

TAX REDUCTIONS IN ARIZONA: EFFECTS ON ECONOMIC GROWTH AND GOVERNMENT REVENUE

A Report from the Office of the University Economist

October 2016

Tom Rex, M.B.A.

Associate Director, Center for Competitiveness and Prosperity Research;
and Manager of Research Initiatives, Office of the University Economist

Center for Competitiveness and Prosperity Research
L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University
Box 874011
Tempe, Arizona 85287-4011

(480) 965-5362

FAX: (480) 965-5458

EMAIL: Tom.Rex@asu.edu

wpcarey.asu.edu/research/competitiveness-prosperity-research
economist.asu.edu



TABLE OF CONTENTS

Summary	1
Conceptual Background	3
Tax Burden and Tax Changes in Arizona	9
The Effects of Tax Changes on Economic Growth and Public Revenue in Arizona	21

LIST OF TABLES

1. Taxes Paid by Households in Phoenix in 2014	12
2. Individual Income Taxes Payable in Arizona in 2013, Married Couple Filing Jointly	12
3. Taxes Paid by Businesses in Arizona in Fiscal Year 2014	14
4. Property Taxes Payable in Phoenix In 2014	14
5. Tax Changes Implemented Since Fiscal Year 1993, Arizona State Government General Fund	18
6. Economic Growth Rates by Economic Cycle: Inflation-Adjusted Annual Average Percent Change	27

LIST OF CHARTS

1. Illustrative Laffer Curve	5
2. State and Local Government Tax Burden in Arizona as a Percentage of the National Average	10
3. Tax Burden as a Percentage of Income, State and Local Governments	11
4. Measures of Tax Burden in Arizona Since Fiscal Year 1970	16
5. Estimate of Annual Change in Ongoing Tax Revenue Due to Statutory Changes, Arizona State Government General Fund	19
6. Comparison Between Tax Changes and Economic Growth in Arizona	22
7. Per Capita and Per Employee Gross Domestic Product in Arizona as a Percentage of the National Average	24
8. Ongoing Tax Revenue Per \$1,000 of Personal Income, Arizona State Government General Fund	30

ACKNOWLEDGMENT

An earlier version of this report was prepared for the Grand Canyon Institute in February 2013: "The Effects of Tax Reductions in Arizona: Significantly Reduced Government Revenue and No Apparent Impact on Economic Growth,"

http://grandcanyoninstitute.org/sites/grandcanyoninstitute.org/files/GCI_Policy_Tax_Reductions_Feb_2013.pdf.

SUMMARY

Since the early 1990s, the Arizona Legislature has repeatedly reduced tax rates and narrowed tax bases of revenue sources used by state government — particularly of those sources providing revenue to the general fund. Even with voter-approved increases in the sales and tobacco taxes that do not benefit the general fund, the overall state and local government tax burden in Arizona relative to the national average — not just the tax burden associated with the state general fund — has dropped significantly since the early 1990s.

The tax reductions usually were passed with the justification that the cuts would be good for the economy. However, empirical evidence indicates that economic performance in Arizona has not been stronger since the tax cuts went into effect.

Average annual growth rates in Arizona relative to the national average were calculated by economic cycle for three categories of economic performance: aggregate growth (such as employment), prosperity (such as per capita personal income), and productivity (such as per employee earnings). Average annual aggregate growth in Arizona versus the U.S. average in the 2001-to-2007 cycle was within the range of the four prior cycles dating back to 1969. The average relative increase in aggregate measures in the current cycle is the lowest of the six economic cycles by a wide margin.

Prosperity and productivity gains relative to the U.S. average during the 2001-to-2007 cycle also were within the range of the four prior cycles. During the current cycle, the average relative increase in the prosperity measures is at the lower end of the historical range and productivity gains are within the historical range.

A correlation analysis indicates that the tax reductions implemented during the 1990s and 2000s followed cyclical upswings in the economy that created temporary revenue surpluses that allowed the tax reductions to be made while initially balancing the budget. Thus, the tax reductions were in response to the economic booms of the 1990s and 2000s, rather than being responsible for them.

When some of the tax cuts were passed, a contention — based on supply-side economic theory — was made that the initial loss of government revenue from the tax reduction would quickly be made up by new revenue brought in by an increase in economic activity. However, the empirical evidence indicates that general fund revenue relative to the size of the economy has been significantly lower since the tax reductions were implemented.

Without considering any dynamic — supply-side — effects to revenue, the Arizona Joint Legislative Budget Committee (JLBC) has estimated the effect on general fund revenue of every tax law change made since 1989. Adjusting those estimates for the growth of the state since each of the tax law changes was made, the tax reductions implemented since the early 1990s lowered revenue to the state government general fund by about \$4 billion in fiscal year 2016, a reduction of approximately 30 percent. The actual loss of revenue is in line with the estimates made by the JLBC.

The lack of supply-side effects from the tax reductions implemented during the 1990s and 2000s in Arizona does not invalidate supply-side theory or the “Laffer Curve.” Instead, the conditions that must be present for reductions in taxes to result in gains in economic activity and increased government revenue were not in place.

Several limitations apply to supply-side economics, especially at a subnational level:

- Most prominently, the “Laffer Curve” indicates that the benefits will occur only if the tax reduction is made to a tax rate that is higher than the revenue-maximizing rate. Reductions to lower tax rates will reduce government revenue.
- The relationship between taxes and economic growth and government revenue is much stronger for business taxes than for individual taxes.
- The reduction in one tax may not have much effect if the overall tax burden remains higher than optimal.
- State and local government taxes are a relatively small expense to businesses, and only the minority of businesses engaged in traded-sector activities can boost a region’s economic growth. Thus, only a small supply-side effect should be expected even if relatively high state and local government taxes are reduced to the revenue-maximizing rate.
- Even if all of the other conditions are met, if a state is already at full employment and has low commercial real estate vacancy rates when the tax reduction goes into effect, a *net* benefit to government finance will not be realized. If the economy is already operating at capacity, workers will need to be imported from outside the state to accommodate the increase in economic activity, meaning that government expenditures must rise to serve the new residents.

Supply-side benefits have not been realized in Arizona for several reasons:

- Even in the early 1990s when the tax reductions began, the overall state and local government tax burden in Arizona was not higher than average.
- Individual taxes have been disproportionately reduced. Even today, the business tax burden in Arizona is average compared to the national norm while the individual tax burden is very low, relative both to other states and to Arizona’s historical norm.
- The tax cuts have been accompanied by spending reductions for public programs valued by businesses, such as education and transportation. The state’s business climate has suffered due to these expenditure cuts.

Moreover, Arizona did not have an ongoing issue with underutilized resources (labor and physical space) from the early 1990s through the mid-2000s. During this period, most of the tax reductions were implemented in the midst of an economic expansion. Therefore, had any increase in economic activity resulted from the tax cuts, an increase in government expenditures would have been necessary to serve the additional labor force migrants to the state.

CONCEPTUAL BACKGROUND

Nearly any position on the relationship between state and local government taxes and economic performance is supported in the published literature. However, the bulk of the modern literature indicates that state and local government taxes have only a small effect on economic growth.

The impact is small because state and local government taxes are not that significant an expense to either households or businesses — in contrast to federal government taxes. For example, the National Bureau of Economic Research (NBER) estimates that the average marginal state individual income tax rate on wages was 3.31 percent in 2014 in Arizona, while the federal rate was 6.5 times higher at 21.61 percent.¹

Further, taxes merely represent the price paid for government services consumed, with many state and local government services — such as education, building and maintaining roads, and public safety — of high value to individuals and businesses alike.

State and local government tax burdens must be far out of line with competitor regions before much of an effect on the economy can be measured. For a state, a tax cut will have little effect on the economy unless the tax burden is comparatively quite high (especially versus competing states) and the tax reduction is very large. In general, tax policy is an inefficient way to stimulate the economy. Investments in infrastructure and education have been shown to have greater effects on economic growth.

Taxes as an Expense

Despite the attention given to taxes, state and local government tax payments are a small expense for most businesses. The *Almanac of Business and Industrial Financial Ratios* (updated annually, published by CCH Inc.) is based on information that is released by the Internal Revenue Service and derived from federal tax returns filed by businesses. It indicates that federal, state and local taxes combined — except for the federal income tax — account for only a little more than 2 percent of the operating income of the average business. Since this average includes some federal taxes, state and local government taxes are less than 2 percent of business operating income for the average business.

For perspective, the compensation of company officers is a larger expense than state and local government taxes for the average company. Therefore, the difference in effective state and local government tax rates between states would have to be very large to have a noticeable effect on a company's balance sheet.

The importance of state and local government taxes to a business depends on the nature of the business. The market area of most businesses, such as retailers and barber shops, is local, ranging from a neighborhood up to a metropolitan area. Proximity to their customers is important to such businesses. State government taxes do not have a competitive effect on these companies since their competitors are subject to the same taxes. As with other business costs, the taxes paid by

¹ The NBER uses microdata from the Internal Revenue Service to calculate the sum of the income tax liabilities owed by all taxpayers in a state in a year. They then increase income by 1 percent for each taxpayer and recalculate the tax — the 3.31 percent for the state individual income tax in Arizona in 2014 is the ratio of the additional tax to the additional income; see <http://users.nber.org/~taxsim/state-marginal/>.

these population-serving businesses are passed on to consumers in the price of the company's goods and services.

In contrast, about one-third of the economy is classified as being in the "traded sector." Traded-sector companies sell their products to customers over a large geographic area, typically operating in a national or international market. With the exception of traded-sector companies tied to a specific physical location, such as a mine, traded-sector companies are mobile. They have considerable freedom in choosing the location for their facilities. Thus, the state and local government tax burden is a location factor for most traded-sector companies, but ranks well down the list of site location factors. The most important of the factors that determine the location of a traded-sector operation are labor force issues — including cost, quality, and availability — and the availability and quality of the physical infrastructure.

To entice a company to locate in their community, many state and local governments grant tax incentives, tax credits, and tax exemptions to businesses. A rational profit-seeking business will avail itself of such opportunities, even if the magnitude of the cost savings is small. However, in site location decisions, such tax breaks can be a deciding factor only if two or more locations are viewed essentially equally on all other factors.

The Laffer Curve and Supply-Side Economics

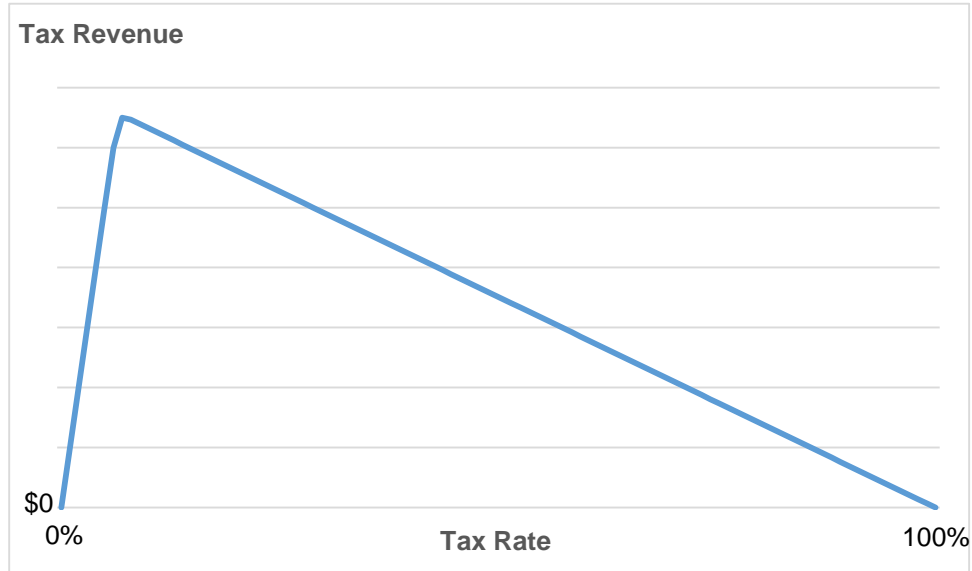
Supply-side economics is based on the concept that tax reductions stimulate economic growth, with the stimulus so great that government revenue rises despite the lower tax rates. The economist Arthur Laffer brought this relationship into the popular literature in the 1970s. Initially, his focus was national, particularly the federal income tax, which had very high tax rates in the 1970s. However, the "Laffer Curve" conceptually applies to state and local government tax rates as well. In reality, the Laffer Curve is a mathematical relationship (Rolle's Theorem), the analytical foundations of which were established centuries ago.

The concept is simple. A single tax rate produces the greatest government revenue. Setting rates below this revenue-maximizing point leaves governments with less revenue but setting rates higher than the revenue-maximizing point has a negative impact on economic activity, which results in lower tax collections despite the higher tax rate. The relationship between tax rates and revenue collected follows a curve. The exact shape of the curve is unknown and may vary over time and by place. However, the end points always are the same. A tax rate of zero results in no public revenue while a 100 percent tax rate would cause all legal economic activity to cease and therefore result in no public revenue.

An example of a Laffer Curve is shown in Chart 1. This example is based on state government corporate income tax rates. The median rate among the states is 6.5 percent; this was assumed to be the revenue-maximizing rate. The tax revenues to the left of the revenue-maximizing rate are straightforward, being directly proportional to the tax rate. The values to the right of the revenue-maximizing rate are speculative. In this example, the amount of revenue collected is assumed to decline on a steady basis as the tax rate rises from 6.5 percent to 100 percent.

While the general concept of supply-side economics and the Laffer Curve is simple and based on a mathematical relationship, it has a number of limitations:

**CHART 1
ILLUSTRATIVE LAFFER CURVE**



Source: Author's illustration.

- In real-world application, it is impossible to identify the tax rate that constitutes the revenue-maximizing point and to describe the exact shape of the Laffer Curve.
- The relationship may not hold when considering the effective rate of one type of tax. For example, if a region's overall tax burden is relatively high, lowering the effective tax rate on one type of tax from higher than to the revenue-maximizing rate may not generate much of an economic effect if the overall tax burden remains relatively high.
- The relationship between taxes and economic growth/government revenues is much stronger for business taxes than for individual taxes.
- Since state and local government tax payments are small relative to federal tax payments and to other expenses, a decrease in a state or local tax rate that is higher than the revenue-maximizing rate will have a relatively small supply-side effect. For example, Arizona's maximum personal income tax rate is 4.54 percent. Nationally, the top rate is 39.6 percent. The federal rate was as high as 90 percent in the 1960s.
- If a regional economy is at full capacity (low unemployment rate and low business and industrial building vacancy rates), then a boost to the economy from a reduction in taxes will not have a *net* positive effect on government finances. To accommodate the increase in economic growth, more people will have to move to the region to fill the new jobs created. Thus, while government revenues may increase, public expenditures will increase as well in order to serve the new residents and businesses.

The Laffer Curve demonstrates that when an effective tax rate is higher than the revenue-maximizing rate, a tax reduction can result in increased government revenue. If an effective tax rate is at or less than the revenue-maximizing rate, however, a tax reduction will result in a decrease in government revenue. This distinction has been lost in many discussions of taxation.

Some proponents of limited government erroneously argue that tax rates are always higher than optimal and that reduced taxation always is beneficial.

Apart from the Laffer Curve, some proponents of tax cuts argue that any income tax cut will reduce the disincentive of an individual to work, thereby boosting productivity and economic growth. While this argument may be valid if the federal income tax rate is very high, it is difficult to imagine that there is a disincentive to work caused by state income tax rates that typically are substantially less than 10 percent.

Application to State and Local Economies

States compete for traded-sector economic activity that is mobile. Capital and labor can move easily throughout the country. Under these conditions, the revenue-maximizing rate for state and local government taxes might be considered to be the average among the states. If the rate is higher than average, a state could lose traded-sector economic activities to other states. If the rate is lower than average, any additional economic activity gained will not offset the lower tax collections from all existing individuals and/or businesses subject to the tax.

While tax rates may influence capital and labor mobility across the states and give rise to Laffer-type effects, capital and labor move for a host of reasons. The amount and quality of public infrastructure (such as airports, roads, and schools) available in a region — amenities supported by state and local government tax revenue — are among the factors strongly influencing economic growth. So, an alternative definition of the optimal tax rate in a state is the rate that allows sufficient investment in public amenities that foster economic growth without imposing tax burdens that negatively affect the economy.

For a state or local government tax reduction to result in much of a positive effect on economic growth and government revenue, the prior tax rate must have been very high and the new tax burden must be near the revenue-maximizing point. A much greater economic impact is likely from a reduction in business taxes meeting these criteria than in a reduction in personal taxes. One business decision (for example, in site selection) can affect many workers but few individuals would decide to start a traded-sector business that would employ many workers based on a reduction in individual taxes. Instead, a tax reduction to individuals primarily results in an increase in consumer spending, whose positive effect on the local economy is negated by the offsetting reduction in government expenditures.

Further, for a net positive effect to accrue to government finance from a state or local government tax cut, the state must have underutilized resources. For example, if a state with relatively high tax rates also has high unemployment and high commercial and industrial vacancy rates, then a reduction in taxes to near the revenue-maximizing point might stimulate economic growth, putting more residents to work and more highly utilizing existing facilities. Since labor to support the faster economic growth would not have to be imported to the state, population growth would not accelerate. Thus, the increase in government revenue would not be offset by the need to increase public spending to support new residents. The need for government expenditures would fall as unemployed people find jobs and stop using public welfare programs.

The argument that reducing income taxes will boost economic growth by encouraging individuals to work more has little, if any, application in Arizona, which has a maximum personal income tax rate of 4.54 percent. With the state's already low income tax burdens and the likelihood of no workforce participation effects, further income tax cuts will invariably erode revenues. The loss of revenue will force reductions in public spending to be made. With income tax revenues largely deposited to the state general fund and with public education receiving half of the appropriations from the general fund, it would be difficult not to reduce spending on education, which has a positive effect on productivity, to balance the general fund. Thus, attempts to increase productivity through tax cuts would be counterproductive if the loss of revenue leads to reductions in the effort to develop requisite workforce skills.

Value of Public Services

Over time, some supply-side supporters have moved to a position that any tax cut is good for the economy and enhances public revenue — which violates the Laffer Curve. Moreover, the idea that lower taxes always are better ignores the purpose of taxation.

Taxes are the price paid for a service that is publicly provided. Particularly at the state and local level, many government services directly impact residents and businesses: road building and maintenance, police and fire protection, the judicial system, the correctional system, water provision and sewer services, collection of trash, the educational system, etc. Many public services — particularly education (prekindergarten through graduate school) and the physical infrastructure — are of key importance to traded-sector companies. For these types of companies, the provision of public services is more important than the level of taxes. Thus, business climate benefits from investment in various public programs.

Empirical evidence exists that public infrastructure plays a role in increasing business investment, job creation, and economic growth. Similarly, tax reductions financed by cutting education, infrastructure spending, and other services valued by businesses likely will have a negative effect on economic performance.

One argument sometimes used to justify tax reductions is that taxes remove money from the economy. In reality, tax revenue is spent in much the same way as revenue received by a company: paying employees, purchasing materials from the private sector, etc. On average, a higher portion of public-sector spending is for personnel while private-sector firms spend a higher portion of their revenue on raw materials and manufactured goods, much of which must be purchased from outside the region. Because of this, public-sector expenditures stay within the state's economy to a greater extent than private-sector expenditures. In other words, the in-state multiplier effect is higher for public-sector spending than for private-sector spending.

Studies of the Effects of Taxes on Economic Growth

A recent report on income taxes from the Office of the University Economist included a section summarizing the literature on the relationship between taxes and economic growth.² That review

² Tim Hogan, "Arizona's Income Taxes: A Comparison With Other States and a Policy Discussion of Potential Tax Reforms," July 2016, starting on page 36, <https://wpcarey.asu.edu/sites/default/files/incometax07-16.pdf>.

noted the lack of consensus across studies and noted that some of the studies have been done by advocacy groups and think tanks that have a particular position on the issue.

The approaches and methodology used in the studies vary greatly. Those studies finding a negative effect of taxes on economic growth often did not adequately address methodological issues, and/or did not adequately consider other factors that affect economic performance, and/or did not explicitly consider the benefits that result from public spending. Even if otherwise sound, those studies finding a negative relationship between taxes and economic performance that did not consider the benefits from public services need to be interpreted not as simply “high taxes decrease economic growth” but rather as “high taxes decrease economic growth, holding public services constant.” However, given the balanced-budget requirement faced by state and local governments, it is virtually impossible to lower taxes without reducing public services. Even in the situation where a relatively high tax burden is significantly lowered, the boost in revenue resulting from enhanced economic growth takes years to be fully realized.

Another limitation of the studies is that they have not adequately considered the conditions under which supply-side economics operates, such as not distinguishing between a tax reduction made in a state with a relatively low tax burden from one made in a state with a relatively high tax burden. Thus, it is no surprise that academic studies that do not differentiate between these factors have inconsistent and often inconclusive results.

TAX BURDEN AND TAX CHANGES IN ARIZONA

This section begins with a review of the tax burden in Arizona relative to the national average, currently and over time. Then, a detailed review of the state government changes in tax policy in Arizona since the 1970s is presented.

Tax Burden in Arizona

Numerous comparisons of the tax burden by state are available, but many of the studies are incomplete or otherwise unreliable. Most studies look at the total tax burden paid by individuals and businesses combined, but a few studies focus on either individual tax burdens or business tax burdens.

Total Tax Burden

The latest state and local government finance data from the U.S. Census Bureau are for fiscal year 2013 and include Arizona's temporary sales tax rate increase that was in effect from June 2010 through May 2013. State and local government taxes per \$1,000 of personal income were 10.1 percent less than the U.S. average in Arizona, ranking 14th lowest among the 50 states and the District of Columbia and third lowest among 10 western states.³ On a per capita basis, Arizona was eighth lowest nationally and second lowest among the 10 western states at 25.6 percent below average.⁴

The historical record of the Census Bureau's state and local government tax data is shown in Chart 2, with the Arizona figures expressed as a percentage of the national average on each of two measures: per capita and per \$1,000 of personal income. Prior to 1980, Arizona's tax burden was near the national average on a per capita basis and generally above average relative to personal income. On each of these measures, Arizona's tax burden relative to the national average has declined significantly since then, with the bulk of the decline occurring after the early 1990s.

The Tax Foundation provides a comparison of total state and local government taxes by state from 1977 through 2012 using a methodology different from that of the Census Bureau.⁵ The tax measure and the income measure used by the Tax Foundation differ from those used by the Census Bureau. In 2012, including Arizona's temporary sales tax, the total amount of taxes collected in Arizona was 8.9 percent of per capita income, 10 percent less than the national average of 9.9 percent. Arizona's figure was 15th lowest among the 50 states. Three of the western states had a lower figure: Texas, Nevada, and New Mexico.

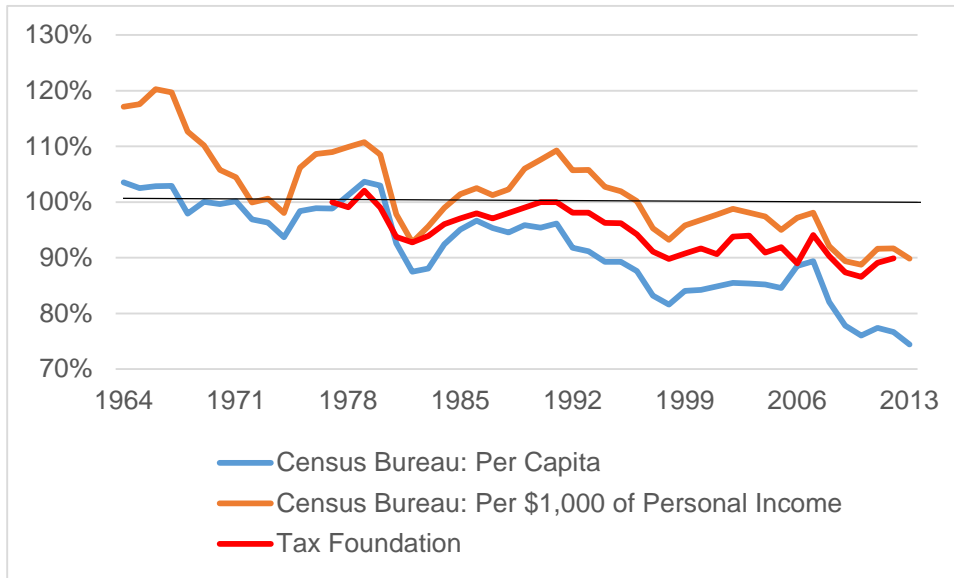
As seen in Chart 2, Arizona's tax burden as a percentage of the national average as measured by the Tax Foundation declines over time similarly to the Census Bureau's data relative to personal

³ The 10 western states are Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Texas, Utah, and Washington.

⁴ The large difference between the per capita and per \$1,000 of personal income measures is due to the very low per capita personal income in Arizona. In 2013, per capita personal income in Arizona was 17 percent below the U.S. average, ranking 42nd nationally and seventh among 10 western states. After adjusting for the cost of living, per capita personal income in Arizona was 15 percent below the U.S. average, ranking 49th nationally and eighth among 10 western states.

⁵ Tax Foundation, *State-Local Tax Burden Rankings*, January 2016, <http://taxfoundation.org/article/state-local-tax-burden-rankings-fy-2012>.

CHART 2
STATE AND LOCAL GOVERNMENT TAX BURDEN IN ARIZONA
AS A PERCENTAGE OF THE NATIONAL AVERAGE



Sources: Tax Foundation, State-Local Tax Burden Rankings, <http://taxfoundation.org/article/state-local-tax-burden-rankings-fy-2012> and U.S. Department of Commerce, Census Bureau. The personal income data used to adjust the Census Bureau’s tax data are from the U.S. Department of Commerce, Bureau of Economic Analysis.

income. However, Arizona’s tax burden relative to the national average is lower based on the Tax Foundation’s data.

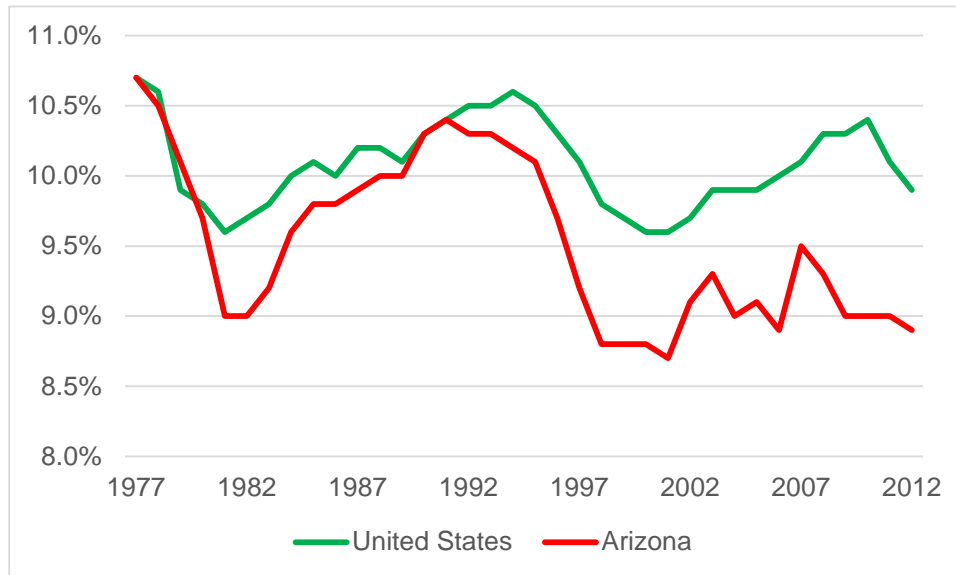
A closer look at the historical comparison of Arizona to the nation is shown in Chart 3 using the Tax Foundation’s data. Arizona’s tax burden was similar to the national average in the late 1970s and again in the late 1980s and early 1990s but otherwise has been below average. It was lowest relative to the nation in 2010 (13.5 percent below average) — before the implementation of the temporary sales tax increase.

Individual Tax Burden

A study of state and local government taxes paid by individuals is produced by the government of the District of Columbia.⁶ For a hypothetical family of three living in the largest city in each state and the District of Columbia, the amount of state and local government taxes paid are calculated based on the applicable tax laws for four types of taxes — which together account for a very high share of total tax revenue — at each of five income levels, ranging from \$25,000 to \$150,000. The latest data are for 2014.

⁶ Government of the District of Columbia, *Tax Rates and Tax Burdens in the District of Columbia — A Nationwide Comparison*, 2014, December 2015, <http://cfo.dc.gov/node/215912>. While this study has been produced annually for a number of years, changes in methodology preclude viewing the results as a time series.

**CHART 3
TAX BURDEN AS A PERCENTAGE OF INCOME,
STATE AND LOCAL GOVERNMENTS**



Source: Tax Foundation, State-Local Tax Burden Rankings, <http://taxfoundation.org/article/state-local-tax-burden-rankings-fy-2012>.

Relative to the median of the 51 cities, total tax payments in Phoenix ranged from 13-to-15 percent lower at household income levels of at least \$100,000 to slightly higher at the lowest income level (see Table 1). The tax structure in Phoenix was more regressive than that of the median city. A study by the Institute on Taxation & Economic Policy indicates that the tax system in Arizona was the eighth-most regressive among the states.⁷

Individual income tax payments in Phoenix were less than half of the median of the cities at incomes of \$50,000 or more. Property tax payments were slightly above average except at the lowest income level. The amount of sales tax paid was very high in Phoenix.

Individual income taxes are examined in more detail in a study done by the Minnesota Center for Fiscal Excellence.⁸ Forty-one states and the District of Columbia, including seven of 10 western states, levy an individual income tax. The Arizona figures for a married couple filing jointly are shown in Table 2; the results are similar for a senior married couple filing jointly, a head of household, a single person, and for a senior single filer. The results from this study are in line with those from the District of Columbia study, showing that individual income taxes in Arizona were very low from a national perspective at incomes of \$50,000 and more. The income tax is

⁷ Institute on Taxation & Economic Policy, *Who Pays? A Distributional Analysis of the Tax Systems in All 50 States*, January 2015, <http://www.itep.org/whopays/>.

⁸ Minnesota Center for Fiscal Excellence, *Comparison of Individual Income Tax Burdens by State, 2015 Edition*, October 2015, <https://www.fiscalexcellence.org/our-studies/income-tax-burden-study-2015edition-final.pdf>.

**TABLE 1
TAXES PAID BY HOUSEHOLDS IN PHOENIX IN 2014**

Tax Payment as a Percentage of the Median of 51 Cities and Rank Among 51 Cities Nationwide/10 Cities in Western States*

Household Income	Income Tax		Property Tax		Sales Tax		Automotive Taxes		Total	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
\$25,000	-% [^]	18/3	94.8%	31/8	131.6%	12/2	101.8%	25/5	103.0%	24/4
\$50,000	45.5	38/6	111.1	21/4	132.6	12/2	105.1	21/4	94.8	30/4
\$75,000	44.0	39/6	110.9	22/4	133.5	11/2	130.2	14/2	90.9	34/5
\$100,000	46.1	39/6	108.6	22/4	131.8	12/2	113.7	16/3	85.2	37/6
\$150,000	48.4	39/7	100.6	25/6	135.8	10/1	185.4	12/2	86.6	37/6

* A rank of 1 indicates the highest tax payments.

[^] The median is zero.

Source: Government of the District of Columbia, *Tax Rates and Tax Burdens in the District of Columbia — A Nationwide Comparison, 2014*, December 2015, <http://cfo.dc.gov/node/215912>.

**TABLE 2
INDIVIDUAL INCOME TAXES PAYABLE IN ARIZONA IN 2013,
MARRIED COUPLE FILING JOINTLY**

Income	Tax Due	Tax as Percent of U.S. Average	National Rank*	West Rank**	Tax as Percent of Income
\$20,000	\$-100	***	23	4	-0.50%
\$35,000	357	101.1%	21	3	1.02
\$50,000	762	56.1	36	5	1.52
\$75,000	1,329	55.0	39	6	1.77
\$100,000	2,055	55.6	40	7	2.06
\$150,000	3,400	54.7	41	7	2.27
\$250,000	6,836	59.1	41	7	2.73
\$500,000	17,888	69.6	39	7	3.58
\$1,000,000	35,358	63.3	39	7	3.54

* Among 42 states that levy the tax, where a rank of 1 indicates the highest tax payments.

** Among seven western states that levy the tax, where a rank of 1 indicates the highest tax payments.

*** The U.S. average also is negative.

Source: Minnesota Center for Fiscal Excellence, *Comparison of Individual Income Tax Burdens by State, 2015 Edition*, October 2015, <https://www.fiscalexcellence.org/our-studies/income-tax-burden-study-2015edition-final.pdf>.

progressive, with the amount due as a percentage of income rising with income. This partially offsets the regressive nature of the sales tax.

Property taxes are examined in more detail in a study done by the Minnesota Center for Fiscal Excellence and the Lincoln Institute of Land Policy.⁹ Residential property taxes — for apartments and for residences of various values — were considerably below average in Phoenix (see Table 3). This is inconsistent with the results of the District of Columbia tax study. Even within a city, the property tax varies with the boundaries of school districts and special districts.

Business Tax Burden

All taxes paid by businesses are included in a study produced by Ernst & Young for the Council on State Taxation.¹⁰ The study identifies six categories of business taxes: property, sales, excise (such as the motor fuel tax), income (corporate income tax plus the individual income tax when used for pass-through income by S corps), unemployment insurance, and license and other taxes (such as severance taxes). The amount of taxes paid by businesses during fiscal year 2014 was determined through a combination of detailed data collection and modeling. To compare states, the total amount of business taxes paid is expressed as a percentage of private-sector gross domestic product.

As seen in Table 4, the overall business tax burden in Arizona in FY 2014 was a little higher than the national average, in contrast to the lower-than-average individual tax burden (at income levels of \$50,000 and higher). Property and sales taxes paid by businesses were far higher than the national average, while the tax burden for each of the other business tax categories was substantially below average. As already-passed business tax cuts (mostly to the corporate income tax) continue to phase in over the next few years, Arizona's position relative to the rest of the country should improve somewhat.

This study done by the Minnesota Center for Fiscal Excellence and the Lincoln Institute of Land Policy provides more detail on business property taxes, indicating that the tax burden of commercial and industrial property taxes in Phoenix relative to other large cities varies with the value of the property (see Table 3). Commercial property taxes were only slightly above average at low values but further above average at high values. Industrial property taxes ranged from below average at low values to substantially above average at high values.

The Ernst & Young study indicates that the business share of state and local government taxes in Arizona was above the national average in FY 2014. This results more from the low tax burden on individuals than the slightly high burden on businesses. The business share of local taxes was considerably above the national average but the business share of state taxes was only a little above average.

⁹ Minnesota Center for Fiscal Excellence and the Lincoln Institute of Land Policy, *50-State Property Tax Comparison Study*, April 2015, https://www.lincolinst.edu/pubs/dl/3550_2891_Pay_2014_PT_Report.pdf.

¹⁰ Ernst & Young, *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2014*, October 2015, <http://www.cost.org/WorkArea/DownloadAsset.aspx?id=91531>. This study has been done annually for about a decade.

**TABLE-3
PROPERTY TAXES PAYABLE IN PHOENIX IN 2014**

Category and Value	Ratio to National Average	National Rank*	West Rank**
Commercial, \$100,000	102.2%	26	4
Commercial, \$1 Million	106.4	24	4
Commercial, \$25 Million	120.7	18	1
Industrial, \$100,000, 50% Personal Property	86.0	31	4
Industrial, \$1 Million, 50% Personal Property	126.3	13	2
Industrial, \$25 Million, 50% Personal Property	137.7	10	2
Apartment, \$600,000	60.6	44	6
Residence, \$150,000	73.4	36	6
Residence, \$300,000	70.3	39	7
Residence, Median Value	71.6	37	6

* Among 53 large cities nationwide, where a rank of 1 indicates the highest tax payments.

** Among 10 large cities in western states, where a rank of 1 indicates the highest tax payments.

Source: Minnesota Center for Fiscal Excellence and the Lincoln Institute of Land Policy, *50-State Property Tax Comparison Study*, April 2015, https://www.lincolninst.edu/pubs/dl/3550_2891_Pay_2014_PT_Report.pdf.

**TABLE 4
TAXES PAID BY BUSINESSES IN ARIZONA IN FISCAL YEAR 2014**

Tax	Share of Business Taxes		Business Taxes as a Share of Private-Sector Gross Domestic Product		
	United States	Arizona	Ratio To U.S. Average	National Rank*	West Rank**
TOTAL	100%	100%	105%	19	1
Property	36	43	122	13	1
Sales	21	32	163	8	4
Income	14	8	56	45	8
Excise	12	9	80	38	8
License/Other	9	4	47	47	10
Unemployment Insurance	7	3	50	48	10

* Rank among 51 states, where a rank of 1 indicates the highest tax payments.

** Rank among 10 western states, where a rank of 1 indicates the highest tax payments.

Source: Ernst & Young, *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2014*, October 2015, <http://www.cost.org/WorkArea/DownloadAsset.aspx?id=91531>.

In addition, the Ernst & Young study looks at the issue of the amount of business taxes paid versus the benefits businesses receive from state and local government services. A number of assumptions must be made in pursuing such an analysis. Ernst & Young conclude that business taxes nationally are high relative to the services received, with Arizona similar to the national average in the extent to which the business tax burden exceeds the value of the public services received.

Tax Changes in Arizona

This subsection concentrates on changes in state government tax policy since the 1970s but data also are provided for combined state and local government taxes. Four measures of Arizona taxes are examined in this subsection:

- State government general fund tax revenue reported by Arizona's Joint Legislative Budget Committee (JLBC) for fiscal years (FYs) 1971 through 2016, expressed per \$1,000 of personal income. The fiscal year runs from July 1 through June 30.
- Beginning in FY 1989, the JLBC has estimated the revenue impact to the state government general fund of every state government tax law change, expressed in unadjusted dollars.
- Total state and local government tax revenue reported by the U.S. Census Bureau for fiscal years 1964 through 2013, expressed per \$1,000 of personal income. The figures for Arizona can be compared to the national average and to other states.
- The Tax Foundation's tax burden measure, which is based on alternative measures of state and local government taxes paid and per capita income, available for fiscal years 1977 through 2012. Arizona can be compared to the nation and to other states.

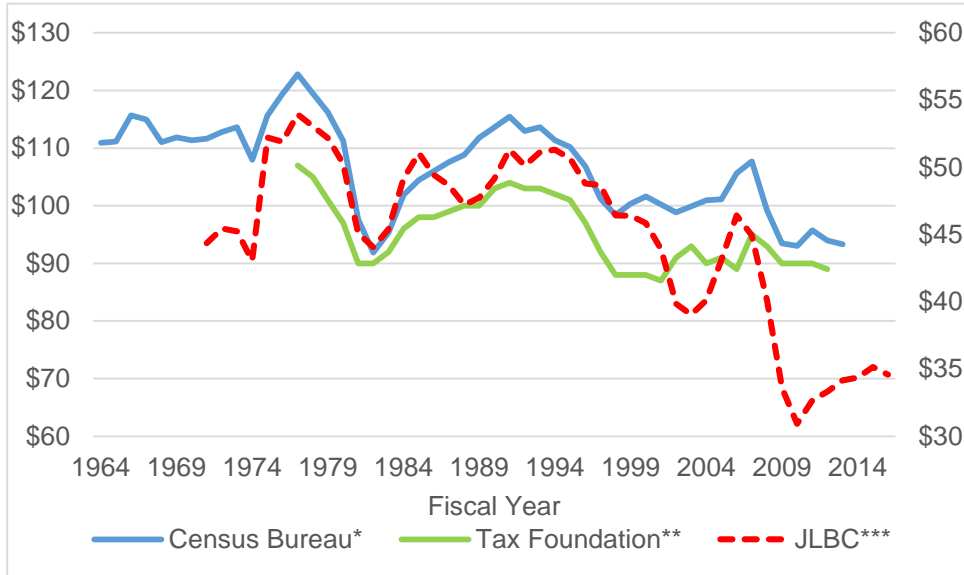
All of the measures express the tax changes as of the year(s) in which they become effective. Since changes in tax laws often have been delayed and/or phased in, the date at which the changes have been passed by the Legislature is less important than the time at which they become effective. (For example, tax reductions passed by the Legislature in early 2011 did not begin to phase in until FY 2014 and are not complete until FY 2019.)

The first, third and fourth measures, each of which are based on total tax revenue, are displayed in Chart 4. Each of these data series display fluctuations over time, due to both the economic cycle and to tax law changes. Total state and local government taxes relative to personal income have declined over time according to the Census Bureau's data and the Tax Foundation's time series, particularly during the mid-to-late-1990s. The more narrow JLBC series is limited to the state's general fund; it displays considerably more cyclicity, and has dropped more substantially, than the other two measures since the early 1990s. Most of the tax reductions in Arizona since the early 1990s have affected the state's general fund. These tax cuts have been partially offset by increases in local government taxes and voter-approved state tax increases whose revenue does not go to the general fund.

Chronology of Changes to Tax Policy

Sparked by a movement to reduce state and local government taxes (especially property taxes) that had begun in California, tax reductions to the property and sales taxes were implemented from FYs 1979 through 1981 in Arizona. They were possible because of strong economic growth during the late 1970s. Lower property taxes were implemented in fiscal years 1979 and 1980.

**CHART 4
MEASURES OF TAX BURDEN IN ARIZONA SINCE FISCAL YEAR 1970**



* The Census Bureau value (use the left scale) is for state and local governments, expressed as tax revenue per \$1,000 of personal income.

** The Tax Foundation value (use the left scale) is for state and local governments, expressed as an alternative measure of taxes paid per \$1,000 of an alternative measure of income. It is multiplied by 1,000 to put it on the same scale as the Census Bureau data.

*** The JLBC value (use the right scale) is limited to the state government general fund, expressed as tax revenue per \$1,000 of personal income.

Sources: Calculated from the Tax Foundation, Arizona Joint Legislative Budget Committee, and U.S. Department of Commerce, Census Bureau. The personal income data used to adjust the tax data from the JLBC and the Census Bureau are from the U.S. Department of Commerce, Bureau of Economic Analysis.

Effective in FY 1981, the sales tax on food to be consumed at home was eliminated. Due to these tax cuts and a weak economy, tax revenues fell sharply through FY 1982, as seen in all three measures displayed in Chart 4. In order to balance the budget, the Legislature increased the general sales tax rate, effective in FY 1984.

After this tax increase, the tax burden in the mid-to-late 1980s still was less than in the 1960s and 1970s. Based on the Tax Foundation’s measure, Arizona’s tax burden fell from more than 10 percent (\$100 per \$1,000 of personal income in Chart 4) and about equal to the national average in the late 1970s to 8.5 percent and below average in the early 1980s. In the mid-1980s, the tax burden rose to 9.5 percent, slightly less than the U.S. average.

Arizona’s economy slowed significantly during the late 1980s, lowering tax collections to the state’s general fund and revealing a structural deficit. The Legislature responded by both reducing spending and increasing revenue. Tax increases were implemented in Arizona from fiscal years 1989 through 1992, though predominantly from FYs 1989 through 1991.

According to the JLBC, the tax increases between FYs 1989 and 1992 summed to \$449 million (in nominal terms). A variety of taxes were increased, with the individual income tax accounting for half of the total. Adjusting for the state's population growth, real per capita economic growth, and inflation, the tax increases are estimated to have raised tax revenues by \$493 million in FY 1992. According to the Tax Foundation, the tax burden rose during this period to 10.4 percent — less than the peak in FY 1977. Since tax increases occurred in many other states from FYs 1990 through 1992, Arizona's tax burden did not exceed the national average.

Reductions in taxes began to be implemented in Arizona in fiscal year 1993 but the tax cuts were insignificant until FY 1995 (see Table 5). Substantial tax decreases were implemented from FYs 1995 through 2001. According to the JLBC, the tax reductions from FYs 1993 through 2001 totaled \$1.2 billion (in nominal terms). Chart 5 compares the magnitude of the tax changes in nominal terms to the magnitude after adjustment for personal income, which reflects the state's population growth, real per capita economic growth, and inflation. After the adjustment, the tax increases in FYs 1989 through 1992 were more than offset by FY 1998. Revenues in FY 2001 are estimated to have been \$1.57 billion lower than they would have been had no tax reductions been made.

While a variety of taxes were reduced from FYs 1993 through 2001, half of the total impact came from individual income tax reductions. Reductions in the corporate income tax were slow to be made — it was not until FY 2001 that the corporate income tax increases from FYs 1989 through 1991 were offset.

The Tax Foundation's tax burden measure fell considerably between 1993 and 2001, dropping from 10.3 percent (0.2 percentage points less than the U.S. average) to 8.7 percent (0.9 percentage points less than the U.S. average). The Census Bureau's data reveal a similar reduction in the tax burden. Due to the narrowing of the tax base used for the state's general fund and due to the high cyclical nature of the increasingly predominant tax sources (sales tax and income tax), tax revenues to the state's general fund began to swing wildly with the economic cycle, dropping sharply during recessions.

Changes in tax policy implemented from FYs 2002 through 2006 were minor. Despite this, the effect of the cumulative tax cuts since FY 1993 had grown to \$2.24 billion in FY 2006 after adjusting for the state's population growth, real per capita economic growth, and inflation. Each data series shows an increase in tax revenues from FYs 2003 through 2007, but these increases were due to cyclical factors. In particular, the real estate boom led to a surge in capital gains.

Significant additional tax reductions occurred in FYs 2007 and 2008, with much lesser reductions implemented in FYs 2009 and 2010. According to the JLBC, the tax reductions over these four years summed to \$483 million (in nominal dollars). The cumulative impact of the tax cuts from FYs 1993 through 2010 reached \$2.86 billion in FY 2010. According to the Tax Foundation, Arizona's tax burden reached a record 1.4 percentage points below the national average in FY 2010.

Because of the temporary nature of the sales tax rate increase passed by voters in May 2010, it is not included in Chart 5. However, the temporary revenue was recorded by the Census Bureau

TABLE 5
TAX CHANGES IMPLEMENTED SINCE FISCAL YEAR 1993, ARIZONA STATE GOVERNMENT GENERAL FUND

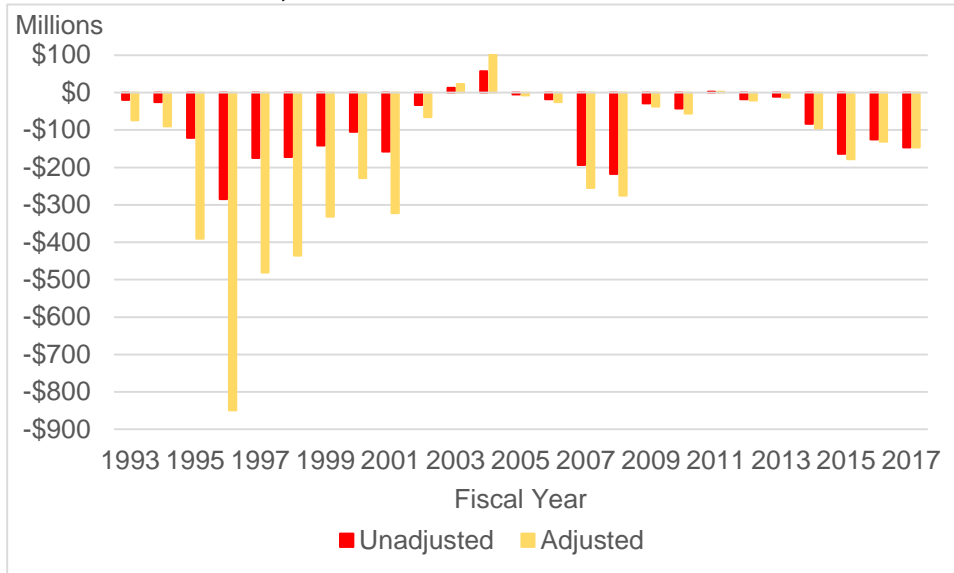
Fiscal Year	Personal Income (in millions)	Tax Change (in millions)	Tax Change per \$1,000 of Personal Income	Cumulative Tax Change per \$1,000 of Personal Income	Cumulative Tax Change (in millions)*	Actual Tax Revenue		Tax Revenue Without Tax Changes	
						In Millions	Per \$1,000 of Personal Income	In Millions	Per \$1,000 of Personal Income
1993	\$73,679	\$-19	\$-0.26	\$-0.26	\$-19	\$3,767	\$51.12	\$3,786	\$51.38
1994	79,686	-25	-0.32	-0.58	-46	4,089	51.32	4,136	51.90
1995	87,715	-121	-1.38	-1.96	-172	4,441	50.63	4,613	52.59
1996	95,154	-285	-2.99	-4.95	-471	4,644	48.81	5,115	53.76
1997	102,994	-175	-1.69	-6.64	-684	5,014	48.68	5,698	55.33
1998	112,355	-172	-1.53	-8.18	-919	5,223	46.49	6,142	54.66
1999	121,207	-142	-1.17	-9.35	-1,133	5,659	46.69	6,792	56.04
2000	129,901	-105	-0.81	-10.15	-1,319	6,016	46.32	7,335	56.47
2001	138,932	-158	-1.14	-11.29	-1,568	6,192	44.57	7,761	55.86
2002	143,558	-33	-0.23	-11.52	-1,654	5,813	40.49	7,467	52.01
2003	150,172	12	0.08	-11.44	-1,718	5,941	39.56	7,659	51.00
2004	161,791	57	0.35	-11.08	-1,793	6,550	40.49	8,344	51.57
2005	178,307	-5	-0.03	-11.11	-1,981	7,743	43.42	9,724	54.54
2006	199,777	-18	-0.09	-11.20	-2,238	9,315	46.63	11,553	57.83
2007	215,694	-194	-0.90	-12.10	-2,610	9,737	45.14	12,347	57.24
2008	224,170	-218	-0.97	-13.07	-2,930	9,059	40.41	11,989	53.48
2009	218,531	-29	-0.13	-13.20	-2,885	7,406	33.89	10,291	47.09
2010	213,109	-42	-0.20	-13.40	-2,856	6,690	31.39	9,546	44.79
2011	220,766	2	0.01	-13.39	-2,956	7,364	33.36	10,320	46.75
2012	230,628	-18	-0.08	-13.47	-3,106	7,850	34.04	10,956	47.50
2013	239,337	-12	-0.05	-13.51	-3,234	8,296	34.66	11,531	48.18
2014	248,454	-84	-0.34	-13.85	-3,441	8,561	34.46	12,002	48.31
2015	261,768	-164	-0.63	-14.48	-3,790	9,167	35.02	12,957	49.50
2016	271,959	-126	-0.46	-14.94	-4,063	9,448	34.74	13,511	49.68
2017**	283,885	-146	-0.52	-15.45	-4,387				

* Calculated as the cumulative tax change relative to personal income multiplied by personal income.

** Personal income for FY 2017 is projected.

Sources: Arizona Joint Legislative Budget Committee (tax change and actual revenue) and U.S. Department of Commerce, Bureau of Economic Analysis (personal income).

CHART 5
ESTIMATE OF ANNUAL CHANGE IN ONGOING TAX REVENUE DUE TO STATUTORY CHANGES, ARIZONA STATE GOVERNMENT GENERAL FUND



Notes:

- Revenue from the temporary sales tax increase in FYs 2011 through 2013 is not included.
- The adjusted figures reflect inflation, population growth, and real per capita economic growth.

Sources: Arizona Joint Legislative Budget Committee, *2016 Tax Handbook*, September 2016, Appendix D, <http://www.azleg.gov/jlbc/16taxbook/16taxbk.pdf> (unadjusted estimates). The adjusted figures were calculated using personal income, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis, <http://bea.gov/regional/index.htm>.

and Tax Foundation. The tax collections from the temporary tax increase totaled \$865 million in FY 2011, \$916 million in FY 2012, and \$962 million in FY 2013.

Limited tax law changes were implemented during FYs 2011 through 2013. However, significant tax law changes were passed by the Arizona Legislature during this period. Statutory changes made during the second special legislative session of 2011 are phased in from FYs 2012 through 2018, with most of the effects occurring from FYs 2015 through 2018. Of the estimated reduction in tax revenue of more than \$400 million, 97 percent applies to the corporate income tax, with the remainder to the individual income tax. In calendar year 2012, the Legislature passed a package of tax reductions totaling a little more than \$100 million that phase in between FYs 2014 and 2019. A little more than one-third of these reductions affect the corporate income tax, with the remainder applied to the individual income tax.

Taking all of the tax changes since FY 1992 into account and adjusting the nominal figures to reflect conditions in FY 2016, general fund revenue was approximately \$4.06 billion less in FY 2016 than it would have been had no tax changes been implemented. The figure reaches \$4.39 billion in FY 2017. Even if no further tax reductions are passed in the next few legislative sessions, the total revenue loss from the tax cuts already passed will continue to increase as the phase-in of tax reductions continues.

Of the \$4.39 billion in lost general fund revenue in FY 2017 resulting from tax changes passed since the early 1990s, more than half (\$2.27 billion) came from the individual income tax, through rate reductions, new tax credits, etc. Revenue from the corporate income tax was cut \$754 million, while revenue reductions totaled \$575 million from the sales tax and \$487 million from the property tax. Changes to other taxes reduced general fund revenue by \$303 million.

In FY 2016, the general fund's loss of revenue from the tax law changes was \$4.06 billion. In contrast, voter-approved tax increases boosted revenue to other funds by \$932 million in FY 2016. Thus, the net loss to state government from tax changes implemented since the early 1990s was \$3.13 billion in FY 2016. Other funds benefited from four increases in the tobacco tax passed by voters between 1994 and 2006, with revenue totaling \$287 million in FY 2016. The additional revenue from these tobacco tax increases primarily is directed to health programs and to early childhood development. In addition, a 0.6 increase in the sales tax rate was passed by voters in 2000 to benefit education, which raised \$645 million in FY 2016.¹¹

¹¹ Voters approved Proposition 301 in November 2000, raising the general sales tax rate from 5.0 percent to 5.6 percent from July 2001 through June 2021. Most of this revenue goes to elementary and secondary education, with lesser amounts directed to the School Facilities Board and higher education.

THE EFFECTS OF TAX CHANGES ON ECONOMIC GROWTH AND PUBLIC REVENUE IN ARIZONA

All four of the measures of Arizona taxes (see the bullet points on page 15) indicate that significant reductions in Arizona's tax burden have been implemented since FY 1993. The question is whether these tax reductions stimulated economic growth and thereby boosted government revenues. The effects of earlier tax law changes also are examined in this section.

Tax Changes and Economic Growth

A chronological discussion of economic performance and tax changes is presented first in this subsection. Then, the empirical relationship between changes in tax laws and economic performance is examined in two ways:

- Correlations between the tax changes, as estimated by the JLBC, and economic growth are examined.
- Annual average economic growth by economic cycle is examined for the last six economic cycles, going back to 1969.

Chronological Record

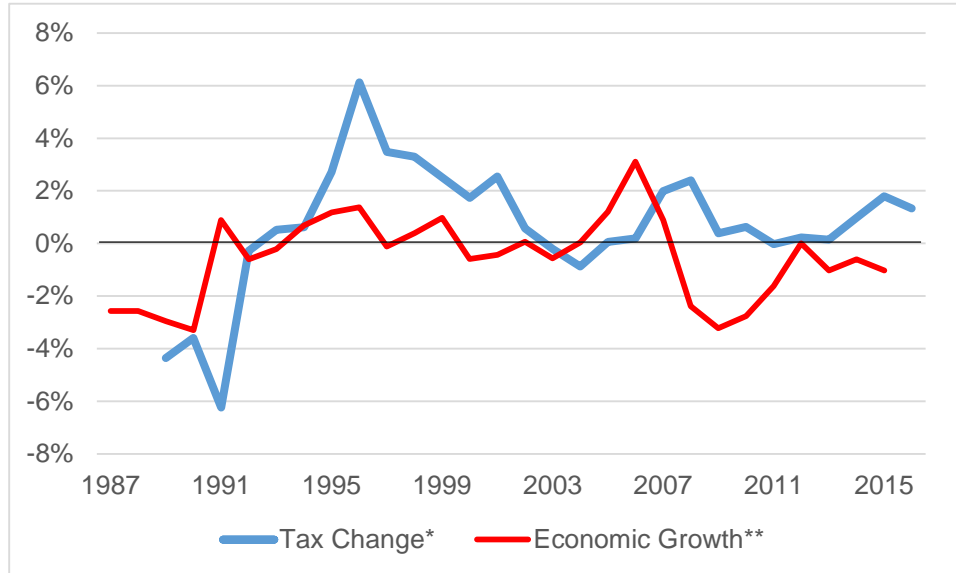
In the late 1970s, the tax burden in Arizona as measured on a per capita basis was similar to the national average and to the state's historical norm versus the U.S. average (see Chart 2). Relative to personal income, the tax burden was above average, but not as high as it had been in the mid-1960s.

The tax cuts that were implemented from FYs 1979 through 1981 did not prevent the Arizona economy from dropping into a recession, with the aggregate growth rate in Arizona lower than the national average in FY 1982. The sales tax rate increase that was implemented in FY 1984 did not disrupt Arizona's economic expansion, during which Arizona experienced faster per capita growth than the national average in FYs 1984 through 1986 and faster aggregate growth from FYs 1984 through 1987. Despite the net tax cut between fiscal years 1979 and 1984, the economic expansion during the mid-1980s in Arizona did not match the historical norm relative to the national average.

Though a national recession did not begin until FY 1990, per capita economic gains in Arizona were atypically below the national average from FYs 1987 through 1990 and aggregate growth rates were lower than the nation from FYs 1988 through 1990, as a real estate recession and federal defense spending cuts disproportionately affected the Arizona economy. To arrest the decline in general fund revenue per \$1,000 of personal income that occurred during this period and to balance the budget, tax increases and spending reductions were implemented from FYs 1989 through 1992. The slow economic growth that precipitated the tax increases is easily seen in Chart 6. In this chart, the sign of the tax changes has been reversed to ease comparison of the two lines. For example, the blue line in Chart 6 indicates a percent change in taxes in 1996 of 6.1 percent — that is, tax *cuts* in 1996 amounted to 6.1 percent of revenue. If supply-side theory applied, this large tax cut should have been followed by a large increase in the red line.

For the entire economic cycle from calendar year 1982 through 1990, during which the state's tax burden was on average lower than it had been during the previous economic cycles (see

**CHART 6
COMPARISON BETWEEN TAX CHANGES AND ECONOMIC GROWTH IN ARIZONA**



Note: the three-year temporary sales tax increase that began late in FY 2010 is not included.

* The tax change is expressed as a percentage of state government general fund revenue. The sign on the tax change has been reversed to facilitate comparison between the two lines.

**Percentage-point difference between Arizona and the United States in the real per capita earnings percent change.

Sources: Calculated from Arizona Joint Legislative Budget Committee (tax change) and U.S. Department of Commerce, Bureau of Economic Analysis (earnings and gross domestic product implicit price deflator).

Chart 2), annual average economic growth in Arizona relative to the national average was less than in each of the two prior cycles on each of a variety of economic measures.

Economic growth in Arizona began to bounce back after FY 1992 despite the state’s tax burden being higher than during much of the 1980s. Before the first significant tax reductions took effect in FY 1995, the Arizona economy was growing faster than the national average, not only in aggregate terms but on a per capita basis as well. The faster aggregate growth in Arizona continued through the long economic expansion, but growth in Arizona did not rise relative to the national average as the significant tax cuts of the mid-1990s through 2001 took effect.

For the entire calendar year 1991-through-2000 economic cycle, the tax burden in Arizona relative to the national average was lower than in the three prior cycles, but annual average growth in Arizona relative to the national average was within the range of the three prior cycles based on each of the aggregate and per person measures.

During calendar year 2001, the nation experienced an economic recession. As is common during economic downturns, per capita economic growth in Arizona was a little less than the national average in FYs 2001 and 2002 — despite historically low tax burdens.

Strong economic growth returned to Arizona from fiscal years 2003 through 2007, with aggregate growth rates well above the U.S. average and per capita gains generally greater than the national average. The growth during this period was only typical of the economic expansions of the prior cycles, despite the low tax burden and the real estate boom. Using general fund surpluses in the mid-2000s that largely can be traced to the real estate boom, another round of substantial tax cuts were implemented in FYs 2007 and 2008 that pushed Arizona's tax burden even further below the national average. It is easily seen in Chart 6 that the tax reductions occurred after the economy had improved. In fact, the tax cuts were implemented as the economy was weakening into the deepest and longest recession since the Great Depression of the 1930s.

For the entire calendar year 2001-through-2007 economic cycle, average annual growth in Arizona relative to the U.S. average was in the middle of the five cycles that occurred from 1969 through 2007 — even though the tax burden was lower than it had been from the four prior economic cycles.

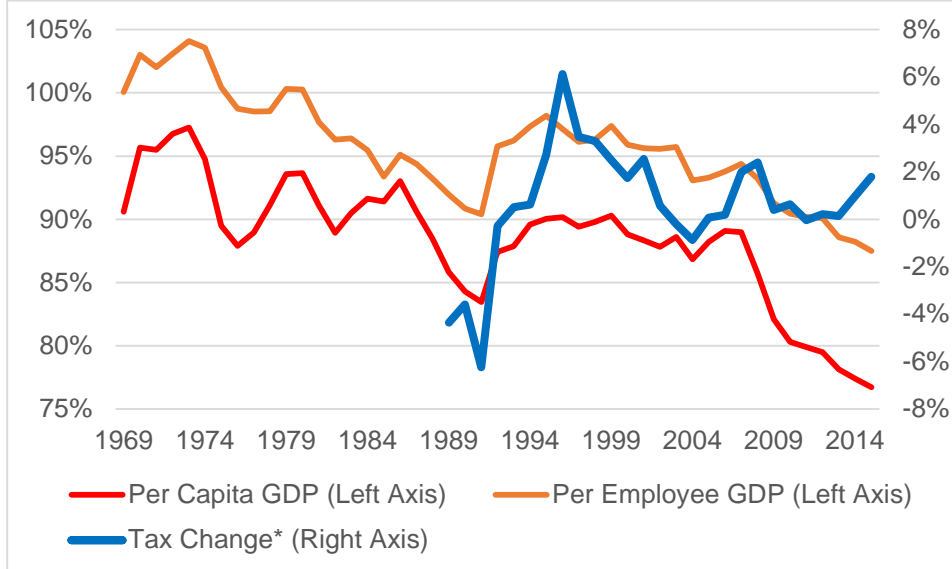
The tax cuts and the record low tax burden in FY 2008 relative to the U.S. average did not preclude Arizona's economy from contracting sharply in calendar years 2008 and 2009. The Arizona economy declined considerably more than the U.S. average from calendar years 2008 through 2010. Per capita rates were further below average. Following the recession, Arizona has experienced a weak economic expansion, with aggregate growth rates ranging from below-to-slightly-above the U.S. average and per capita growth generally below average — despite the lowest tax burden on record relative to the U.S. average.

The ultimate goal of economic development is not to increase aggregate economic growth — it is to improve productivity and prosperity. Arizona's highest levels on these measures relative to the national average occurred in the early 1970s. This is seen in Chart 7, using the per employee and per capita versions of the broadest measure of the economy: gross state product. Since the early 1970s, a downward trend is seen in per employee GDP, with a greater decline in per capita GDP. Significant declines had occurred before the tax increases of the 1989-to-1991 period and significant declines have continued since taxes were reduced. Note that following the tax increases of the 1989-to-1991 period, per capita GDP and per employee GDP each rose relative to the national average from 1992 through 1995. The downward slide resumed as the first large tax cuts were implemented.

Correlations Between Economic Growth and Tax Changes

Various measures of economic performance can be compared to the changes in tax revenue resulting from the tax law changes, but since the tax changes are measured on a fiscal year basis, it is ideal for the economic data to be on that basis as well. Gross domestic product is the broadest measure of economic performance but was available by state historically only on a calendar year basis. Personal income is available quarterly, allowing it to be calculated on a fiscal year basis, but personal income includes income not earned in the period received, such as Social Security retirement benefits. Thus, personal income is better suited as a measure of economic well-being than economic performance. The earnings component of personal income is the broadest measure of economic performance available on a quarterly basis. The fiscal year data are adjusted for inflation using the fiscal year average of the GDP implicit price deflator.

CHART 7
PER CAPITA AND PER EMPLOYEE GROSS DOMESTIC PRODUCT
IN ARIZONA AS A PERCENTAGE OF THE NATIONAL AVERAGE



* The tax change is expressed as a percentage of state government general fund revenue. The sign on the tax change has been reversed to facilitate comparison to the two lines representing GDP.

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

The deflator and the earnings figures are produced by the U.S. Bureau of Economic Analysis (BEA).

The real percent change in earnings was measured in six ways:

- Aggregate for Arizona.
- Aggregate, difference between Arizona and the nation.
- Per capita for Arizona, using the population estimates from the Census Bureau.
- Per capita, difference between Arizona and the nation, using the population estimates from the Census Bureau.
- Per capita for Arizona, substituting the population estimates from the Arizona Office of Employment and Population Statistics (OEPS) for the estimates from the Census Bureau since 2000.
- Per capita, difference between Arizona and the nation, substituting the population estimates for Arizona from the OEPS for the estimates from the Census Bureau since 2000.

Conceptually, the difference in the percent change between the state and the nation should be the superior measure for determining the relationship with tax changes, since the ups and downs in economic growth that equally affect the nation and Arizona are accounted for in this way.

The tax change was measured in three ways:

- Nominal dollars, as estimated by the JLBC.

- Dollars adjusted by personal income, reflecting inflation and the growth in the state since each tax law change was implemented.
- As a share of actual revenue in the year in which the tax change was implemented.

Timing also is an issue in doing the correlation analysis. Most of the tax changes that took effect during the 1990s and 2000s were passed during the regular legislative session, generally from February through April. Generally, the tax changes did not take effect until the following fiscal year and in some cases were phased in over a longer period. In the correlation analysis, the implementation date of the tax changes is used. Thus, if the tax changes were made in response to economic conditions that caused either a deficit or surplus in the general fund budget, one would expect that economic conditions would lead the tax changes by one or two years. In contrast, if the tax changes caused economic conditions to change, one would expect the change in economic conditions to lag behind the tax changes.

Correlations have been calculated between the annual change in taxes as estimated by the JLBC and the real percent change in annual earnings. Since a tax reduction is recorded as a negative value, a negative correlation is expected between the change in taxes and economic growth rates. In order to provide an indication of possible causal relationship, five sets of correlations have been produced: with the real percent change in earnings leading the change in taxes by two years and by one year, with the changes in taxes and earnings occurring in the same year, and with the change in taxes leading the real percent change in earnings by one year and by two years. The time period of the correlation analysis covers the tax changes implemented from FY 1989 through FY 2014.¹²

As conceptually expected, correlations between tax changes and economic growth are considerably higher when economic growth is measured as the difference between Arizona and the nation. Not much difference was found between the correlations based on the aggregate measures of earnings and those on a per capita basis; the correlation coefficients using per capita correlations are slightly higher and are cited below.¹³ The choice of using the population estimates from the Census Bureau or the OEPS to calculate per capita earnings also had little effect, though the correlations were a little higher with the estimates from the OEPS. The three ways of measuring tax changes had some effect on the correlations; the highest correlations were with the nominal dollar measure.

If tax changes have had an effect on economic performance, one would expect the highest negative correlations to be between tax changes in one year and economic growth in a subsequent year. Instead, the highest negative correlations occur when the real percent change in earnings leads the tax changes by one or two years, with a correlation coefficient based on the nominal measure of the tax change as high as -0.70.

¹² The estimates of the tax changes are available from the JLBC for FYs 1989 through 2016, while the latest estimate of earnings is for FY 2016. The analysis leads and lags the earnings data by up to two years. Thus, the consistent period of tax changes available for all correlations is FYs 1989 through 2014 (26 years).

¹³ The correlation coefficient can range from -1 (perfect negative correlation) to +1 (perfect positive correlation). A value of zero indicates no correlation.

The correlations are considerably lower when the real percent change in earnings and the tax change are coincident (occur in the same year), at approximately -0.30. The correlation disappears when the tax change leads the earnings change by one year; a small *positive* correlation exists when the earnings change is two years behind the tax change.

The results of the correlation analysis indicate that the tax changes implemented through FY 2014 were in response to economic growth. When the economy is strong, surpluses in the general fund are realized, allowing taxes to be cut while still balancing the budget as required by the Arizona Constitution. When the economy is weak, budget deficits occur: either tax cuts have been small or tax increases have occurred. Thus, there is no indication that the tax increases from FYs 1989 through 1992 harmed the economy, nor is there any evidence that the tax reductions since FY 1993 have benefited the economy.

Average Economic Growth by Economic Cycle

The Arizona and national economies are cyclical, with periods of strong economic gains interspersed with periods of contractions (economic recessions). The Arizona economy is substantially more cyclical than the national economy. Comparing annual average economic growth over entire economic cycles is one way to adjust for these cyclical variations. In this subsection, economic cycles are dated from peak to peak — that is, as beginning with the recession.

Three types of economic measures are examined: aggregate, per capita (gauges of prosperity), and per employee (proxies for productivity). The annual average percent change by economic cycle has been calculated for each of multiple economic measures within each category. The primary focus is the difference in the growth rates between Arizona and the nation, though the growth rates for Arizona also are considered.

On an aggregate basis, economic growth in Arizona historically was much stronger than the nation during economic expansions, but recessions in Arizona were on average as deep as the national average. For the entire cycle, the average growth rate in the various aggregate measures was considerably higher than the U.S. average. On a per capita basis, gains in Arizona were greater than the U.S. average in some years during expansions, but declines during recessions were deeper than the U.S. average. For the entire cycle, the average per capita gain typically was close to the U.S. average, ranging from higher to lower. After the 1969-to-1973 cycle, Arizona has underperformed the nation on average. Annual changes in the per employee measures have been less closely linked to the economic cycle. Like the per capita measures, the average growth rate by cycle in the per employee measures has ranged from a little above to a little below the U.S. average but Arizona has underperformed the nation on average since the 1970s.

In Table 6, the annual average percent change in the current cycle is compared to the annual average of each of the five prior cycles for the broadest indicators in each of the three categories.¹⁴ The percent changes in the current cycle have been calculated in two ways:

¹⁴ For a more extensive discussion of the performance of the Arizona economy during the last six economic cycles, see the Office of the University Economist report “The Performance of the Arizona Economy, Particularly During the Current Cycle,” October 2016, available from <https://economist.asu.edu/p3/competitiveness>.

TABLE 6
ECONOMIC GROWTH RATES BY ECONOMIC CYCLE:
INFLATION-ADJUSTED ANNUAL AVERAGE PERCENT CHANGE

Economic Cycle	Aggregate			Per Employee		Per Capita			
	GDP*	Personal Income	Earnings POW**	Employment	GDP*	Earnings POW**	GDP*	Personal Income	Earnings POR**
ARIZONA									
1969-73		9.1	8.9	6.8		2.0		3.7	3.1
1974-81		5.3	4.2	4.5		-0.3		1.6	0.4
1982-90		4.8	4.5	4.2		0.3		1.7	1.2
1991-2000	7.0	5.7	6.4	4.0	2.9	2.3	3.4	2.2	3.0
2001-07	4.3	4.6	4.0	3.1	1.2	0.9	1.7	2.0	1.4
2008-15^	-0.5	0.9	0.1	0.3	-0.8	-0.1	-1.8	-0.4	-1.2
2008-15^^	0.0	1.5	0.7		-0.3	0.4	-0.9	0.5	-0.3
ARIZONA LESS UNITED STATES									
1969-73		4.9	5.2	4.8		0.3		0.8	1.1
1974-81		2.5	2.3	2.5		-0.2		-0.0	-0.2
1982-90		1.2	1.0	2.1		-1.1		-0.9	-1.2
1991-2000	3.5	2.0	2.5	2.2	1.2	0.3	1.2	-0.3	0.3
2001-07	2.0	2.4	2.3	1.9	0.1	0.3	0.4	0.7	0.7
2008-15^	-1.5	-0.8	-1.2	-0.5	-1.1	-0.7	-2.0	-1.2	-1.7
2008-15^^	-1.0	-0.2	-0.6		-0.6	-0.2	-1.1	-0.4	-0.7

* Gross domestic product. Inflation-adjusted figures are not available prior to 1987.

** POW: by place of work. POR: by place of residence.

^ Unadjusted; these values are directly comparable to prior cycles.

^^ These values are adjusted for the change in the cost of living in Arizona relative to the national average. In addition, the per capita figures were calculated using the population estimates produced by the Arizona Office of Employment and Population Statistics.

Note: The 2008-15 cycle is incomplete. Annual average growth rates likely will be slightly higher by the time the cycle ends.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, <http://bea.gov/regional/index.htm>.

(1) consistent with those of the prior cycles, not considering changes in the relative cost of living and using the population estimates produced by the Census Bureau to calculate the per capita figures; and (2) adjusting for the change in the relative cost of living and using the population estimates produced by the Arizona Office of Employment and Population Statistics (OEPS). Each of these adjustments raise the annual average percent changes in Arizona and relative to the nation.¹⁵

Any positive economic response to the tax reductions would take time to be realized. If the tax reductions of the 1990s boosted economic performance, the effect might not begin to be seen until the 2001-to-2007 economic cycle. A greater effect would be expected in the current cycle, resulting from the reductions during the 1990s and the additional cuts in the 2000s.

Average aggregate growth in Arizona versus the U.S. average in the 2001-to-2007 cycle was below the average of the four prior economic cycles. The average difference between Arizona and the nation in the current cycle is by far the lowest of the six cycles, even after adjusting for the relative change in the cost of living.

Prosperity and productivity gains in Arizona relative to the national average were typical during the 2001-to-2007 cycle. Based on the unadjusted data, the average differences between Arizona and the nation during the current cycle are the lowest of the six cycles in the prosperity measures and second lowest in the productivity measures. However, after the adjustment, the average difference between Arizona and the nation in the current cycle generally is within the range of the prior cycles on the productivity and prosperity measures.

In summary, despite the significant decline in Arizona's tax burden relative to other states since the early 1990s, economic growth in Arizona relative to the nation since then has not been stronger than the historical relationship. Indeed, during the current cycle, Arizona's performance on aggregate measures is far below its historical norm.

Tax Changes and State Government Tax Revenue

The declines in actual state government general fund revenues since the early 1990s are easily seen in Chart 8, which standardizes revenue over time by dividing it by personal income. The fluctuations in the line in Chart 8 reflect both changes in tax policy and the economic cycle, which has a substantial effect on government revenues, even after adjusting for personal income.

In the late 1970s, state general fund tax revenue exceeded \$50 per \$1,000 of personal income (alternatively, revenue was greater than 5 percent of personal income). The tax reductions of the FY 1979-to-1981 period, combined with an economic recession, lowered the figure to \$44 in FY 1982. The tax increase of FY 1984 and an improving economy pushed the figure back up to above the long-term average of \$48.64 from FYs 1984 through 1986, but the weakening economy caused the figure to drop in FYs 1987 and 1988. Despite further weakening of the economy, the tax increases from FYs 1989 through 1992 pushed revenues up to about \$51 in FY 1991. The figure remained near \$51 through FY 1994, but then fell as the substantial tax reductions were implemented. In FY 2001, still a year of strong economic growth, revenue per

¹⁵ Neither the cost-of-living data nor the OEPS population estimates are available for the entire time period back to 1969.

\$1,000 of personal income had declined to \$44. It fell further in FYs 2002 and 2003 due to the economic recession, bottoming at \$39.

Tax revenue per \$1,000 of personal income increased from FYs 2004 through 2006 as the economy improved and capital gains soared due to the real estate boom. The peak, however, was less than \$47 — less than the \$50+ peaks of the 1970s and 1980s and less than the historical average.

Between FYs 2006 and 2010, tax revenue per \$1,000 of personal income dropped substantially to the lowest level on record (\$31). The big decline largely resulted from the recession, though the tax cuts implemented from FYs 2007 through 2010 contributed.

Despite an improving economy, tax revenue per \$1,000 of personal income rose only to \$35 in FY 2015. The preliminary figure for FY 2016 is slightly lower. This is far below the historical average, despite being in the midst of an economic expansion. It is lower than every value recorded prior to FY 2009.

Using the JLBC's estimates of the effect on general fund revenue of the various tax increases and reductions implemented since FY 1989 (adjusted for inflation, population growth, and real per capita economic growth), general fund revenues that would have occurred had no tax law changes been made also are plotted in Chart 8.

Had no tax changes affected the general fund since the early 1990s, tax revenue per \$1,000 of personal income in FY 2016 would have been slightly higher than the historical norm. The below-average revenue figures after adjusting for tax reductions from FYs 2009 through 2014 were due to the severity of the last recession and the slow economic recovery that followed.

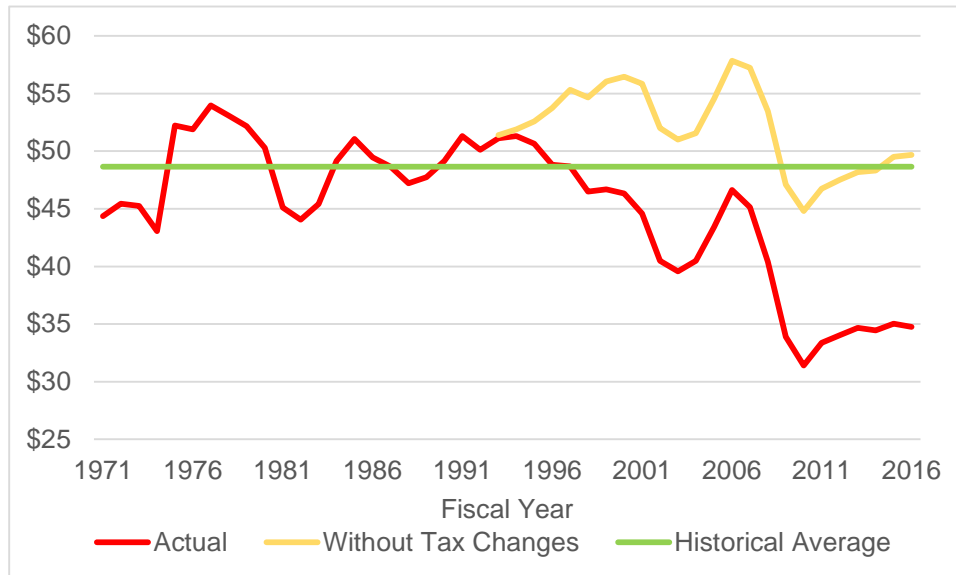
Each of the lines demonstrate the severe cyclicity of general fund revenue that has occurred since the late 1990s. The difference between the actual line and the other line represents the cumulative effect of the tax law changes. The cumulative effect continues to grow. In FY 2016, actual general fund revenue per \$1,000 of personal income was nearly \$15 lower than it would have been had no tax changes occurred since FY 1992. General fund revenue relative to personal income was 29 percent lower than the historical average. Had no tax code changes been made since 1992, total revenue would have been \$4 billion higher.

The empirical evidence is that the effect on government revenue from tax increases and tax decreases in Arizona has been as estimated by the JLBC without considering possible supply-side effects. Tax increases have raised revenue and tax cuts have reduced revenue. No evidence exists of a supply-side boost in revenue resulting from the tax cuts.

Why the Tax Reductions in Arizona Have Not Boosted Economic Growth or Government Revenue

The empirical evidence of no apparent supply-side effect is consistent with the conceptual analysis presented earlier in this paper.

**CHART 8
ONGOING TAX REVENUE PER \$1,000 OF PERSONAL INCOME,
ARIZONA STATE GOVERNMENT GENERAL FUND**



Notes:

- Ongoing tax revenue is expressed prior to the subtraction for urban revenue sharing.
- The general fund tax revenue without tax changes is based on estimates of what general fund tax revenue would have been had no changes to tax laws been made since FY 1992.
- The historical average is based on fiscal years 1971 through 1992.

Sources: Arizona Joint Legislative Budget Committee, <http://www.azleg.gov/jlbc.htm> (actual general fund revenue and estimated impact of tax changes), and U.S. Department of Commerce, Bureau of Economic Analysis, <http://bea.gov/regional/index.htm> (personal income).

First, looking at the overall state and local government tax burden using the Tax Foundation’s data series (the middle line in Chart 2), Arizona’s tax burden in 1990 and 1991 was equal to the national average and in 1992 and subsequent years was below average. Assuming the revenue-maximizing tax rate on the Laffer Curve is equal to the national average, this suggests that the tax reductions in Arizona should have had little effect on economic growth and should have reduced government revenues by about the amount of the tax reductions estimated by the JLBC.

Second, it also is useful to examine the specific tax reductions and whether the specific tax burdens were higher than the revenue-maximizing rate before the tax reductions began. In particular, relatively few of the tax reductions implemented through FY 2011 were targeted to businesses, though some of the reductions applied to businesses as well as to individuals. The disproportionate emphasis on individual taxes caused the individual tax burden to fall far below average while the business tax burden remains near the national average. Conceptually, this mix of tax cuts minimizes any possible supply-side effects. Moreover, the reductions in income taxes did not result in a boost in productivity by raising the workforce participation rate. The employment-to-population ratio in 2015 in Arizona relative to the national average was the lowest on record.

Specific taxes can be examined using both of the tax measures produced by the JLBC as well as the Census Bureau dataset. In addition, the individual income tax can be examined using a dataset produced by the National Bureau of Economic Analysis that extends from the late 1970s through 2014. The NBER has estimated the average marginal state income tax rates for various types of income. Focusing on the tax rate applicable to wages, Arizona's marginal rate annually was above the national average in the 1980s, with Arizona ranking in the teens among the states (with a rank of 1 indicating the highest taxes). The marginal rate peaked in 1989. Since other states increased income taxes in the 1990-to-1992 period, Arizona's marginal rate fell below the national average and ranked in the 30s even before the first individual income tax reduction of the 1990s was passed. In 2014, the marginal rate in Arizona was 44 percent lower than the 1989 peak. It was 26 percent below the national average, compared to more than 20 percent above average during the 1980s.

The other datasets verify that Arizona's individual income tax burden in the early 1990s was less than the average of the states. Using the Laffer Curve, this suggests that the individual income tax cuts in Arizona since that time should have decreased, not increased, government revenue. Conceptually, it is unlikely that these tax cuts had much of an effect on the state's economic performance.

Like the individual income tax, the property tax rate in Arizona already was relatively low in the early 1990s, so reductions in the property tax were unlikely to have had any positive effect on government revenue or economic performance. The vehicle license tax rate was near the middle of the states, so this tax cut also is unlikely to have had much of any positive effect.

In contrast, the general sales tax rate in Arizona was considerably above average, so the reductions in the sales tax potentially had a positive effect. Most of the reductions occurred between FYs 1995 and 1998, resulting from a decrease in the commercial lease rate and the passage of numerous sales tax exemptions. Similarly, the corporate income tax rate was relatively high before tax cuts were implemented in the early 2000s and late 2000s.

While the reductions in the sales tax and corporate income tax might have generated a Laffer Curve effect, the magnitude of any benefit conceptually should have been small based on various considerations: though these specific taxes were high, the overall tax burden was not high; less than one-fourth of the total tax reductions were to these taxes; the sales tax burden remains very high; the corporate tax reductions in the early 2000s were small in magnitude; and the very small scale of the tax cuts from the perspective of the size of all business expenses. Further, with most of these cuts being implemented when Arizona's economy was booming, any economic stimulus created by the cuts would have resulted in an increase in the importation of labor to the state and therefore a rise in government expenditures offsetting any gains in public revenues.

One additional conceptual reason for not expecting the tax reductions to have had an effect on the economy or on government revenue is that as a result of the tax reductions, significant decreases in public spending have been implemented by the Arizona Legislature. Reductions have been made to programs valued by businesses, including K-12 education, higher education, and the Arizona Department of Transportation. The labor force and physical infrastructure rank at the top of the business location factors, while the tax burden ranks lower. In particular,

Arizona does not compare favorably on labor force issues. Thus, since the tax reductions had to be accompanied by spending reductions, the state's business climate evaluations have suffered; Arizona ranks among the middle of the states in the most reliable studies.¹⁶

Therefore, the size, nature, and timing of the tax cuts in Arizona, combined with the conceptual basis for supply-side economics, suggest that little positive effect either on economic growth or on government revenue should have occurred as a result of the tax reductions implemented from the early 1990s through the early 2010s.

Since the tax reductions currently being implemented more heavily affect business taxes, it is possible that some positive effect on economic growth may be realized. Moreover, due to the sluggish Arizona economy, the unemployment rate is relatively high, raising the possibility that any boost in economic activity could be accommodated by the existing labor force. However, the magnitude of any economic boost and subsequent government revenue increase likely will be small, with any gain in revenue offsetting only a small fraction of the revenue lost due to the tax cuts. With the tax reductions still being phased in through FY 2019, it will be years before their effects can be ascertained.

¹⁶ See the Office of the University Economist report "Overview of Economic Competitiveness: Business and Individual Location Factors, With a Focus on Arizona," November 2014, <https://wpcarey.asu.edu/sites/default/files/competitiveness11-14.pdf>.