP, corporate income tax collections were 21 percent below the national average, but Arizona ranked only 22nd/seventh. In contrast to the low tax collections relative to private-sector GDP in these five tax categories, the amount paid by businesses in Arizona was considerably more than average in the two largest categories — property tax and sales tax — with Arizona having among the highest tax burdens in the country.

In general, very small unincorporated businesses in Arizona pay relatively little in taxes relative to counterparts in other states, in part because they pay income taxes based on the very low individual rates rather than the corporate rates, and in part since they typically own limited amounts of property and therefore are not as subject to the state's high business property taxes. This low burden has little positive effect on the economy since few small unincorporated businesses are part of the economic base. Similarly, the very low amount of taxes paid by individuals has little positive effect on the economy — few individuals own a business that operates in the base economy. Further, there is little difference in the local economic impact between dollars collected from taxes that are spent by government and dollars spent directly by individuals.

In contrast, large industrial companies that own considerable property — which make up a large share of Arizona's base economy — pay a high amount in state and local taxes relative to counterparts in other states. These businesses pay a relatively high price for their consumption of

TABLE 12
TAXES PAID BY BUSINESSES IN ARIZONA, FISCAL YEAR 2013

	Share of Business Taxes		Business Taxes as a Share of Private-Sector Gross Domestic Product	
Tax	United States	Arizona	Arizona Ratio To U.S. Average	Arizona Rank*
TOTAL	100%	100%	108%	35/8
Property	36	43	130	40/9
Sales	21	33	173	46/8
Excise	12	8	73	14/4
Corporate Income	8	6	79	22/7
Unemployment Insurance	8	3	48	3/1
License/Other	10	3	37	5/1
Individual Income	6	3	50	10/4

* Rank among 50 states and among the 10 comparison states, where a rank of 1 indicates the lowest tax payments.

Source: Ernst & Young, *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2013*, http://www.cost.org/WorkArea/DownloadAsset.aspx?id=87982.

public services and physical infrastructure, while the smallest businesses and individuals pay relatively little for their consumption of public services and physical infrastructure.

On average, businesses pay a disproportionate share of the state and local government taxes collected in Arizona. The business share ranked 37th/sixth in Arizona, including ranks of 32nd/sixth on state government taxes and 42nd/ninth on local government taxes.

The Ernst & Young study also provides estimates of business taxes per dollar of government expenditures that benefit businesses. Business taxes in Arizona are higher than average relative to the services businesses receive, with the state ranked tied for 35th/ninth using the middle of three alternative assumptions regarding expenditures that benefit businesses. Thus, despite low overall taxes, Arizona did not compare favorably in 2013 on the location factor of the amount of business taxes paid relative to the public services and infrastructure used by businesses; this factor was particularly negative for large base companies.

The temporary sales tax was in place for 11 of the 12 months covered by the Ernst & Young study. Excluding this tax, Arizona would have improved on the sales tax measure by one state on the rank; the sales tax burden would have been 52 percent, rather than 73 percent, higher than average. On the overall tax burden, the state's rank would have been three places better; the overall tax burden would have been 3.6 percent, rather than 8.1 percent, higher than average.

In order to get an idea of the effect on business tax competitiveness of the tax reductions passed between 2011 and 2013 that were not yet in effect in fiscal year 2013, the time period of the last Ernst & Young study 2013, assume that all of the reductions were in place then. The corporate income tax in Arizona would have been sixth lowest in the country at 66 percent below average. Individual income taxes paid by businesses and business property taxes would have lowered more modestly. Including these tax reductions and excluding the temporary sales tax, the overall business tax burden would have been 2 percent *below* average, with a rank of 26th. Business property and sales tax payments still would have been very high.

Comparison of Business Tax Studies

The methodologies of the Tax Foundation and Ernst & Young studies are very different. The category weights also are very different, as seen in Table 13. While the correlations, calculated from the scores of each of the 50 states, are significant at the 0.1 percent level in four of the categories, the correlation of the overall measure of the two studies is quite low and insignificant.

In order to make the studies more comparable, the 2014 Tax Foundation study was used. In addition, the license and other taxes category of the Ernst & Young study was omitted from the overall measure. The overall correlation still was a weak and insignificant 0.21. Part of the reason for the low correlation is the very different weighting of the categories between the two studies. If the Tax Foundation category scores are reweighted using the Ernst & Young category weights, the correlation improves to 0.37, but this is not significant at the 0.1 percent level. Thus, the differing data and methodologies used by the two studies produce very different results. The correlation of the tax burden portion of Moody's Cost of Doing Business Index (0.44) is significant at the 1 percent level with the Tax Foundation study, but insignificant at 0.11 with the Ernst & Young study.

TABLE 13
COMPARISON OF THE TAX FOUNDATION'S STATE BUSINESS TAX CLIMATE INDEX AND ERNST & YOUNG'S BUSINESS TAX STUDY

	Weight		Correlation	Arizona Rank*	
	Ernst & Young**	Tax Foun-dation		Ernst & Young*	Tax Foun-dation
Property Tax	40.0%	14.4%	0.37	40	6
Sales & Excise Taxes	36.6***	21.5	0.63	43***	49
Corporate Income Tax	8.7	20.2	0.46	22	26
Individual Income Tax	6.1	32.4	0.77	10	18
Unemployment Insurance Tax	8.4	11.5	0.52	3	1

* Rank of 1 represents the lowest tax burden
** Reweighted after excluding license and other taxes
*** Sales and excise categories combined

Sources: Ernst & Young, *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2013*, http://www.cost.org/WorkArea/DownloadAsset.aspx?id=87982 and Tax Foundation, 2014 State Business Tax Climate Index, http://taxfoundation.org/article/2014-state-business-tax-climate-index.

Arizona's ranks by category from the Tax Foundation and Ernst & Young studies are not substantially different except in the property tax category. In this category, the Tax Foundation combines residential and commercial property tax collections; in reality, the assessment ratio in fiscal year 2013 was considerably higher for commercial properties (19.5 percent) than residences (10 percent) in Arizona, and a variety of other factors also differ in the calculation of the tax payment between the property types.

Changes Over Time in Tax Revenue in Arizona

Relative to the ability to pay, the total amount of state and local government tax revenue in Arizona has fallen considerably since the early 1990s. Based on the Census Bureau's data, tax collections per $1,000 of personal income relative to the nation fell from 7 percent above average in 1992 to 8 percent below average in 2011 (even with the inclusion of the temporary sales tax in 2011). Between 1992 and 2011, tax collections fell substantially for the motor vehicle license tax, the individual income tax, and the corporate income tax. Selective sales and property taxes also declined relative to the national average.

Based on the Tax Foundation's "Annual State-Local Tax Burden Ranking," the state and local government tax burden in Arizona was above average from 1977 through 1979, but from 1980 through 1988, the tax burden in Arizona was lower and less than the national average. From 1989 through 1991, tax payments relative to per capita income ranged from the same as to 2 percent more than the national average, with the state ranking between 29th and 35th. In 1991, per capita tax payments amounted to 10.3 percent of per capita income. The large tax reductions implemented during the 1990s lowered Arizona's tax burden, both in absolute terms and relative to the rest of the nation. Continued state government tax reductions kept the state and local burden low versus other states. In 2011, the per capita tax burden in Arizona was down to 8.9 percent of per capita income — 9 percent below the national average and 17th lowest among the states — even though the temporary sales tax was included.

The decline in Arizona in the overall tax payment relative to the ability to pay primarily results from a series of individual tax reductions put in place since the early 1990s by state government that predominantly affected the state's general fund revenue. The tax cuts that have been implemented in Arizona have had no measurable impact on economic growth. That is, the loss of revenue resulting from the tax cuts has not begun to be offset by greater economic growth, even years after the reductions were implemented. These conclusions come from an in-depth study: "The Effects of Tax Reductions in Arizona: Significantly Reduced Government Revenue and No Apparent Impact on Economic Growth," February 2013, Grand Canyon Institute, (http://grandcanyoninstitute.org/sites/grandcanyoninstitute.org/files/GCI_Policy_Tax_Reductions_Feb_2013.pdf).

Looking specifically at changes in the state tax code passed by the Arizona Legislature and implemented between 1993 and 2013 (excluding the temporary sales tax rate increase), state government revenues have been reduced by $1.7 billion per year in nominal terms, according to the Joint Legislative Budget Committee. (See Appendix D of the *2014 Tax Handbook*, http://www.azleg.gov/jlbc/14taxbook/14taxbk.pdf.) Most of the decreases occurred from fiscal years 1995 through 2001, with additional large cuts in fiscal years 2007 and 2008. Adjusted for inflation and the state's population growth, the cumulative effect of these state government individual and business tax reductions now totals approximately $3.3 billion per year. The additional tax reductions passed between 2011 and 2013, the vast majority of which phase in between fiscal years 2014 and 2018, will add another $668 million per year in nominal terms in revenue loss to the state government's general fund once fully implemented.

Nontax Revenue and Incentives

Based on the Census Bureau's data, Arizona also is considerably below average on nontax sources of income relative to the ability to pay, ranking ninth at 15 percent below average in 2011. User fees ("current charges" in the Census Bureau's report) ranked tenth at 18 percent below average.

The legislation passed by the Arizona Legislature in 2011 also transformed the Arizona Department of Commerce into the Arizona Commerce Authority, with a focus on economic development. The availability of incentives intended to help companies decide to move to or expand operations in Arizona was broadened, including a "deal-closing" fund and a credit for job creation. Unlike the tax reductions, these changes went into effect in fiscal year 2012. Incentives can be important in location decisions, but typically do not make a difference unless a region is a finalist based on the other location factors, according to the economic literature.

The Effects of Tax Reductions on the Quality and Quantity of Public Services

Since state and local governments are not allowed to run a budget deficit, the substantial reductions in tax revenues in Arizona since the early 1990s have necessarily required similar decreases in public spending. Since the tax cuts have largely affected revenue to the state government's general fund, expenditures from the general fund have dropped substantially, from a historical average of about $49 per $1,000 of personal income to around $35 — a decrease of nearly 30 percent. Since expenditures from other state government funds and by local governments have not dropped nearly as much, total state and local government noncapital expenditures per $1,000 of personal income relative to the national average have not declined as

much as state general fund expenditures. Based on the Census Bureau's data, total state and local government noncapital expenditures per $1,000 of personal income in Arizona was marginally higher than the U.S. average in 1993 and ranked 28th. In 2011, Arizona's figure was 7 percent below average and ranked 19th.

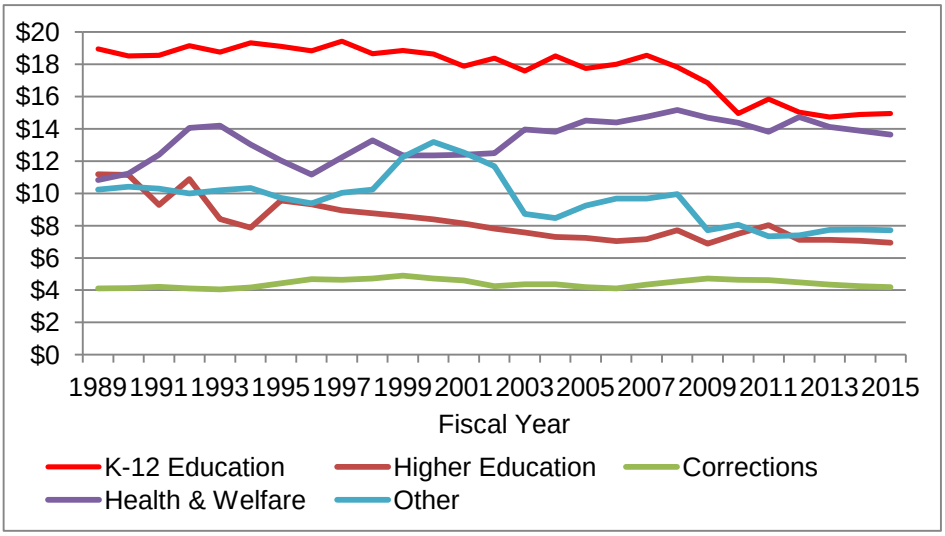
The reduction in available public funds has necessarily resulted in curtailments of public services. Particularly during the last recession, some programs were terminated and others experienced substantial reductions in funding. Even today, when faced by requests to restore funding that was cut in recent years, officials respond that public revenue is inadequate. While accurate, this response does not note that revenue is not adequate due to decisions to reduce taxes to far below historical levels. If general fund revenue per $1,000 of personal income were increased from the fiscal year 2014 figure of $34 to the historical norm of $49, general fund revenue would be more than $3.5 billion higher. Yet, even with such a large increase, Arizona taxpayers — relative to their ability to pay — would be contributing to the general fund no more than the historical norm of the 1970s and 1980s.

So, the *quantity* of public programs has been reduced, either through the elimination of a program or through limits placed on a program, such as restricted eligibility. It is much more difficult to establish the extent to which the *quality* of public programs has been negatively affected by the spending reductions, since spending is not the only factor affecting quality. However, one can say that the quality has dropped to zero for those barred from a public service that was previously available.

The impact of public spending reductions has been highly uneven across the categories of public expenditures. Certain programs largely funded from the state's general fund have been affected the most. The total amount appropriated by state government from the general fund and from other funds, per $1,000 of personal income, is displayed in Chart 6. Expenditures for elementary and secondary education fell considerably after 2007. University funding has also dropped considerably, though over a longer time period. In contrast, spending on social services — primarily public welfare programs, of which AHCCCS (Arizona Health Care Cost Containment System) is the largest — has increased over time (to a level near the national average). Reductions in spending for public safety have been minimal; Arizona consistently spends among the most in the nation per $1,000 of personal income for public safety.

Spending reductions for many programs do not have an immediately perceptible effect on the economy. For example, it takes more than a decade for a child to complete their K-12 education; a failure to spend adequately to maintain infrastructure does not result in the immediate deterioration of that infrastructure. Thus, while it may appear that certain types of spending can be reduced without significant ill effects, it may simply be that the negative effects have yet to manifest themselves. Whether the spending reductions that have already gradually occurred in some programs over the last 20 years may be contributing to the state's relatively weak economic recovery in recent years is a matter of conjecture. However, when the negative effects of reduced public investment do become apparent, it will be very difficult to reverse years of neglect in a short period of time — even if there is a strong desire to do so.

CHART 6
TOTAL APPROPRIATIONS BY TYPE PER $1,000 OF PERSONAL INCOME, ARIZONA STATE GOVERNMENT



Sources: Arizona Joint Legislative Budget Committee (expenditures) and the U.S. Department of Commerce, Bureau of Economic Analysis (personal income).

Relationship Between Taxes and Economic Performance

The correlations between the five tax studies and between each of these studies and various economic measures are discussed in this subsection.[23] Correlations with geographic measures also are examined. The five tax studies include:

- Two measures of the overall tax burden: the Tax Foundation's "Annual State-Local Tax Burden Ranking" and the Census Bureau's state and local government taxes collected per $1,000 of personal income.
- The District of Columbia's measure of the individual tax burden.
- Two measures of the business tax burden: the Tax Foundation's State Business Tax Climate Index and the Ernst & Young study.

Alaska was excluded from the correlation analysis because a high proportion of Alaska's revenue comes from the severance tax on oil, a tax that can be largely exported to the out-of-state buyers of the oil. The tax studies vary substantially in how they treat this tax revenue.

Conceptually, the two measures of the business tax burden should be highly correlated if each is providing an accurate appraisal. However, no correlation (-0.02) exists between the state ratings of the Tax Foundation and Ernst & Young studies. Similarly, the two measures of the overall tax burden should be highly correlated. However, the correlation (0.10) between the Tax Foundation's measure and the Census Bureau's data is insignificant.

[23] In order for the time periods covered by the studies to be more consistent, the 2014 State Business Tax Climate Index from the Tax Foundation is used instead of the just-released 2015 study.

Some correlation should exist between each of the overall tax measures and the measures of either individual or business taxes. The Tax Foundation's overall measure is significantly correlated to the Tax Foundation's business measure (0.70) and to the District of Columbia's individual measure (0.56), but is not correlated to the Ernst & Young study (-0.11). The overall data from the Census Bureau are significantly correlated with the Ernst & Young business measure (0.58), but not with the District of Columbia study (-0.16) or the Tax Foundation's business tax measure (0.08).

The same economic measures using the same time periods as discussed earlier in the correlations with the results of the competitiveness studies (see page 43) were correlated with the tax studies. The economic measures can be grouped into three categories: the dollar level of productivity and prosperity, real percent changes in productivity and prosperity, and real percent changes in aggregate measures of the economy.

The results of the Ernst & Young study of business taxes are not correlated with the level of productivity and prosperity in 2013. The growth rates between 1993 and 2003 of the aggregate economic measures and of the measures of productivity and prosperity are not correlated to the Ernst & Young figures. Moderate and significant correlation is present between the Ernst & Young results and the growth rates between 2003 and 2013 of the aggregate economic measures and of the measures of productivity and prosperity, but the correlation is of the opposite sign than expected: States that grew the most and had the greatest gains in productivity and prosperity between 2003 and 2013 have relatively high business taxes. This likely is an aberrant result caused by the real estate boom and bust that varied widely in intensity across the states. Instead, it is likely that business taxes as measured by Ernst & Young have no relationship with either aggregate economic growth or with the level or change in productivity and prosperity.

The Tax Foundation's measure of business taxes is not correlated to either the level or change in productivity and prosperity. Low business taxes are associated with stronger growth in the aggregate economic measures, though the correlations are only weak to moderate, marginally significant.

The District of Columbia's study of individual taxes is not correlated to the level of the productivity and prosperity measures except for a significant correlation with earnings per employee: Higher taxes are associated with higher levels of the productivity measure. Correlations with the change in productivity and prosperity are not significant except at the $25,000 income level, which is minimally significant. In contrast, the tax figures from the study are moderately and significantly correlated to aggregate growth rates except at the $25,000 income level.

The Tax Foundation's overall tax measure generally is not correlated with either the level or change in productivity and prosperity. Marginally significant correlations were measured with the aggregate measures of growth: the lower the taxes, the stronger the growth.

The relationships between the tax data from the Census Bureau and the economic measures are similar to those from the Ernst & Young study. Taxes generally are not correlated with the level of productivity and prosperity, though marginally significant correlation with the two GDP

measures is seen in 2013: the higher the taxes the higher these two measures. The growth rates between 1993 and 2003 of the aggregate economic measures and of the measures of productivity and prosperity are not correlated to the Census Bureau figures. Moderate and significant correlation is present between the Census Bureau figures and the growth rates between 2003 and 2013 of the aggregate economic measures and of the measures of productivity and prosperity, but the correlation is of the opposite sign than expected: Higher taxes are associated with greater growth.

Thus, the tax measures generally are not significantly correlated to the level of productivity and prosperity; the significant positive correlation to the change in the productivity and prosperity measures between 2003 and 2013 registered in a couple of the studies likely is an aberration. Low taxes are associated with faster aggregate economic growth in three of the studies, but in the other two studies, higher taxes are associated with faster aggregate growth in the most recent time period.

To the extent that any relationship is present between tax burdens and aggregate economic growth, taxes cannot be deemed to be the cause of the faster growth. First, a statistically significant relationship does not imply causality. In Arizona, the tax reductions that were passed during the 1990s came *after* economic growth had accelerated, providing a cyclical budget surplus that was used as justification for the permanent tax reductions.

Second, the variation in tax burdens across the country is not randomly distributed. Instead, southern and western states on average have lower tax burdens than the rest of the country. Are the southern and western states growing faster than the rest of the country because of their low tax burdens, or is another factor or a combination of factors causing the faster growth? It seems likely that other factors, particularly climate, are playing a significant role in the faster growth.

ARIZONA'S BUSINESS COMPETITIVENESS

In this section, Arizona's competitiveness is assessed on each of several location factors. In order to determine the ability of the public sector to provide public services desired by businesses, state government's fiscal situation also is examined.

Labor Force Quality and Availability

Labor force supply/availability is a challenge to measure. The competitiveness studies mostly measure labor force supply/availability by a state's right-to-work status or another measure of union participation, but these are narrow indicators of only a portion of the entire issue. Arizona compares quite favorably on these indicators. Migration sometimes is included in the studies. While defects in the local labor supply can be offset to some extent by recruiting workers from outside, this adds to a company's costs.

Labor force quality also is difficult to measure. Most commonly, educational measures, including attainment and achievement, as measured by test scores, are used as proxies for labor force quality. Job training programs are a component of creating and maintaining a quality workforce, but the competitiveness studies provide limited information on job training.

In addition to being a proxy for labor force quality, various aspects of education also appear on the list of economic development factors, particularly for the key base industries. Given its importance to competitiveness, a more detailed examination of education in Arizona follows. Significant decreases in public expenditures for education — including elementary and secondary (K-12) and higher education — have occurred in Arizona over the last several years, following relative declines in prior decades. The decreases in public funding of higher education have been offset by significant increases in tuition and fees. In contrast, total K-12 funding has dropped considerably.

Elementary and Secondary Education

Using data from the "State and Local Government Finances" report produced by the U.S. Census Bureau (http://www.census.gov/govs/), K-12 noncapital expenditures per $1,000 of personal income in Arizona were 12 percent lower in 2011 (the latest year of data) than in 1993, compared to an increase nationally of 5 percent. Arizona's 2011 figure was 22 percent less than the national average; it had been 6 percent less than average in 1993. The state's spending moved from 15th-lowest to fourth-lowest.

Spending relative to personal income is not an ideal measure since it does not consider the demand for the public service. When caseload data, such as the number of students enrolled in public school, are available, the ideal measure considers both the overall ability to pay and the size of the caseload.

The JLBC produces a report (http://www.azleg.gov/jlbc/mofunding.pdf) that includes all sources of funding for K-12 education and provides these figures on a per student basis. Maintenance and operations funding is reported separately from capital and other expenditures, such as debt service. Funding is reported by source; each source's share of the total in fiscal year 2014 is shown below:

- State government general fund: 53.9 percent

- State government, proposition 301 (voter-approved 0.6 percentage-point increase in the sales tax in 2000): 7.5 percent
- State government permanent fund (proceeds from sale and lease of state land): 0.7 percent
- County and local government (primarily from the property tax): 36.5 percent
- Federal government: 1.4 percent

Between fiscal years 2008 (at the beginning of the recession) and 2012, total spending per student dropped 13 percent; relative to per capita personal income, the decline was 9 percent. State government funding fell 21 percent but county and local funding rose 13 percent. A small increase in total spending per student occurred between fiscal years 2012 and 2014.

Using the Census Bureau data, noncapital expenditures for elementary and secondary education per student per $1,000 of per capita personal income was second-lowest in the country in Arizona in 2011 (only Utah spent less); the figure was 22 percent less than the national average. Compared to the rest of the nation, spending on this basis has fallen considerably since the early 1990s; in 1993, Arizona had the 15th-lowest spending with a figure 8 percent less than the U.S. average.

The Census Bureau provides more detail on noncapital expenditures for K-12 education in its "Public Elementary-Secondary Education Finances" report (http://www.census.gov/govs/). Expenditures per pupil in the 2012 school year are measured in two ways in Table 14: adjusted for the cost of living and per $1,000 of per capita personal income. On both measures, Arizona was far below the national average overall and ranked near the bottom of the states in most of the expenditure categories. Arizona's expenditures per student adjusted for living costs were second-lowest overall at 36 percent below the national average.

Instructional expenditures (for teachers, aides, supplies, and materials) were the lowest in the nation at 42 percent below average. Support expenditures were third lowest at 26 percent below average and other expenditures were lowest at 39 percent below average. Of the seven support subcategories, Arizona's spending was among the eight lowest in six, including general (school district) administration (fourth-lowest, 62 percent below average) and school administration (lowest, 50 percent below average). The exception is pupil support — which includes counseling, health care, social work, and student appraisal — in which expenditures were far above average.

On most measures of elementary and secondary student performance, Arizona ranks among the bottom tier of states. The available measures can be grouped into several categories: student achievement (as measured by test scores), high school completion rates, assessments of resources, and academic standards and accountability. (See the University Economist report "Arizona Constitution: Specified Duties of State Government," November 2010, available at http://economist.asu.edu/public-finance). The state has compared unfavorably on student achievement over the two decades for which comparable test scores are available.

If Arizona's K-12 educational system were performing well, the low and declining funding for public education would be of lesser significance. While funding is not the only input into the

educational system and therefore not the only factor affecting the performance of Arizona's educational system, funding is of obvious significance. To expect Arizona's elementary and secondary schools to perform well despite the very low funding levels, the quality of the other inputs would need to be very high.

However, there is no evidence that funding deficiencies in Arizona are offset by inherently more intelligent or harder-working students, by better-qualified teachers, etc., relative to the national average. In fact, Arizona's teachers have less experience on average than their counterparts nationally and Arizona has disproportionate shares of students whose parents are poorly

TABLE 14
ELEMENTARY AND SECONDARY EDUCATION FUNDING IN ARIZONA, 2012

	Expenditures In Millions	Ratio to U.S. Average	Rank Nation*	Rank Comparison States**
		Expenditures Per Student, Adjusted for the Cost of Living		
Total	$7,135	63.6%	50	9
Instruction	3,918	57.8	51	10
Support Services	2,856	74.2	49	8
Pupil Support	1,015	162.7	9	1
Instructional Staff Support Services	179	35.3	51	10
General Administration	80	38.4	48	9
School Administration	297	49.9	51	10
Operation and Maintenance of Plant	760	73.6	49	8
Pupil Transportation	308	62.3	46	6
Other Support Services	217	56.2	44	8
Other	361	61.3	51	10
		Expenditures Per Student Per $1,000 of Per Capita Personal Income		
Total		74.9%	49	9
Instruction		68.0	51	10
Support Services		87.3	38	5
Pupil Support		191.4	5	1
Instructional Staff Support Services		41.5	51	10
General Administration		45.1	47	8
School Administration		58.7	51	10
Operation and Maintenance of Plant		86.6	40	5
Pupil Transportation		73.3	43	6
Other Support Services		66.1	39	8
Other		72.1	46	9

* Among 50 states and the District of Columbia; 1 = highest expenditures
** Among 10 comparison states; 1 = highest expenditures

Sources: U.S. Department of Commerce, Census Bureau, "Public Elementary-Secondary Education Finances," http://www.census.gov/govs/ (expenditures); U.S. Department of Education, National Center for Education Statistics (enrollment); U.S. Department of Commerce, Bureau of Economic Analysis (personal income and regional price parity).

educated, who are living in poverty, and who are learning English as a second language — circumstances requiring above-average rather than below-average funding to overcome. In contrast, Idaho and Utah, the other states with very low per pupil expenditures, have much more homogenous populations.

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. Access/proximity to universities is separately listed as an important site selection factor.

Public higher education noncapital expenditures by state and local governments expressed per full-time-equivalent student per $1,000 of per capita personal income also are below average in Arizona. Using Census Bureau data for 2011, Arizona's spending was 4 percent less than the national average, 20th-lowest among the states. In the early 1990s, Arizona's figure had been marginally higher than the U.S. average.

Educational Attainment

An alternative to student achievement to assess Arizona's educational system is to compare the educational attainment (number of years of schooling) of adults living in Arizona to their national counterparts. The average attainment of Arizona's adults is below average. In particular, the educational attainment of those born in Arizona and still living in the state is considerably less than both

- The attainment of those born in another state who have moved to Arizona
- The national average of those living in the same state in which they were born

In contrast to the low level of attainment among Arizona natives relative to natives in other states, the educational attainment of Arizonans who had been born in another state generally ranked at or only a little below the national median of interstate migrants. That is, the educational attainment of those who migrated to Arizona was close to the national average of interstate migrants. Arizona's differential in attainment between those migrating from other U.S. states and those not moving is among the highest in the country.

Education Summary

Through the first five decades of Arizona statehood, the state's education spending was above average. Educational attainment also was above average historically in Arizona. The decline in spending for public education — from kindergarten through universities — since the early 1990s continues a trend of falling expenditures relative to the rest of the nation that began in the late 1960s.

Physical Infrastructure

Like labor force quality and supply, measuring the physical infrastructure is difficult. Little information on infrastructure is included in the competitiveness studies. A report card specific to Arizona's infrastructure is scheduled to be released later this year by the American Society of Civil Engineers (http://www.infrastructurereportcard.org/arizona/arizona-overview/).

Arizona's infrastructure needs and options were examined in detail in a series of reports produced in 2008.[24] The reports estimated the amount of spending that is needed to improve Arizona's existing infrastructure to be economically competitive and then to keep up with the expected growth in the Arizona population. While provision and maintenance of the physical infrastructure is expensive, the costs can be spread out over a long time span because of the long useful life of most of the infrastructure. In some cases, the costs need not be borne by the public sector, but the public sector must be responsive to the infrastructure needs through its long-term planning and regulatory functions.

Three broad conclusions were cited in the summary of the November 2008 report:

- "Arizona's public infrastructure — particularly the transportation system — has not kept pace with the state's growth over the last 15 years, resulting in a need to 'catch up'."
- "Arizona's existing public-sector physical infrastructure — especially the water infrastructure — is aging, leading to an increasing need for renovation."
- "Arizona continues to grow rapidly, creating a substantial demand from new residents and new businesses for public-sector and private-sector infrastructure."

Thus, while it may not be clear how well Arizona's physical infrastructure currently compares to other states, Arizona is at risk of falling behind in its competitiveness if action is not taken to maintain, renovate, and improve its infrastructure.

Business Costs

Arizona ranked 33rd nationally and ninth in the comparison group in the business costs category of the *Forbes* study. In the CNBC study, Arizona ranked 28th/sixth in its category of cost of doing business.

One of two components of the business costs category in the *Forbes* study is the Cost of Doing Business Index produced by Moody's Analytics for states and metropolitan areas. By state, the index consists of three components: unit labor cost, energy cost, and state and local tax burden; the labor cost component is weighted most heavily. By metro area, office rents are included in the index as a proxy for real estate costs.

[24] A detailed report focusing on four types of physical infrastructure was produced by the L. William Seidman Research Institute, W. P. Carey School of Business, Arizona State University, for the Arizona Investment Council: "Infrastructure Needs and Funding Alternatives for Arizona: 2008-2032," May 2008, available from http://wpcarey.asu.edu/research/competitiveness-prosperity-research/other-reports. A summary of that report and a discussion of other types of infrastructure was included in the University Economist report "Preparing for an Arizona of 10 Million People: Meeting the Infrastructure Challenges of Growth – Background Report," October 2008, available at http://economist.asu.edu/p3/competitiveness. A shorter version of the background report was released in November 2008, also available from http://economist.asu.edu/p3/competitiveness.

Since Moody's index is proprietary, current data are not available. However, the figures for 2010 are available online at http://providenceri.iqm2.com/Citizens/FileOpen.aspx?Type=4&ID=1323. Overall, Arizona's business costs were 1 percent less than the national average in 2010 but ranked only 34th nationally (the lowest costs are given a rank of 1).[25] Arizona ranked ninth among the comparison states. Of the 17 metro areas with a population of at least 3 million, the Phoenix area had the fifth-lowest business costs. The components of Moody's index are discussed in the following subsections.

Labor Costs

While businesses desire lower costs, they must pay their workers enough to attract and retain a qualified workforce. In contrast, workers desire higher wages, though wages after considering the regional cost of living are most relevant.

In Moody's Cost of Doing Business Index, the unit labor cost index is explicitly limited to sectors in which basic economic activities are common. Labor costs, as measured by the average wage, are adjusted for productivity, as measured by GDP per employee; that is, labor costs are expressed relative to output. The calculations are made by subsector so that differing industrial mixes by state do not affect the measured labor costs. Unit labor costs in Arizona were 2 percent higher than the U.S. average in 2010 and ranked 36th/eighth. The Phoenix area was fifth-lowest among the 17 largest metro areas.

The Beacon Hill Institute reports a cost of labor adjusted for educational attainment. Arizona ranked between 21st and 30th nationally and sixth or seventh in the comparison group. Otherwise, the only indicator related to labor costs that is included in the competitiveness studies is the minimum wage. Since Arizona has a higher minimum than the federal standard, the state ranks below average on this indicator.

According to BEA data, average compensation[26] per employee in Arizona in 2013 was 7.5 percent below the national average, but the state only ranked 29th nationally and fifth in the comparison group (where a rank of 1 indicates the lowest compensation). After adjustment for living costs, average compensation in Arizona was 5.7 percent below average and ranked 21st/fifth.

A more accurate assessment of the average compensation would adjust for job quality. Using the latest job quality data for 2004, average compensation adjusted for job quality in Arizona in 2013 was 5 percent less than the U.S. average without considering the cost of living and ranked 25th/seventh. Thus, from the perspective of businesses, labor costs in Arizona are below the national average, but Arizona ranks in the middle of the states. Adjusting for both job quality and cost of living, average compensation in Arizona was 3 percent below average and ranked 15th/sixth. From the perspective of workers, compensation in Arizona after considering the cost of living not only is below average, but 15th-lowest in the nation.

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[25] On a variety of indicators related to costs and incomes, a minority of the states has a figure above the national average, but many of the most populous states have above-average figures. Thus, a state can have a cost below the national average yet rank relatively poorly.

[26] Compensation includes supplements to wages and salaries — employer contributions for government social insurance and employee pension and insurance funds — as well as wages and salaries.

The ratio of compensation per employee to GDP per employee, similar to the measure of labor costs adjusted by productivity used by Moody's, was 67.7 nationally in 2013. The higher the ratio, the more costly is labor and/or the lower is productivity. Arizona's ratio was 69.8, which ranked 37th nationally and tied for eighth in the comparison group. Arizona compares poorly due to its low productivity, even after considering its low compensation costs.

Energy Costs

Moody's calculates its energy cost index using only commercial and industrial electricity rates, expressed as cents per kilowatt hour. Arizona's energy costs in 2010 were 6 percent below the national average, but the state ranked only 29th/eighth. The Phoenix area was eighth-lowest among the 17 largest metro areas.

The BHI ranks Arizona between 21st and 30th nationally and eighth in the comparison group on electricity prices. Pollina assigns a grade of "B" to Arizona's cost of electricity.

Taxes and Other Costs

Moody's tax rate index is measured simplistically, as total tax revenue as a percentage of personal income. Arizona ranked 28th nationally and seventh in the comparison group. Taxes were examined in detail in the previous section; while the state's individual taxes are quite low, this has a limited effect on business competitiveness. In contrast, business taxes are above average, due to the high sales tax rate and high property taxes.

Real estate costs can be important in location decisions, but limited information is available on this factor. Moody's estimates office rents for Class A space in metro areas. Office rents in each of Arizona's metro areas were below the national metro average. The Phoenix area was eighth-lowest among the 17 largest metro areas.

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 labor force, physical infrastructure, and costs.

Regulatory Environment

The regulatory environment is particularly important to mining and manufacturing firms. The Pollina study rated Arizona's regulatory environment as a "B." In the CNBC study, the regulatory framework is part of the "business friendly" category; Arizona ranked 16th/tied for third on this category.

While the *Forbes* study has a category labeled "Regulatory Environment," the indicators included in this category go beyond regulations. Arizona ranks 19th/fourth in this category. Part of this category consists of the regulatory policy category of the "Freedom in the 50 States" study produced by the Mercatus Center at George Mason University (http://freedominthe50states.org/). In the 2013 study, Arizona ranked 13th/third in this category, comparing favorably for its policies related to the liability system, health insurance, labor market, and miscellaneous regulations. The state did not compare as favorably for real property

rights, occupational freedom, and cable/telecommunications, but the latter two subcategories were lightly weighted in the George Mason study.

Access to Capital

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. In the access to capital category of the CNBC study, Arizona ranked tied for fifth/tied for fourth.

Government

Other than the tax burden, various other aspects of government operations were included in some of the competitiveness studies. The BHI study included three indicators, with Arizona ranking 16th/third on tort liability, between 21st and 30th/fourth or fifth on budget surplus as a percentage of GDP, and 47th/ninth on state government's bond rating. The Pollina study assigned the state "B" grades for its litigation environment and its long-term budget plan. The ALEC study included several indicators: Arizona ranked favorably on public employment per capita, tax and expenditure limitations, and on the state's legal system, but was ranked near the bottom on debt service as a share of tax revenue.

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 competitiveness studies include a quality-of-life category, though the indicators included in this category varied across the studies. The *Chief Executive* study rates Arizona as a little above average, CNBC ranks Arizona 27th/seventh, and *Forbes* rates Arizona poorly at 42nd/eighth.

The cost of living is included as a category of the CNBC study, with Arizona ranking 27th/fifth. Apartment rents are included in the BHI study, with Arizona ranked 35th/sixth. In the 2012 regional price parity measure produced by the BEA, Arizona ranked 29th among the 50 states and fifth among the 10 comparison states in overall costs at 1.9 percent below the national average. Arizona was 39th/seventh for goods (0.6 percent above average), 29th/fifth for rents (6.4 percent below average), and 31st/second for other services (2.0 percent below average).

Arizona ranked 31st nationally and eighth in the comparison group in BHI's environmental policy category. This category consists of three measures. Arizona's carbon emissions per square mile ranked 14th nationally, but only sixth in the comparison group. In contrast, air quality ranked 47th.

Crime is measured by three indicators in the BHI study. Arizona ranks 36th/seventh overall, 31st/third on the change in the overall crime rate, and 36th/ninth on murders. Pollina gives the state an "F" on the crime rate.

Health also is measured by three indicators in the BHI study. Arizona is ranked 36th/tied for fifth on the percentage with health insurance, 35th/sixth on the per capita number of physicians, and between 21st and 30th/between eighth and tenth on infant mortality.

Public Finance in Arizona

State government is a primary source of funding for public education, has a large role in the funding of the transportation infrastructure, and provides various other public services of importance to businesses. Thus, state government's fiscal condition is a key factor in the state's economic competitiveness.

As noted in the prior section, a succession of tax reductions has lowered state government revenues substantially, mostly affecting the general fund. Despite a 30 percent reduction in general fund expenditures, the fund is currently running a deficit, according to the JLBC. The deficit can be traced to three factors: the tax cuts currently being phased in (discussed earlier) that contribute to a structural deficit, weaker-than-expected economic growth in Arizona, and judicial decisions regarding funding for K-12 public education.

Though it is now more than four years since the end of the last recession in Arizona, the state has not yet experienced a period of strong aggregate economic growth that has occurred in each prior economic cycle. This relatively slow economic growth translates into sluggish gains in government revenues. If economic growth were to accelerate considerably, the state's short-term fiscal situation would be much improved. However, as soon as economic growth slowed, a budget deficit would again occur in the general fund.

Court-Ordered Increase in Education Funding

The JLBC was projecting a deficit in the current balance even before the courts ordered the state to increase funding for K-12 education. According to the voter-approved Proposition 301 from November 2000, the K-12 base level must be adjusted annually for inflation. This base level is the starting point for computing formula funding for the schools. However, the inflation adjustment was not fully made to the base level for several consecutive years; the money saved was used to balance the budget. Instead of $3,327 per student, funding in the current fiscal year would have been $3,560 had the adjustments been made. The courts have ordered the base level be increased to the latter figure for the current fiscal year, though the state is appealing this decision. Resetting the base will increase expenditures by $331 million in the current fiscal year and by $1.7 billion over five years.

The courts have yet to decide on the second part of the plaintiffs' case — that the schools should be reimbursed for the amount that was not funded over the last several years. This could amount to another $1.3 billion in expenditures over five years. Thus, it is possible that the state will need to increase funding by a total of $3 billion over five years.

General Fund Current Balance

Since the state general fund began this fiscal year with a carry forward[27] of nearly $600 million, only a small year-end shortfall of $189 million was expected. This shortfall was expected to rise to $520 million in the next fiscal year. However, including the reset to per pupil funding, the year-end shortfalls are expected to be $667 million in the current fiscal year and $1 billion in the next year. After that, the year-end deficit is expected to drop to about $900 million in fiscal year 2017 and $800 million in fiscal year 2018.

The budget stabilization fund (BSF, or "rainy day" fund), which has a balance of $460 million, could be applied to the general fund deficit as a partial solution. However, if the BSF funds are used in the near term, this would leave nothing in the fund to offset the loss of revenue during the next cyclical downturn, the purpose for which the fund was created. (See the University Economist report "Ensuring That Arizona State Government's Budget Stabilization Fund Serves Its Purpose," June 2012, available at http://economist.asu.edu/public-finance.)

Other potential solutions to the projected deficit in the general fund include increasing revenues, decreasing expenditures, and eliminating tax credits and exemptions. One way to effectively raise revenues without levying a tax increase is to postpone the phase-in of the tax cuts passed in 2011 and 2012. In the past, various accounting maneuvers were used to temporarily resolve a cyclical deficit, but such schemes largely have been exhausted.

Structural Deficit

Even before the phase-in of the tax reductions passed in 2011 and 2012 began, the JLBC estimates that the structural deficit — the difference between ongoing revenues and expenditures not counting one-time adjustments — was approximately $400 million per year. An operating deficit was not present due to the revenue raised by the three-year temporary increase in the sales tax rate that expired in May 2013 and, in fiscal year 2014, by a carry forward that had been built up from the revenues received from the temporary sales tax. The JLBC estimates that the structural deficit — considering the reset of the school funding base level but not the possibility of back payments — is $1.1 billion in the current year. The structural deficit is expected to gradually decline to about $800 million in fiscal year 2018 as economic growth accelerates.

How Additional Educational Funding Would Affect the State's Rank

Even if the courts rule that back payments must be made to the public schools in addition to the reset, the increase in funding will not be enough to substantially improve the state's position relative to the rest of the nation.

The Census Bureau's "Public Elementary-Secondary Education Finances" report includes revenue received from all sources (federal, state, and local governments). In the 2011-12 school year (the latest for which data are available), Arizona's "current spending" — not including capital outlays to build and repair schools or interest payments on debt — was $7.1 billion. Per student, Arizona's figure was 37.6 percent below the national average; Arizona ranked 49th among the 50 states and the District of Columbia, with only Idaho and Utah spending less. If spending in 2011-12 had been nearly $600 million (8 percent) higher — the average amount over

[27] A positive balance remaining from prior years, resulting from the revenues received from the temporary sales tax rate increase.

five years if the courts order back payments as well as the per pupil reset — the differential from the national average would have narrowed to 32.5 percent, but Arizona still would have ranked 49th.

Given the wide differences in the cost of living from state to state, spending per student should be adjusted for living costs. Using the regional price parity figures, adjusted spending per student in 2011-12 in Arizona was 36.5 percent less than the national average; only Utah spent less. The addition of nearly $600 million would have raised the state to 31.3 percent below the national average and a rank of 49th.

In order to approach the national average, expenditures on K-12 education in 2011-12 would have needed to have been $4 billion (56 percent) higher; Arizona would have ranked 29th at 1.6 percent below the U.S. average on per pupil spending, adjusted for the cost of living. While a $4 billion/56 percent increase in K-12 funding might seem daunting, had state general fund revenue per $1,000 of personal income in fiscal year 2012 been at the historical norm, an additional $3.7 billion of revenue would have been available just from this one source.

Fiscal figures often are evaluated based on the ability to pay, typically as measured by personal income. If the per student spending is adjusted by per capita personal income, $2.5 billion of additional spending in 2011-12 would have brought Arizona close to the national average and the middle of the states. However, this additional funding would have left per pupil spending (without considering the ability to pay) below average. As the historical record shows, below-average funding results in student achievement and attainment being below the national average in Arizona. In fact, expenditures per student need to be above the national average to offset the negative effects from the state's low incomes and high poverty rates.

Summary of Arizona's Business Competitiveness

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. Achievement tests indicate that Arizona's elementary and high school students have not performed as well as their peers nationally for at least two decades. Many employers report difficulty finding enough individuals with basic work skills.

These limited educational attainments and work skills are a particular disadvantage in the key base industries. Companies in those industries 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 among 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, largely 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 funding for Science Foundation Arizona has been eliminated. Arizona's large but few university campuses means that few locations in the state offer the proximity to research universities that many companies in the key base industries require. Further, potential employees for such companies are concerned about the quality of the educational system that their children will attend.

The other aspect to producing a quality workforce is job training. Some job training occurs within the public education system, particularly at community colleges, and the state has a variety of other job training programs. However, these programs are viewed as inadequate by many employers, especially those in the key base industries.

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 budget difficulties limiting the ability of the public sector to address issues, the state's physical infrastructure is at risk of becoming a negative factor to its economic competitiveness.

The importance of workforce and infrastructure was verified at the spring 2014 conference of the Arizona Association for Economic Development. Asked to identify the greatest economic challenge of the next 20 years, economic developers most often identified workforce or education. Infrastructure was the second-most common response.

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 the physical infrastructure, including transportation.

In contrast, public policy does not have much effect on most business costs. The primary exception is taxes. While the individual tax burden in Arizona is considerably below average, the tax burden for businesses is relatively high. Even after the business tax reductions that are being phased in are completed, Arizona will not compare that favorably on the business tax burden. A further reduction in business property taxes would enhance Arizona's competitiveness. However, given the state's fiscal issues and already low spending for services utilized by businesses, a reduction in business property taxes likely would be counterproductive by forcing additional spending cuts — unless the funding loss was offset by increased revenues from personal taxes.

Among other business location factors, Arizona generally is rated favorably on the regulatory environment, based on limited regulations being perceived positively. 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 base industries, the Phoenix metro area has one of the nation's largest workforces, but does not have a highly skilled workforce.[28] Its high-tech base always was narrow — aerospace and electronics — and its electronics cluster has been declining. While there are other clusters of base economic activities, such as financial services, tourism, and mining, these clusters either are not part of the innovative, knowledge economy, or are only tangentially connected. Thus, the Phoenix area does not have multiple sizable clusters of economic activities that employ highly skilled and highly paid workers.

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. The state generally compares favorably on costs, with the exception of business taxes, and on some of the less-important factors, such as business regulation and availability of land and buildings. The assessment of the quality of place often is positive, being based on perceptions and qualitative factors such as climate, but in many of the measurable factors, the state compares poorly. Limited information is available on how the state's infrastructure compares, but is may be fair to assess it as somewhat positive but at risk due to the state's finances and lack of prioritization. In contrast, Arizona compares poorly on the quality of its labor force. Despite the labor force issues, the state has grown historically due to its ability to attract better-qualified in-migrants. This dependence on outsiders is a risky strategy that likely will not work so well in the 21st century, especially among those who have specialized skills.

Arizona's fast growth, other than during recessions, through 2007 was an indication that its export base was 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 offset its weaknesses 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 base industries.

A Look at the Past and the Future

Arizona's economy after World War II was bolstered by the development of two strong high-tech clusters: aerospace and electronics. The large presence of these activities helped to offset the substantial number of activities that paid low-to-average wages. In the 1970s and early 1980s, a period of higher public-sector revenues and expenditures, Arizona's economic performance was better relative to the national average than it has been since then. Arizona was close to the

[28] This discussion of the Phoenix metro area applies to the state as a whole. The Phoenix area accounts for 75 percent of Arizona's gross domestic product and 70 percent of its employment (and a larger share of its high-wage employment).

national average on productivity and prosperity measures. High-technology activities were a larger share of overall economic activity than they are now.

Since the 1980s, the electronics cluster in Arizona has shrunk and aerospace has been largely stable. Some of the state's early success in attracting high-technology operations had little to do with the location factors that are important today. The electronics and aerospace industries were initially attracted to the state because of its climate, open spaces, and low costs, particularly for large parcels of land. As companies evolved in their requirements, many regions of the country (and elsewhere in the world) improved their economic competitiveness and economic development strategies to meet the evolving needs of modern base industries. In particular, the northeastern United States went from a long economic slump to being a premier location for high-tech companies, starting in the late 1970s. In contrast, Arizona did little to advance itself. Economic development efforts in Arizona focused on attracting cost-sensitive operations — such as mature manufacturing industries and customer-service centers — in which business costs are disproportionately important among the location factors.

Economic development efforts in Arizona have evolved substantially since 1989, when the Arizona Strategic Planning for Economic Development effort began. This likely played a role in ending the sharp decline in productivity and prosperity relative to the national average that occurred during the 1980s and early 1990s. Still, the state has not regained the ground that was lost and recently has fallen further behind the nation.

While Arizona's economic development has been modernized, the state's investments in itself — in the factors that not only will enhance its economic competitiveness but improve the quality of life of all of its residents — have continued to deteriorate. In addition to reductions in funding for education and infrastructure, updating of an outdated tax system has not occurred, and a variety of other public programs, such as all-day kindergarten, either have not been adopted or have not been adequately funded. In essence, the state has a modern economic development community using tools from a previous time, to the extent that tools are even available.

Since the 1980s, other base industries, such as financial and insurance services, have taken up some of the slack created by the stagnation or loss in the high-tech activities. While some of these activities pay above-average wages, they do not pay as well as the key base industries. Meanwhile, the growth of low-to-average-wage jobs continues, accounting for the relative decline in Arizona's productivity and prosperity over this period.

Arizona may be as competitive now as during the last two decades that featured rapid aggregate growth but somewhat subpar gains on productivity and prosperity. However, the relatively slow aggregate economic growth of recent years raises doubts as to the accuracy of that assessment. Even if the state's competitiveness has not yet declined, it is at risk of doing so due to the reduced expenditures for education and the limited funding for physical infrastructure over the last two decades.

If the state's competitiveness has declined, or soon will, then its ability to compete for higher-wage jobs will be compromised. Though Arizona's overall costs still are competitive relative to other U.S. states, much of the competition for cost-sensitive operations now comes from other

nations that have substantially lower costs. Thus, even the growth rate of lower-wage jobs may be less than in the past.

This analysis suggests that without changes, Arizona's economic future at best will be a continuation of the conditions of the last few decades: fast aggregate growth but slow declines in productivity and prosperity relative to the rest of the nation. More likely, diminishing competitiveness in the labor force and the physical infrastructure will cause the rate of decline in relative productivity and prosperity to accelerate.

If the goal is to improve job quality and raise the standard of living of Arizonans by expanding the key base industries, then action needs to be taken to improve the state's competitiveness on the most important factors that can be influenced by public policy: (1) education and workforce skills, and (2) the quality and availability of the physical infrastructure. However, according to Moretti, improving competitiveness on these factors may not be enough for the state to succeed in building clusters of the key base industries.

INDIVIDUAL COMPETITIVENESS AND LOCATION FACTORS

Individual location factors are 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 http://economist.asu.edu/p3/competitiveness. 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.
- Tourists, seasonal residents, and migrating retirees represent a type of basic 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.

Introduction to Individual Location Factors

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: cost of living, 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 have a preference for 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.

Evaluation of Arizona's Individual Competitiveness

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, Arizona experienced large employment losses during the last recession and its unemployment rate still is high, meaning that potential in-migrants are experiencing unusually high competition for jobs from those already residing in the state. Moreover, the employment growth rate since the end of the recession has been mediocre compared to the state's historical norm and only about equal to the national average. Thus, employment opportunities in Arizona currently are not a positive factor to 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. As mentioned earlier, average compensation per employee in Arizona in 2013 was 3 percent below the national average after adjustment for living costs and job quality. 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.

In the October 2013 report on individual location factors, Arizona — and its two major metropolitan areas of Phoenix and Tucson — ranked below average, and often near the bottom of the states, on quality-of-place factors other than climate. But, at least to many living outside the state, 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.

Given the large number of indicators on which the state compares poorly, it is no surprise that Arizona is rated below the average state in what the October 2013 paper described as "traditional methodologies" of best-place/quality-of-life studies. In contrast, the state ranked high on the "statistical analyses" approach to evaluating quality of place, whose results are more in line with actual migration flows. The paper gave a possible explanation for this contradiction 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, particularly those with technical skills who are paid well.

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 the 21st-century U.S. economy that is being driven by more educated and innovative individuals. 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.

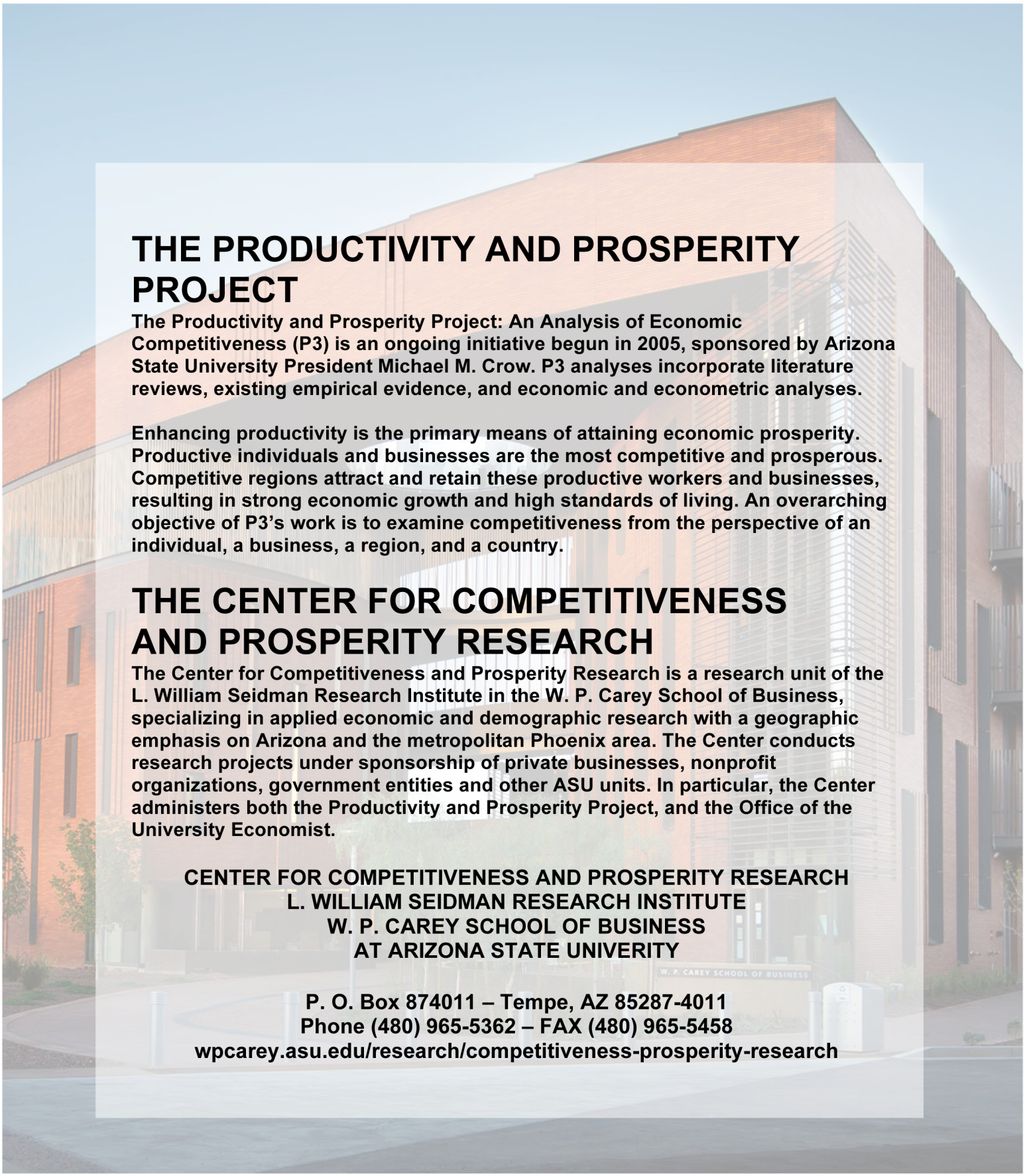
Comparison of Business and Individual Competitiveness

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. While it would be desirable in Arizona to further reduce corporate taxes, due to the revenue losses associated with reductions in individual taxes over the last 25 years this cannot be done without decreasing expenditures to public programs valued by businesses.



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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