



OKLAHOMA OIL AND GAS INDUSTRY TAXATION

Comparative Effective Tax Rates in the Major
Producing States

January 11, 2018

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Oklahoma Oil and Gas Industry Taxation

I. Introduction

This report provides estimates of the effective tax burden faced by the oil and gas industry in Oklahoma and fifteen other major energy-producing states. Evaluations of oil and gas tax burden are typically restricted to the role of severance taxes and ad valorem taxes related to oil and gas production. Data is readily available for these taxes and they capture much of the direct tax contribution from oil and gas production. However, these two tax streams do not capture the tax contribution of the oil and gas industry more broadly. The industry and its employees make significant contributions to several other major tax streams as well. In Oklahoma, the most important among these are personal income tax and sales tax, two of the largest sources of revenue to state and local government. Other smaller tax streams include corporate income tax, franchise tax, motor vehicle tax, and motor fuel tax.

When doing cross-state comparisons, the use of a narrow set of taxes can produce a grossly misleading view of the overall tax contribution of the oil and gas industry. The major energy-producing states assess a range of taxes and rely on them to varying degrees. Some producing states do not levy a personal income or sales tax and rely much more heavily on severance and ad valorem taxes to fund state and local government spending. Even among states that do levy income and sales taxes, the effective rates vary greatly. The size of the oil and gas industry varies as well, as states with a large oil and gas employment base receive relatively more tax revenue from the industry. Drilling-active states also tend to receive significant current tax revenue from increasingly capital-intensive wells relative to producing states with little drilling activity.

The purpose of this report is to provide a broader comparison of the tax burden faced by the oil and gas industry in Oklahoma. Estimates of the combined effective tax rate for severance, ad valorem, personal income, and sales tax are provided for Oklahoma and fifteen other major producing states. While this does not provide an exhaustive review of the total tax payments made by the industry, these taxes comprise the two largest sources of state and local taxes in Oklahoma and capture the major taxes typically derived from oil and gas drilling and production activity.

In the first section of the report, historical severance tax payments in Oklahoma are examined, and updated estimates of the effective rate in Oklahoma and other oil and gas-producing states are provided. The influence of severance tax rate changes and production valuation changes on severance tax payments in Oklahoma is also examined. Finally, the projected effect of recent increases in severance tax rates on revenue projections in the current and next fiscal year are evaluated.

The second section provides estimates of annual ad valorem tax payments and effective ad valorem tax rates for Oklahoma and the sample of producing states. A combined effective tax rate including both severance and ad valorem taxes is then estimated for the sixteen states.

The third section broadens the analysis of the Oklahoma oil and gas industry tax burden to personal income and sales taxes. An overall effective rate that includes severance, ad valorem, personal income, and sales taxes is estimated for Oklahoma and the other fifteen states in the sample. Oklahoma's overall effective rate is then evaluated under both the recent increase in the severance tax rate and potential additional increases in the rate.

The fourth and final section of the report highlights the overall sensitivity of the total tax base in the sixteen states to fluctuations in the oil and gas industry in the recent energy price cycle. This provides a better perspective on the overall sensitivity of total tax revenue in Oklahoma relative to the other producing states. It also highlights the direct and indirect influence of oil and gas activity on the overall volatility of state tax revenue. Producing states with an overall economic cycle that remains highly sensitive to oil and gas activity must give special consideration to both the direct and indirect activity influenced by tax policy decisions.

The findings of the report have important implications for Oklahoma policymakers setting tax policy in the state. While the FY2016 effective tax rate in Oklahoma ranks 12th among the 16th largest producing states based solely on severance and ad valorem taxes, the overall effective rate rises to 8th when personal income and sales taxes are considered. Many of the major producing states have either no personal income tax or very low sales tax rates, or both, and are heavily reliant upon traditional severance and ad valorem taxes to fund state and local government. Oklahoma, on the other hand, levies relatively low severance and ad valorem taxes but relies heavily upon above-average sales and personal income taxes paid by the industry.

More importantly, the recently implemented increase in the state's severance tax rate is pushing the state's overall effective tax rate on oil and gas production much higher this fiscal year and next. Based on Oklahoma Tax Commission forecasts, the severance tax rate increase is projected to push the state's overall effective tax rate to 5th highest in the current fiscal year (FY2018), rising above the overall rate levied by dominant-producer Texas.

Further increases in severance tax rates would raise the state's overall effective tax rate to among the highest levied by the major oil and gas-producing states. A scenario of shifting all projected FY2019 production in the 2% tax bracket to a 4% severance tax rate would give Oklahoma the 3rd highest overall effective tax rate. A scenario of shifting all oil and gas production in FY2019 to a 7% severance tax rate would give Oklahoma the 2nd highest overall effective tax rate among the sixteen largest producing states.

II. Severance Taxes

Severance taxes have long been levied on oil and gas production in Oklahoma and are a key source of funding for state and local government. Sometimes referred to as gross production taxes in Oklahoma, they are often viewed as the primary tax paid by the oil and gas industry.¹ The analysis in this section examines recent changes in severance tax rates in Oklahoma and the effect on total severance tax payments. The effective annual severance tax rate is then calculated for the state the past two decades. Effective rates are calculated for fifteen additional oil- and gas-producing states in the FY2012 to FY2017 period. Finally, effective rates in Oklahoma are evaluated under Oklahoma Tax Commission projections of severance tax revenue based on recently increased severance tax rates.

Recent Tax Law Changes. Historically, Oklahoma has assessed a 7 percent marginal severance tax rate (before deductions, exemptions, and rebates) on most crude oil and natural gas production.

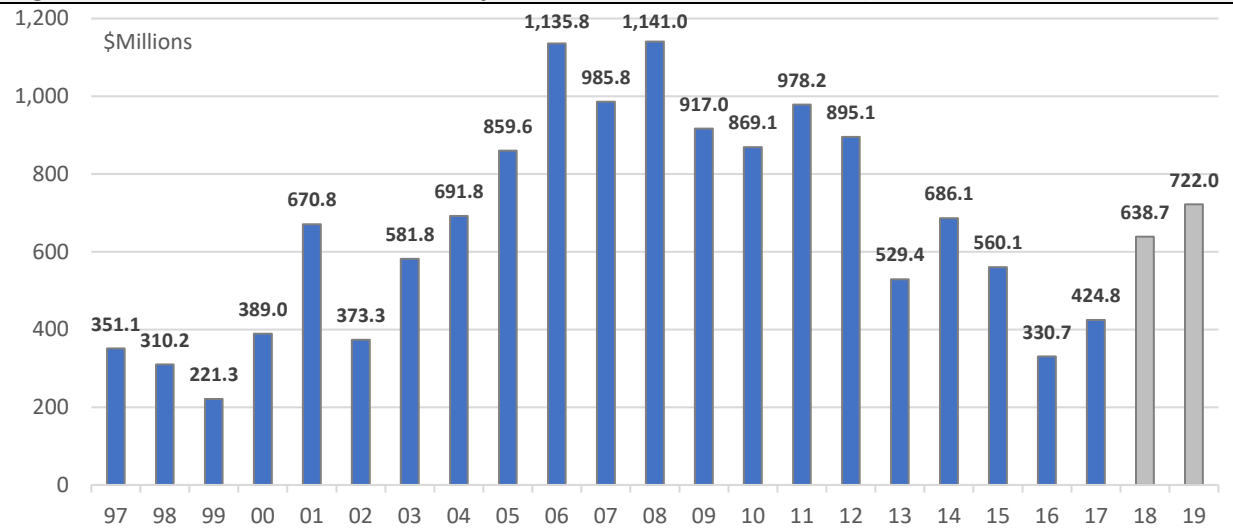
Effective July 2011, the Legislature changed the incentive in place for horizontally-drilled wells and certain deep wells. In lieu of a rebate, the severance tax rate was changed to 1% for 48 months on production from new horizontally-drilled wells and 4% for deep wells.²

In 2014, the Legislature streamlined oil and gas taxation further, and severance tax rates were changed once again. All wells drilled after July 2015 are subject to a tax of 2% for the first 36 months of production, with the rate reverting to 7% thereafter. Some deep wells are still taxed at 4% for 48 months, reverting to 7% thereafter. Wells taxed under the previous 1% rate for horizontal wells retained their original date to revert to 7%. As a result, wells in Oklahoma are currently taxed at either 1%, 2%, 4%, or 7%, with all production ultimately transitioning to 7%.

Historical exemptions for other gross production tax incentives including secondary recovery projects, tertiary recovery projects, inactive wells, production enhancement, some deep wells, new discovery wells, and wells using 3-D seismic technology sunset by July 1, 2017.³ Economically at-risk leases were made subject to sunset by December 31, 2016. A longstanding excise tax of 0.095% of production value on crude oil and natural gas production is still levied.

Oklahoma Severance Tax Payments. Figure 1 provides an overview of total annual severance tax payments made by Oklahoma oil and gas producers the past two decades. Severance tax receipts averaged approximately \$385 million annually between FY1997 and FY2002 before rising substantially along with both energy prices and production beginning in FY2003. Payments averaged almost \$1 billion annually between FY2005 and FY2012, boosted by high prices for both crude oil and natural gas.

Total severance tax receipts averaged \$503 million annually from FY2013 through FY2017. The low in receipts of \$331 million in FY2016 reflects severance tax relief from the Legislature for horizontally-drilled wells coupled with an unusually adverse set of industry conditions. In FY2016, severance tax receipts were driven downward by a collapse in crude oil prices (\$38/bbl average), a nearly 20-year low in natural gas prices (\$2.26/mBtu average), relatively flat state natural gas production, and a decline in

Figure 1. Oil and Gas Severance Tax Payments – Oklahoma (Fiscal Year)

Source: Oklahoma Tax Commission

Notes: Includes both severance taxes and the 0.095% petroleum excise tax.

state crude oil output. From FY2014 to FY2016, the total value of crude oil and natural gas produced in the state declined by nearly half to the lowest level in more than a decade. The state similarly remained mired in a nearly two-year state-level recession tied to the oil and gas industry slowdown.

Total severance tax receipts rebounded by 28% in FY2017 to \$425 million as market prices for crude oil and natural gas recovered from recent lows. The most recent tax law change is also lifting severance taxes in the current fiscal year (FY2018) as wells previously taxed at either the 1%, 2%, or 4% rate are now moving into the 7% marginal tax bracket. As a result, current forecasts by the Oklahoma Tax Commission suggest that severance tax receipts will rebound much further in the near term. December 2017 projections by the Oklahoma Tax Commission suggest a rebound in total severance tax receipts to \$639 million in the current fiscal year and \$722 million in FY2019.⁴

The shifting share of production at each severance tax rate for both crude oil and natural gas is detailed in Figure 2. Oklahoma Tax Commissions forecasts suggest that 70.9% of total state production will be taxed at 7% in FY2018, rising to 81.5% by FY2019. Relatively small shares of production will be taxed at

Figure 2. Oklahoma Severance Tax Revenue Projections

Tax Rate	Crude Oil		Natural Gas		Total	
	FY2018	FY2019	FY2018	FY2019	FY2018	FY2019
1%	\$3,223,000	\$0	\$3,662,000	\$0	\$6,885,000	\$0
2%	74,865,000	76,497,000	51,875,000	56,866,000	126,740,000	133,363,000
4%	24,123,000	0	28,269,000	0	52,392,000	0
7%	211,740,000	290,053,000	240,991,000	298,544,000	452,731,000	588,597,000
Total	\$313,951,000	\$366,550,000	\$324,797,000	\$355,410,000	\$638,748,000	\$721,960,000

Source: Oklahoma Tax Commission. State of Oklahoma FY2018-19 Revenue Certification. December 20, 2017.

Notes: Petroleum excise tax payments of 0.095% are included in these projections.

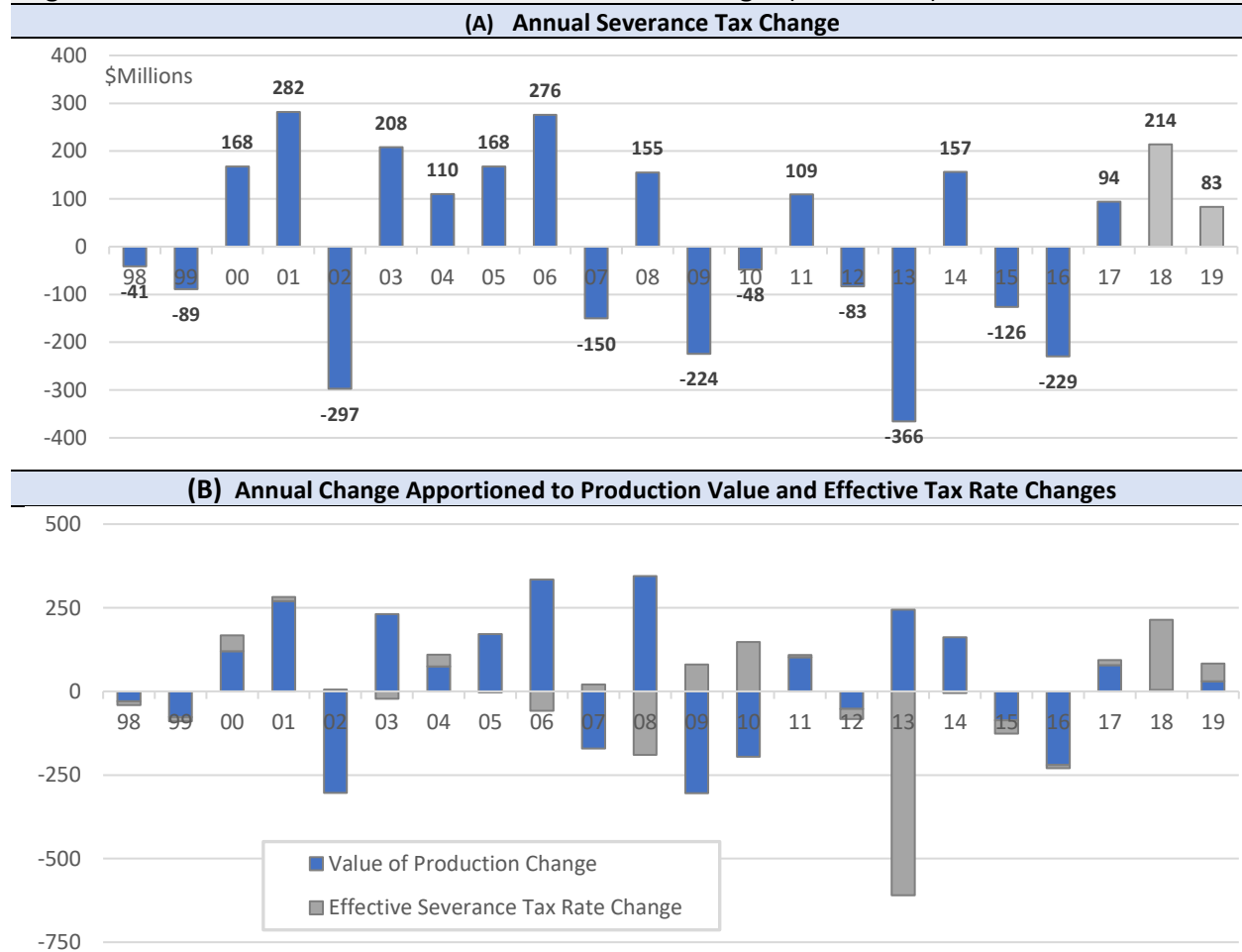
either the 1% or 4% legacy rates in FY2018. No production of either crude oil or natural gas is expected to remain at the 1% or 4% rates in FY2019.

Tax Changes Apportioned to Value and Rate Changes. It is important to understand the degree to which tax law changes versus shifts in the value of production have driven recent year-to-year changes in state severance tax payments. Figure 3 apportions the annual change in severance taxes (panel A) into changes due to production value and changes due to tax rate (panel B).

Most of the effective shift from the tax rate change in 2011 was fully absorbed by FY2013. No significant changes due to tax rates have taken place since FY2014, with weak severance tax revenue in FY2015 and FY2016 traced almost fully to declining production value.

Higher production value contributed nearly all the net gain in tax payments in FY2017. Going forward into FY2018 and FY2019, tax rate changes are expected to contribute nearly all new severance tax revenue growth. Approximately \$300 million in net new annual severance tax revenue is projected through FY2019 relative to FY2017, mostly from tax rate increases.

Figure 3. Oklahoma Severance Tax – Source of Annual Changes (Fiscal Years)



Source: Oklahoma Tax Commission and RegionTrack calculations

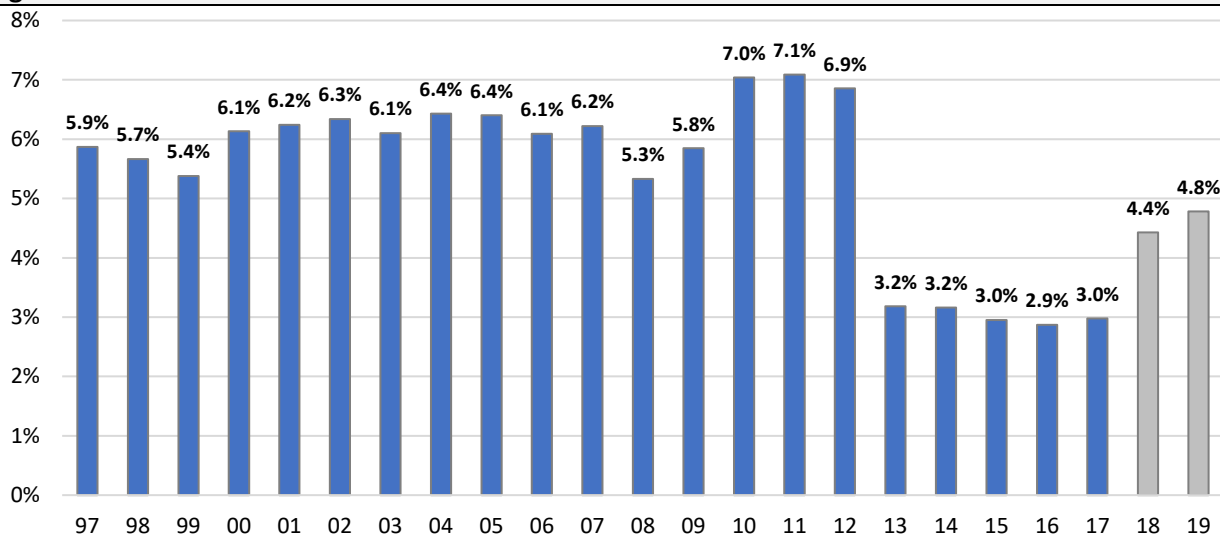
Oklahoma Effective Severance Tax Rate. Figure 4 provides estimates of the effective severance tax rate in Oklahoma the past two decades. Projections for FY2018 and FY2019 are provided to illustrate the expected change in the rate in response to recently enacted tax law changes. See Figure A1 in the Appendix for detailed components of the rate calculations.

Methodology. The effective rate is calculated as total severance taxes divided by the total market value of oil and gas production. The value of production is calculated using Energy Information Administration (EIA) estimates of monthly production which are converted to fiscal years. The price of crude oil is the first purchase price at the state level provided by EIA. This provides price estimates that closely track state-level prices used for severance tax reporting purposes and can be used in making consistent cross-state comparisons. The value of natural gas production is determined using the Henry Hub spot price of natural gas. These prices for crude oil and natural gas are also used in the calculation of production values in cross-state comparisons for consistency.⁵

Historical Rates. The effective severance tax rate in Oklahoma fluctuated around an average of 6.0% between FY1997 and FY2009. Rates then bounced higher to an average of 7.0% between FY2010 and FY2012 before falling in response to severance tax relief legislation. The rate has averaged 3.0% since FY2013, approximately half the 6.2% average rate from FY1997 to FY2012. The steep decline in the effective rate from FY2012 to FY2013 reflects, in part, the shift in severance tax policy from the use of a refunded rebate to a reduced severance tax rate. Prior to FY2011, severance taxes were collected and then returned to taxpayers in arrears as rebates, while the replacement legislation collects revenue from non-exempt production only.

The most recent tax law changes will produce a significant rise in the state's effective severance tax rate as production transitions to the 7% tax bracket. Based on Oklahoma Tax Commission forecasts for severance tax receipts, the effective rate is projected to rise to 4.4% in FY2018 and 4.8% in FY2019. The

Figure 4. Effective Severance Tax Rate – Oklahoma



Source: Energy Information Administration, Oklahoma Tax Commission, and RegionTrack calculations

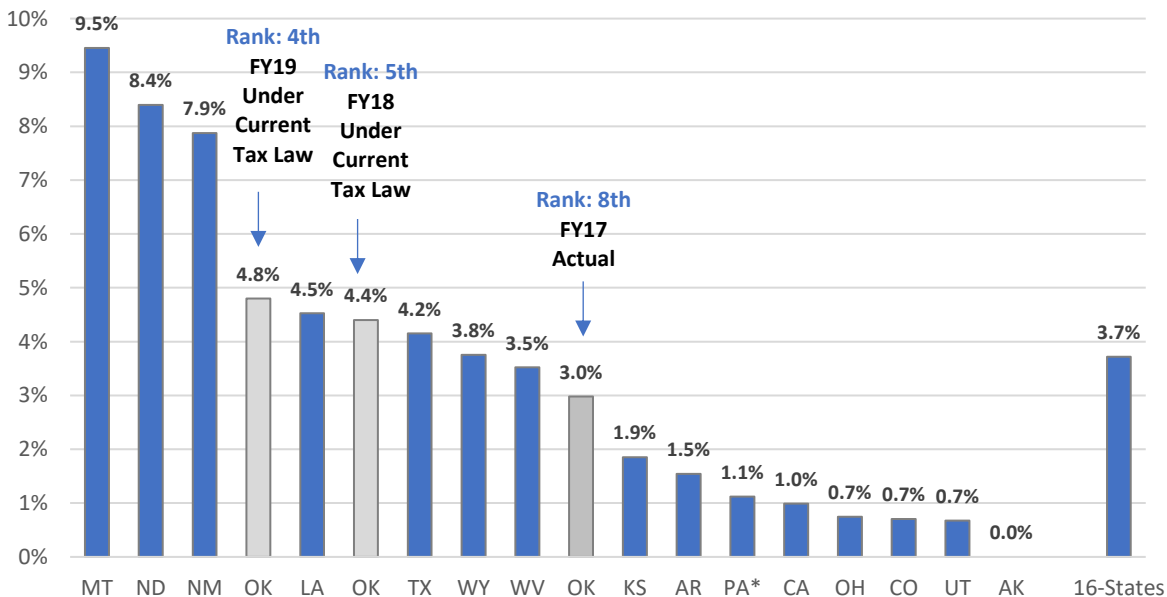
effective rate forecast is based on estimates of flat production quantities for crude oil and natural gas in both FY2018 and FY2019, oil prices of \$47.49 per barrel in FY2018 and \$51.08 per barrel in FY2019, and natural gas prices of \$2.94 in FY2018 and \$2.99 in FY2019.

As illustrated in Figure 3, the primary contributor to the rise in the effective severance tax rate in FY2018 and FY2019 will be rising tax rates, with little contribution from rising production value.

Oklahoma Versus Other Producing States. Oklahoma's FY2017 effective severance tax rate is compared to fifteen additional energy-producing states in Figure 5. The states in the sample all rank among the top ten producers of either crude oil or natural gas, or both. As a group, they represent the sixteen largest producing states based on value of production, with each producing at least \$1 billion or more in combined value of crude oil and natural gas in 2016. This provides for a broad range of comparative oil and gas-related tax policies across the producing states.

Severance taxes are defined as traditional production or extraction taxes, typically based on either the volume or market value of production. These taxes vary widely across the states but are generally linked directly to the removal of minerals from the ground. Payments for production on state land are generally included while Federal payments are not. Excluded are Wyoming's ad valorem taxes based on production (which are evaluated in the next section on ad valorem effective rates). Pennsylvania's impact fees are included as severance taxes in the initial stage of the tax rate analysis because no other taxes are assessed by the state either directly or indirectly on production.

Figure 5. Effective Severance Tax Rate - 16 Largest Producing States (FY2017)



Source: Various state oil and gas and tax reporting agencies. Refer to notes at the end of the report for links to electronic sources.

Calculations by RegionTrack.

Notes: All data are stated on a fiscal year basis. The effective rate is calculated as total severance taxes divided by the total value of oil and gas production. *Pennsylvania's effective rate includes the state impact fee in this initial stage of the analysis.

A variety of sources are used to collect severance tax data for the sixteen states. The primary sources are state tax reporting agencies or natural resource administrative agencies. Sources available in electronic form are detailed in the notes to the report.⁶ Figure A1 in the Appendix provides summary measures underlying the effective severance tax rate calculation for each of the sixteen states in the FY2012 to FY2017 period. Taxes are calculated based on the fiscal year used by each state.⁷

Oklahoma's effective severance tax rate is 3.0% in FY2017, 8th highest among the group and below the group's value-weighted average of 3.7%. The simple average of rates across the states is 3.3%. The overall effective severance tax rate for the group is also roughly half the 6.6% effective rate reported in a recent study of Idaho oil and gas taxation (Covenant, 2016) covering a smaller sample of nine producing states.

Three states (Montana, North Dakota, and New Mexico) comprise a top tier with significantly higher effective rates of approximately 8% or more. These states are commonly included in cross-state reviews of severance tax rates but appear more as outliers when viewed across a broader set of producing states.

Oklahoma and four other states (Louisiana, Texas, Wyoming, and West Virginia) form a middle tier with effective rates between 3% and 4.5%. Texas, the nation's largest producer of both crude oil and natural gas, has a 4.2% effective rate, 1.2% above Oklahoma and one-half percentage point above the group weighted average.

A third tier of eight states – Kansas, Arkansas, Pennsylvania, California, Ohio, Colorado, Utah, and Alaska – has relatively low effective severance tax rates below 2% in FY2017. Neighboring Kansas and Arkansas both have rates between 1.5% and 2%. Kansas provides a 3.67% credit toward severance taxes for property taxes paid, leaving a net marginal rate of 4.33% but an effective rate of only 1.9%. Rapidly growing gas producers Pennsylvania and Ohio have effective rates of about 1% or less. Pennsylvania, the second largest gas producing state, is included in the comparison despite having no direct severance tax. It is included in the initial stage of the analysis based on its impact fee serving as the only direct production cost assessed by the state.

California, the third largest oil producing state, has only a 1.0% effective severance tax rate.⁸ The state has long assessed no direct severance or ad valorem taxes at the state level, but does allow local ad valorem taxes. The state assesses only a small fee based on the volume of production of crude oil and natural gas.

Large and rapidly growing producer Colorado has an effective rate below 1.0% due to an allowed offset of severance taxes by ad valorem tax payments. This functions largely as an ad valorem tax in lieu of severance tax payments, opposite the relationship in place in Oklahoma.

Despite historically large severance tax payments, Alaska, the fourth-largest oil producing state, has experienced a multi-year collapse in severance tax receipts in recent years. In Alaska, the severance tax is based on profitability of the reporting firm rather than the price of oil or value of production.⁹ Because

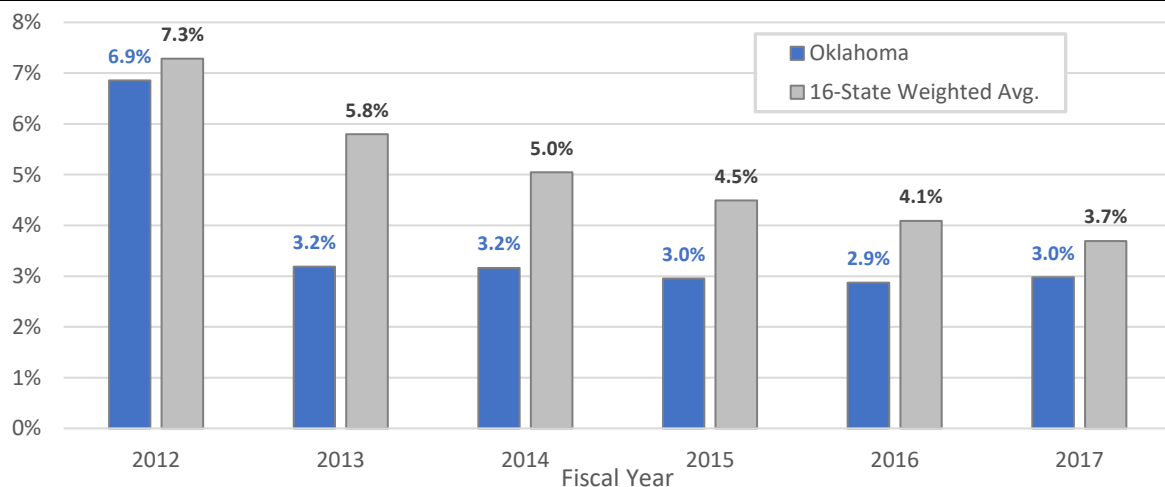
of both low energy prices and declining oil production in the state, the industry has experienced extreme financial distress in recent years. While a final estimate is not yet available for FY2017, the state is expected to post a slight decline in severance taxes. Because of the uncertainty and potential for a negative effective rate, we assign the state a 0% estimated effective severance tax rate in FY2017.

State Trends in Severance Tax Rates. Figure 6 illustrates recent trends in effective severance tax rates for Oklahoma relative to the average for the group of sixteen producing states. Effective rates for each of the states are detailed in Appendix A1. The key finding is that average severance tax rates have fallen steadily across the producing states between FY2012 and FY2017. Oklahoma's effective rate has remained roughly 3% since severance tax rates reductions took hold in FY2013. In contrast, the effective rate for the group of sixteen states has declined by nearly half in the period, from 7.3% in FY2012 to 3.7% in FY2017. Using a simple average of the effective rates across the states, the rate for the group has declined from 6.3% to only 3.3% the past five years, leaving it slightly above Oklahoma's rate of 3.0%.

Most importantly for Oklahoma, the projected rise in the state's effective severance tax to 4.8% by FY2019 would push Oklahoma's rate to 4th highest among the 16 largest producing states given fixed tax policy in the other states. Oklahoma would exceed the 4.2% rate in Texas and the 3.7% average rate across the group of sixteen states.

While the large drop in Alaska's effective severance tax rate (from 28.6% in FY2012 to approximately zero currently) has weighed on the group average, declining severance tax rates are more the norm across the sample of states than the exception. Every state but two (Ohio and Arkansas) experienced a decline in the effective rate in the five-year period from FY2012 to FY2017. The rate in Texas declined from 4.6% to 4.2%, and was as low as 3.6% as recently as FY2016. Among other large producing states, the effective rate declined from 5.1% to 4.5% in Louisiana, 9.9% to 8.4% in North Dakota, 1.8% to 0.7% in Colorado, 5.7% to 3.8% in Wyoming, 2.4% to 1.0% in California, and 9.8% to 7.9% in New Mexico.

Figure 6. Falling Effective Severance Tax Rates – Oklahoma vs. Group of Producing States



Source: Oklahoma Tax Commission and various state tax reporting agencies. Calculations by RegionTrack.

Notes: Sources available in electronic form are detailed in the notes to the report.

III. Ad Valorem Taxes

Along with severance taxes, most producing states assess some form of ad valorem, or property, tax tied to the production of crude oil and natural gas. The tax is typically applied to the value of either minerals in the ground or the equipment used above ground for extraction and production, or both. An exception is Wyoming, which has a local ad valorem tax based on the value of production.

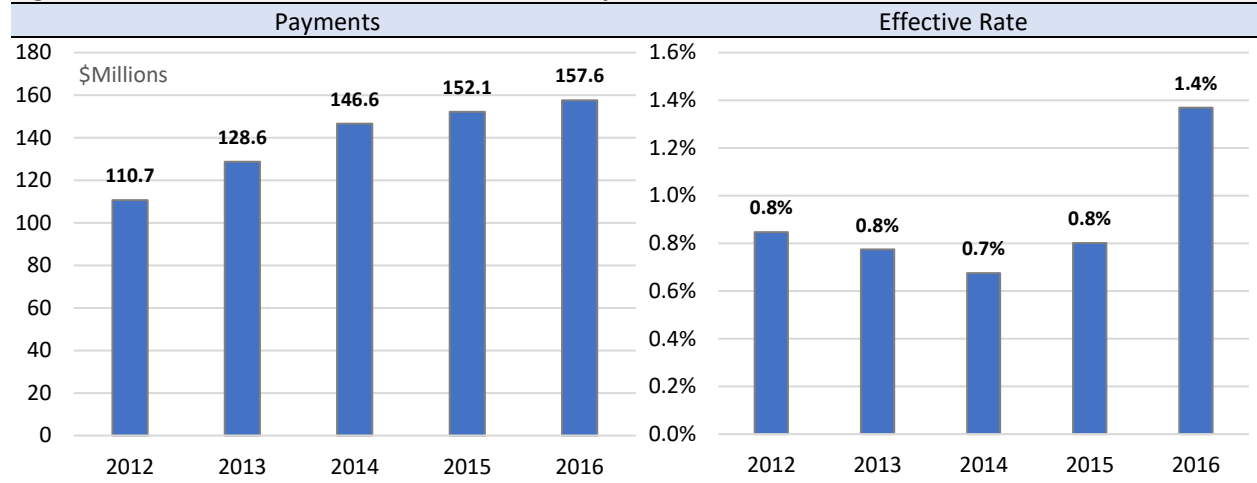
In Oklahoma, the severance tax is levied in lieu of a local property tax on the value of minerals in the ground and the equipment that is essential to the production of a well. Local governments in the state do, however, have authority to assess the value of other oil and gas-related equipment and infrastructure. Hence, Oklahoma is historically viewed as a low property tax state for oil and gas activity.

Oklahoma Taxes. Readily available state-level data on oil and gas-related property tax payments in Oklahoma is sparse. Statewide data are available for 2012, 2014, and 2016 based on valuations as of November 1 for the stated calendar year.¹⁰ We interpolate tax payments for 2013 and 2015 using the midpoint between actual payments in the surrounding years. Given the smoothness inherent in ad valorem tax receipts over time, we do not believe the results are sensitive to this approach.

Two categories of reported severance taxes are used in the analysis: 1) Refineries, Gas Plants, Gathering & Compression and 2) Other Oil, Gas & Mining Property. Refineries are viewed as manufacturing and are removed from the total for four counties in Oklahoma (Kay, Carter, Tulsa, and Garvin). The adjusted total (ex refineries) for the first category is added to the second to reflect total oil and gas-related property tax payments in Oklahoma. It is important to note that this measure substantially understates the total property tax payments paid by the oil and gas industry. The total includes only property used in the production of oil and gas and excludes buildings and other real property, as well as significant personal property used in the operations of oil and gas firms across the state. Effective property tax rates are calculated as annual property taxes divided by the total value of oil and gas production.

Figure 7 illustrates annual Oklahoma property tax payments related to oil and gas production and effective ad valorem tax rates from FY2012 to FY2016. Payments totaled \$157.6 million in FY2016, up 42% from \$110.7 million in FY2012. The effective rate was 1.4% in FY2016 based on \$157.6 million in property taxes and \$11.51 billion in production value. Over the FY2012 to FY2015 period, property taxes averaged slightly less than 1% of production value. The effective rate increased sharply in FY2016 because of both higher tax payments and falling production value.

State-Level Reporting Challenges. We next examine estimated annual property tax payments for the sixteen largest producing states. The targeted comparison year is FY2016, the most recently available data for most states. A variety of sources are used to form ad valorem tax estimates for the sixteen states. The primary sources are state tax reporting agencies. Sources available in electronic form are detailed in the notes to the report.¹¹

Figure 7. Oil and Gas-Related Ad Valorem Tax Payments and Effective Rate - Oklahoma

Source: Oklahoma Tax Commission and RegionTrack calculations.

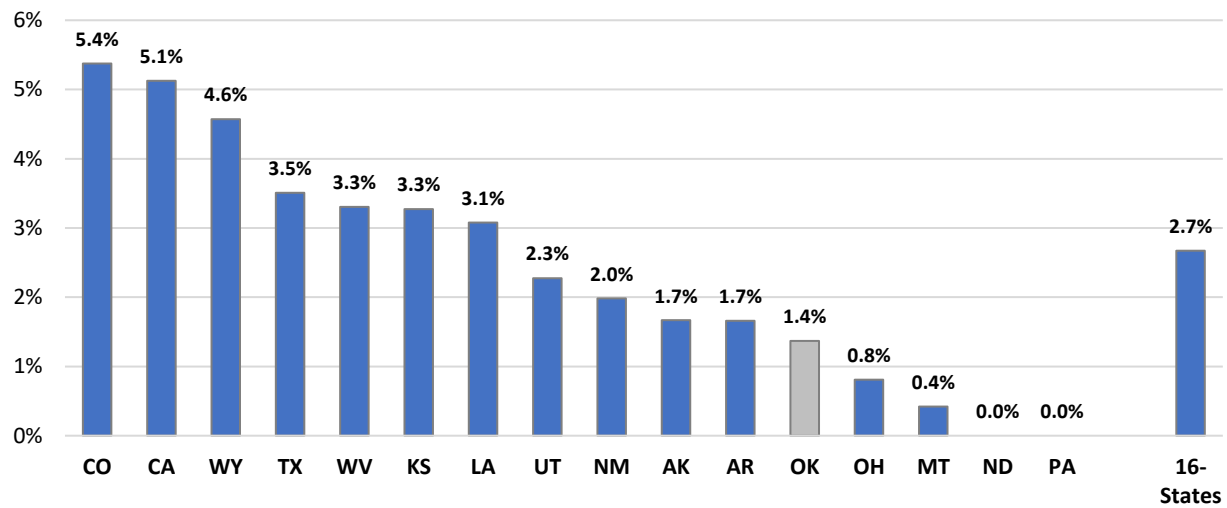
Notes: Oklahoma levies a severance tax in lieu of ad valorem tax on production. All data are for fiscal years. Payments in 2013 and 2015 are interpolated as the midpoint between adjacent years. The effective rate is calculated as ad valorem tax payments divided by the total value of oil and gas production.

Numerous challenges are faced in assembling a state-level comparative view of oil and gas-related ad valorem taxation. For example:

1. Property valuations are not determined at a uniform point in time across the states;
2. The definition used for the oil and gas industry differs greatly across the states;
3. The specific assets deemed oil and gas-related differ greatly across the states;
4. Property taxes are generally assessed by local governments rather than the state and a consolidated source of tax reporting may not be available;
5. There are timing differences associated with the schedule governing when property taxes are calculated, reported, and paid that may affect the comparative base year for some states;
6. Some states simply report valuations and millage rates that require a direct calculation or estimation of taxes;
7. There are generally no follow-up revisions to the data to reflect valuation challenges, rebates, reassessments, and other subsequent changes to actual tax receipts.

Among the 16 largest producing states, there are no property taxes assessed on oil and gas activity in North Dakota and Pennsylvania. The estimates for Colorado, New Mexico, Texas, and Ohio reflect FY2015 tax payments, the latest data available. Taxes in West Virginia for FY2016 are based on the value of production from two years prior. Taxes reported for Arkansas are for 2016 payment but based on FY2015 valuations. California property taxes are only reported at the local level and must be extrapolated to the state level.¹²

Estimates of oil and gas-related ad valorem tax receipts for each state and the underlying effective rate calculations are detailed in Appendix A2. See Raimi and Newell (2016) for detailed comparative estimates of ad valorem taxes paid by the oil and gas sector in the producing states.

Figure 8. Effective Ad Valorem Tax Rate (FY2016¹)

Notes: Data are collected from various state reporting agency. Sources available in electronic form are detailed in the notes to the report. See Figure 15 for ad valorem tax payments by state.

¹ The effective rates have a targeted base year of FY2016, subject to the inherent variability in state-to-state reporting.

Oklahoma Versus Other Producing States. Comparative estimates of effective ad valorem tax rates are shown in Figure 8 for the 16 largest producing states. The rates are targeted at a base year of FY2016, subject to the inherent variability in state-to-state reporting. Given the historical smoothness in aggregate state-level ad valorem tax data over time, this variation is not believed to alter the overall results in any meaningful way.

The average effective ad valorem tax rate is 2.7% across the group of sixteen states, ranging from 0% in North Dakota and Pennsylvania to 5.4% in Colorado.

Three states – Colorado, California, and Wyoming – have effective ad valorem tax rates above 4.5%. Colorado uses primarily property taxes because it allows an offset of 87.5% of ad valorem taxes paid as a credit toward severance taxes, leaving little net severance tax liability for most payers. California assesses a local ad valorem tax, with no statewide or local severance tax. Wyoming has a local ad valorem tax levied on production value as well as a tax on equipment.

Four additional states – Texas, West Virginia, Kansas, and Louisiana – levy property taxes between 3% and 4% of production value. Texas applies property taxes to both mineral value and equipment.

Oklahoma falls in a third tier of states – Utah, New Mexico, Alaska, Arkansas, and Oklahoma – with effective ad valorem tax rates between approximately 1.5% and 2.5%. Alaska and New Mexico have historically relied more heavily on severance taxes. Utah, Arkansas, and Oklahoma have historically favored limited reliance on property taxes.

The final four states – Ohio, Montana, North Dakota, and Pennsylvania – have effective ad valorem tax rates below 1% of production value. Fast-growing gas producer Ohio continues to levy low overall oil

and gas-related taxes. North Dakota and Pennsylvania do not permit local governments to assess ad valorem taxes on oil and gas production activity.

Combined Severance and Ad Valorem Tax Rates. Figure 9 provides a comparative view of combined severance and ad valorem effective tax rates with a base year of FY2016 for severance taxes and an approximate base year of FY2016 (subject to data limitations) for ad valorem taxes. Appendix A2 provides details of the component calculations for the combined effective rates.

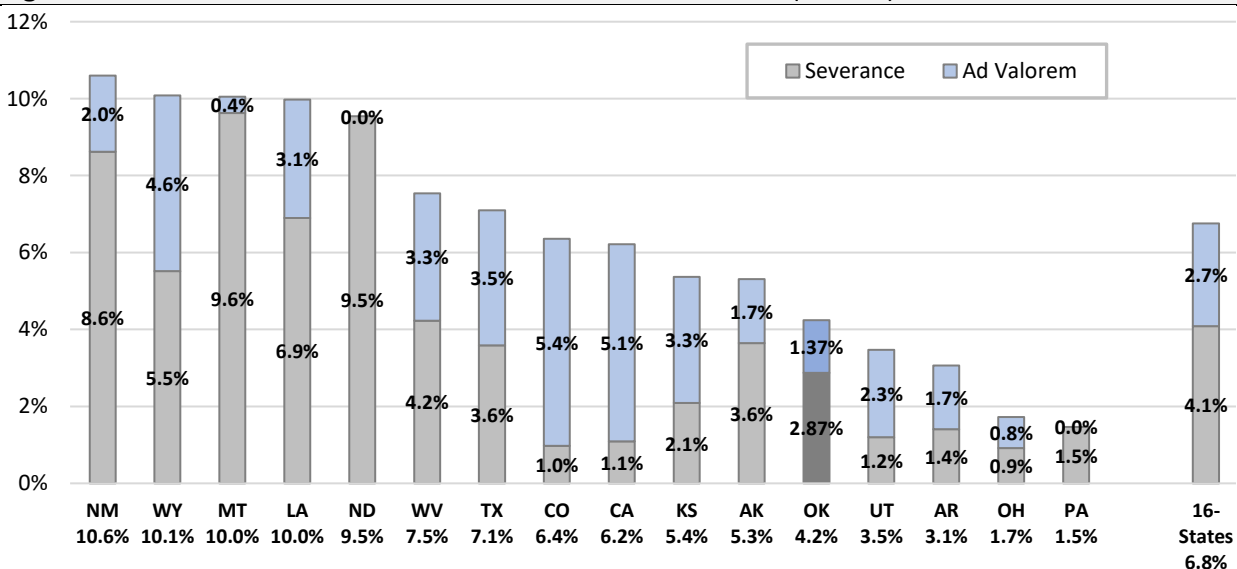
Oklahoma's combined effective rate is 4.24%, composed of a severance tax rate of 2.87% and ad valorem rate of 1.37%. This ranks 12th among the sixteen states in the sample.

The average combined effective rate is 6.8% across all sixteen states - 4.1% for severance and 2.7% for ad valorem.

A top tier of five states – New Mexico, Wyoming, Montana, Louisiana, and North Dakota – have combined effective rates of approximately 10%. Among these states, all but Wyoming are heavily tilted toward high severance taxes and relatively low property taxes. Montana levies less than 0.5% in effective property taxes. Montana also has no ad valorem taxes on the value of minerals but allows local property taxes on some surface equipment. Wyoming is unique in that it assesses a relatively high share of both severance and property taxes. Louisiana assesses a large severance tax in lieu of ad valorem tax on production but allows local ad valorem taxes on equipment. North Dakota allows no property taxes on oil and gas assets but relies heavily on high severance taxes.

A second tier of six states – West Virginia, Texas, Colorado, California, Kansas, and Alaska – has combined effective rates between 5% and 8%. These states generally use a more balanced combination of severance and property taxes. Leading producer Texas has a 7.1% rate that is split almost evenly

Figure 9. Combined Severance & Ad Valorem Effective Tax Rates (FY2016)



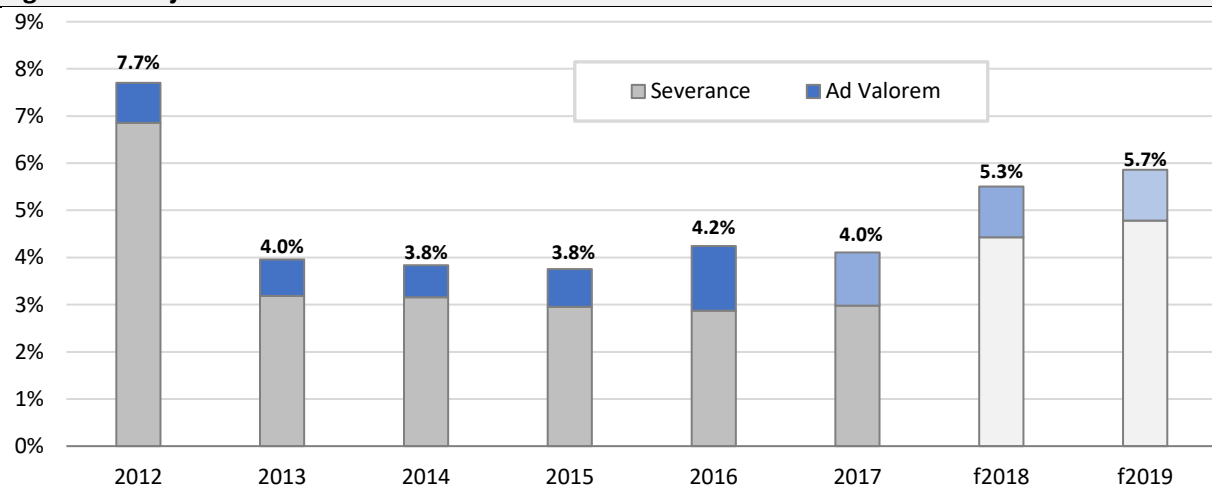
between the two taxes. Colorado and California are heavily weighted toward property taxes and have among the lowest severance tax rates at approximately 1%. Kansas assesses ad valorem taxes on both equipment and reserves. Alaska has transitioned from heavy reliance on severance taxes to a more balanced share of each following a collapse in state severance taxes in recent years.

Oklahoma's combined rate of 4.2% is grouped among a final tier of five states – Oklahoma, Utah, Arkansas, Ohio, and Pennsylvania – with combined effective rates below 5%. Utah maintains a low combined rate of 3.5%, including ad valorem taxes on reserves and a conservation tax of 0.2%. Neighboring Arkansas assesses a 3.1% combined rate. Both fast-growing gas-producing states of Ohio and Pennsylvania have very low combined effective rates of 1.7% and 1.5%, respectively.

Forward-Looking Combined Rate. The expected rebound in Oklahoma severance taxes in response to recent tax law changes will raise the combined severance and ad valorem tax rate going forward. Figure 10 provides projections of the combined rate through FY2019. The severance tax outlook is based on Oklahoma Tax Commission projections of severance tax payments described in the prior section. The ad valorem tax assumptions assume property tax payments increase by 2% annually in the FY2017 to FY2019 period. The oil and gas production value assumptions are the same used to estimate projected severance tax rates in the prior section of the report. Figure A1 in the Appendix provides details on the components of the projected effective rate calculations.

The combined severance and ad valorem effective tax rate in Oklahoma will rise to a projected 5.3% in the current fiscal year (FY2018) and to 5.7% in FY2019. Assuming constant tax policy in other states, this would rank Oklahoma 10th among the 16 states based on FY2019 combined effective severance and ad valorem tax rates. The adjusted effective rate would fall just above Kansas (5.4%) and Alaska (5.3%) and just below California (6.2%). The state would fall 1.4% below the effective rate of 7.1% in Texas.

Figure 10. Projected Combined Severance & Ad Valorem Effective Tax Rate - Oklahoma



Source: Oklahoma Tax Commission, Energy Information Administration, and RegionTrack calculations.

Notes: Data are for fiscal years. Ad valorem tax payments in FY2017, FY2018, and FY2019 assume 2% annual growth. Severance tax receipts in FY2018 and FY2019 are based on estimates by the Oklahoma Tax Commission. Value of crude oil and natural is calculated as the total market value of crude oil and natural gas production. The effective rate is the calculated as the sum of the effective severance tax rate and effective ad valorem tax rate in each period.

IV. Measuring the Broader Tax Contribution of Oil & Gas

The combined effective severance and ad valorem tax rate is often used as a measure of the tax contribution of the state's oil and gas industry. Cross-state comparisons also frequently use the two taxes as a basis for comparing relative tax burdens on the industry. For recent examples of multi-state comparisons based on these measures, see Covenant (2017) and Raimi and Newell (2018). For examples of advocacy groups using severance and ad valorem taxes as evidence of a low oil and gas tax burden in Oklahoma, see Headwaters (2013) and Blatt (2017).

Based solely on these two taxes, Oklahoma appears to be a relatively low-tax state with respect to oil and gas activity, with a combined 4.2% effective severance and ad valorem tax rate (see Figure 9). While these taxes tend to capture the direct taxation applied to production, they provide a wholly ineffective measure of the overall tax contribution of the oil and gas industry within the state. Along with severance and ad valorem taxes, Oklahoma also levies relatively high personal income and sales taxes. These are also the two largest sources of total state and local government tax revenue in Oklahoma.

Instead, the overall structure of a state's tax system can have as much influence on the total tax burden of the oil and gas industry as the amount of severance and ad valorem taxes levied. The other oil and gas-producing states levy a widely varying range of taxes, including various levels of personal income and sales taxes. For example, the three major producing states of Alaska, Texas, and Wyoming levy no personal income tax. Household earnings in these states accrue to wage and salary workers, self-employed proprietors, royalty owners, and others in the oil and gas sector, but these earnings do not contribute to total state tax revenue through personal income tax payments. In Oklahoma, personal income taxes have comprised almost one-third of total state tax revenue the past two decades. Even among energy states that do levy an income tax, tax rates can differ greatly.

Not all states collect sales taxes either, with rates highly variable as well. Alaska and Montana, two traditionally high severance tax states, have only small local sales taxes. In fact, Alaska has long relied predominately on production taxes from oil and gas to fund state government and is the only state that does not collect state sales tax or levy an individual income tax on personal income.

Reports produced by other state governments recognize the broader influence of the oil and gas industry on statewide taxation. For example, Colorado examines the effective rate for a combination of production taxes, property taxes, corporate income taxes, and sales taxes generated by firms in the oil and gas industry (Carey, 2014). While not including personal income taxes, this approach provides a much better measure of the 'corporate' tax contribution of the industry than simply using severance and ad valorem taxes. New Mexico measures state and local tax revenue from production, royalties and bonuses, gross receipts on purchases, payroll, income, and many other taxes (Anklam and Graeser, 2015 and Clifford, 2011).¹³ While the approach used in New Mexico provides an all-encompassing view of oil and gas taxation, limited data availability makes this exercise cost-prohibitive across multiple producing states. Detailed tax incidence studies that provide reliable estimates of tax payments by industry are simply not available in Oklahoma and most other states.

We broaden the widely used approach of focusing solely on severance and ad valorem tax by expanding the effective tax rate analysis to both personal income and sales tax payments. This approach captures the two largest tax sources in Oklahoma and accounts for key differences with other producing states (e.g. leading-producer Texas has no personal income tax).

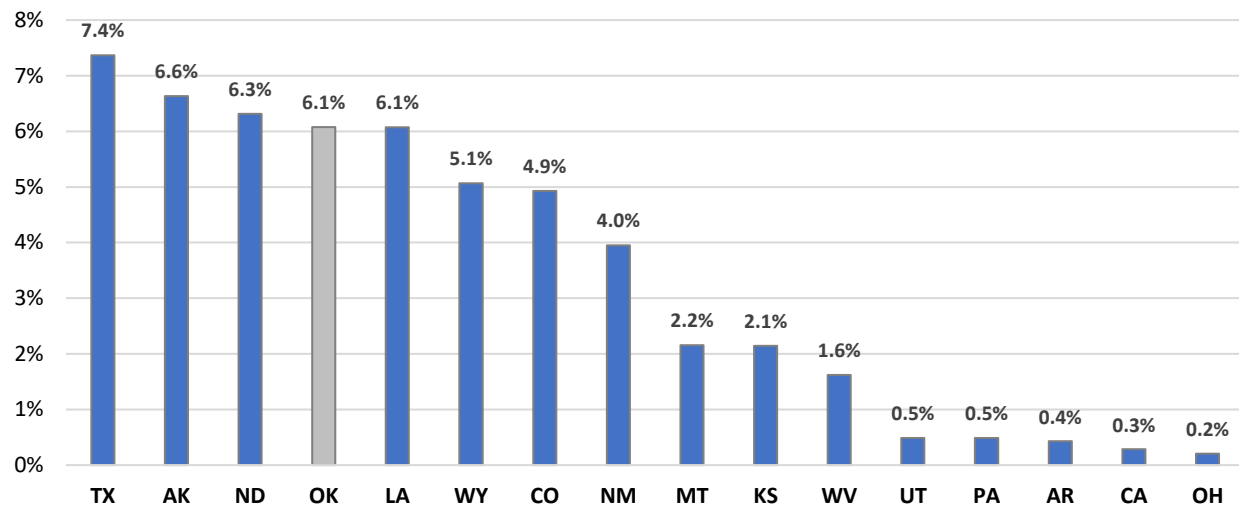
While not a comprehensive assessment of the total tax obligation of the industry, this approach uses a consistent methodology across the producing states to provide estimates that are much more reflective of the true tax contribution of the industry. It also demonstrates the necessity of using a broader approach when evaluating the tax burden of the oil and gas industry in a state like Oklahoma that levies relatively large personal income and sales taxes.

Personal Income Taxes and Oil and Gas Earnings. The income tax contribution of the oil and gas industry in Oklahoma is traced to the significant wages paid to the state's oil and gas workers and earnings of self-employed proprietors. Oklahoma is one of only a handful of producing states with both a very large white-collar oil and gas labor force and significant field employment, including both production and exploration.

Measured by average annual household earnings derived directly from the oil and gas sector¹⁴ in the 2015 to 2016 period (for consistency with the FY2016 tax year), Texas (\$71.4 billion), Colorado (\$10.26 billion), Louisiana (\$8.41 billion), Oklahoma (\$7.27 billion), and California (\$4.38 billion) have far higher levels of total oil and gas industry earnings than the remaining producing states. The potential for personal income tax payments in these five states is far greater than in the smaller producing states. A second tier of states based on oil and gas earnings by households includes Pennsylvania (\$2.18 billion), Kansas (\$2.12 billion), North Dakota (\$2.06 billion), Alaska (\$2.06 billion), New Mexico (\$2.05 billion), and Wyoming (\$1.08 billion). No other producing state generates \$1 billion or more annually in household oil and gas earnings.

Certain oil and gas states, including Oklahoma, also have a far greater share of total household earnings derived from oil and gas activity (see Figure 11). In the 2015 to 2016 period, Texas (7.4%) has the highest share of household earnings derived directly from the oil and gas sector. Oklahoma ranks 4th (6.1%), just behind Alaska (6.6%) and North Dakota (6.3%) and matching Louisiana (6.1%). Other states with a high share include Wyoming (5.1%), Colorado (4.9%), and New Mexico (4.0%). Among these states, Texas, Oklahoma, Louisiana, and Colorado are all classified as having both a very large oil and gas earnings base relative to other producing states and an oil and gas sector that comprises a large share of total statewide household earnings. It is vitally important to consider the role of personal income tax payments in states like Oklahoma that have both a large oil and gas industry and a high share of total statewide household earnings derived from the industry.

No other producing state has more than a 2.2% share of total statewide household earnings originating in the oil and gas sector in the period. Several major producing states have less than 1% of state earnings from oil and gas, including Utah (0.5%), Pennsylvania (0.5%), Arkansas (0.4%), California (0.3%), and Ohio (0.2%). The low overall share of household earnings in these states is due either to the industry

Figure 11. Share of Total Household Earnings Derived from Oil and Gas Sector (2015-16 Average)

Notes: Household earnings is defined by Bureau of Economic Analysis as employee compensation plus proprietors' income. Proprietor's income consists primarily of the income of sole proprietors and partnerships. The share of household earnings in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

being a small component of a relatively large state economy (e.g. California, Pennsylvania, and Ohio) or the state simply having a relatively small oil and gas sector (e.g. Arkansas and Utah). It is also much less important to consider the role of personal income taxes in assessing the tax contribution of the oil and gas industry in these states.

While the amount of oil and gas earnings influences personal income tax revenue in many producing states, it has no effect in states with no income tax. These include Texas, the nation's largest producer, as well as major producers Alaska and Wyoming. Even among the producing states that levy income taxes, there are large differences in average income tax rates. Measured using total personal income tax payments as a share of total household earnings, Oklahoma paid 2.62% of total household earnings in income taxes versus 3.06% nationally and 3.02% in the sixteen major producing states in FY2016. Among the producing states, average income tax rates range from 0% in Texas, Wyoming, and Alaska to 5.1% in California (see Figure 12).

Figure 12 provides comparative estimates of the personal income tax contribution of oil and gas activity in Oklahoma and the other major producing states. The income tax estimates are derived by multiplying the total household earnings of workers and proprietors in the oil and gas sector by the average income tax rate within each state. The use of the average tax rate will substantially understate the amount of oil and gas-related income taxes paid in Oklahoma and most producing states given the high average earnings in the oil and gas industry and progressive tax rates in most states. Nonetheless, it provides a consistent measure for comparing tax relative tax burdens across states. Earnings in the oil and gas sector are averaged across the 2015 to 2016 period for consistency with FY2016 tax data.

Because oil and gas activity is a component of the broader mining sector, we remove non-oil and gas mining activity. The share of earnings in each state derived from oil and gas activity is calculated as the

Figure 12. Personal Income Tax Contribution of Oil & Gas Sector (FY2016)

State	Oil & Gas Sector Household Earnings ¹ (2015-16 avg.)	FY2016 Average Income Tax Rate ²	Oil & Gas-Related Income Tax at Average Rate ³	Oil & Gas-Related Income Tax at OK Rate (2.62%) ⁴	FY2016 Oil & Gas Production Value	Effective Income Tax Rate
Alaska	\$2,059,141,152	0.00%	\$0	\$54,019,749	\$6,704,000,405	0.00%
Arkansas	312,181,427	3.73%	11,643,239	8,189,804	2,265,993,926	0.51%
California	4,382,463,364	5.11%	224,129,405	114,970,054	7,804,566,938	2.87%
Colorado	10,258,354,390	3.09%	316,683,019	269,118,863	8,085,748,405	3.92%
Kansas	2,116,304,923	2.28%	48,205,166	55,519,390	2,095,423,520	2.30%
Louisiana	8,412,495,955	2.12%	178,176,948	220,694,398	6,422,504,345	2.77%
Montana	626,211,317	4.07%	25,459,759	16,428,101	991,287,508	2.57%
North Dakota	2,055,294,361	1.36%	28,008,974	53,918,832	15,546,573,903	0.18%
New Mexico	2,048,685,420	2.69%	55,099,020	53,745,452	8,329,094,006	0.66%
Ohio	749,459,851	2.30%	17,213,991	19,661,417	3,742,552,340	0.46%
Oklahoma	7,269,059,179	2.62%	190,697,345	190,697,345	11,514,670,836	1.66%
Pennsylvania	2,175,342,862	2.61%	56,863,547	57,068,198	11,819,866,993	0.48%
Texas	71,388,693,090	0.00%	0	1,872,819,284	63,591,098,355	0.00%
Utah	450,381,628	3.53%	15,890,641	11,815,364	1,996,888,030	0.80%
West Virginia	673,791,358	4.54%	30,604,998	17,676,321	3,177,522,760	0.96%
Wyoming	1,083,658,766	0.00%	0	28,428,830	6,717,027,690	0.00%
16-States	\$116,061,519,042	3.02%	\$1,198,676,051	\$3,044,771,400	\$160,804,819,959	0.75%

Source: Bureau of Economic Analysis, Census Bureau, and RegionTrack calculations.

Notes: ¹ Household earnings is defined by Bureau of Economic Analysis as employee compensation plus proprietors' income. Earnings are averaged in the 2015-2016 period for consistency with the FY2016 tax year. Proprietor's income consists primarily of the income of sole proprietors and partnerships. The share of household earnings in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

² The average income tax rate for each state is calculated as total individual income tax payments divided by total household earnings.

³ Income tax paid by the oil and gas industry is estimated as oil and gas earnings times the average income tax rate in the state.

⁴ Oil and gas earnings in each state multiplied by the 2.62% average rate in Oklahoma.

sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

In Oklahoma, estimated personal income tax payments by workers and proprietors in the oil and gas sector at the state average tax rate total \$190.7 million in FY2016. This is approximately 6.4% of the \$3.0 billion in total personal income tax payments made in the state in FY2016. Again, this provides a highly conservative estimate based on the average income tax rate in the state, which understates the actual rate in the high-wage oil and gas industry.

Colorado (\$316.7 million) derives considerably more personal income tax revenue from oil and gas than Oklahoma, due primarily to a higher average income tax rate. California (\$224.1 million) slightly exceeds the income tax payments in Oklahoma, but has a far lower level of earnings combined with a far higher tax rate. Louisiana also produces significant personal income tax revenue of \$178.2 million.

Among the remaining states, none produces even one-third the income tax revenue received in Oklahoma from oil and gas activity. In FY2016, Oklahoma produced approximately \$150 million or more

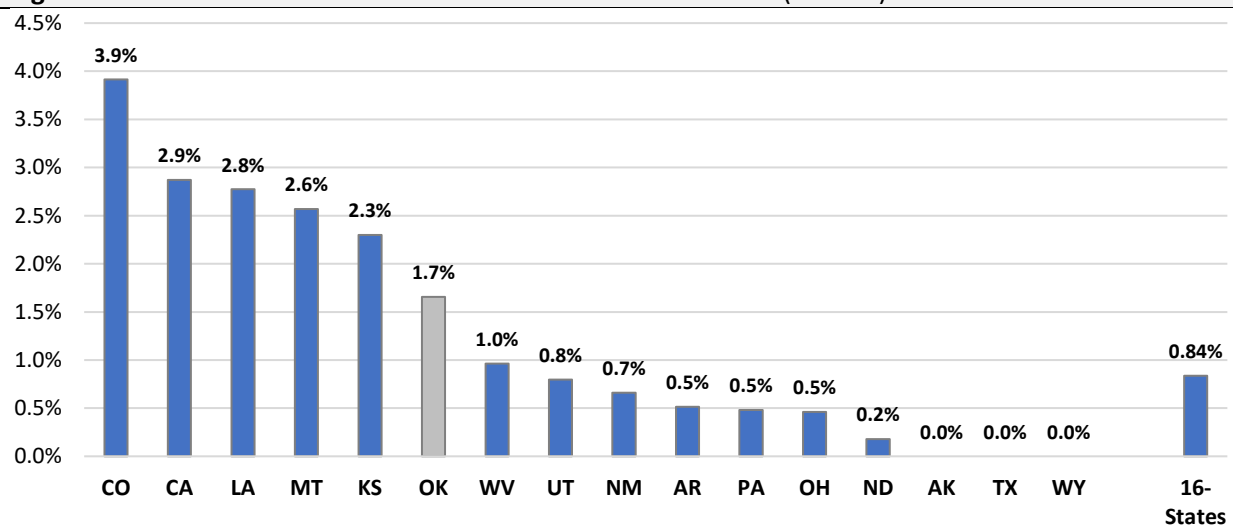
in income tax revenue than Arkansas, Kansas, Montana, North Dakota, New Mexico, Ohio, Pennsylvania, Texas, Utah, West Virginia, and Wyoming. Again, Texas, Alaska, and Wyoming derive no personal income tax revenue from the activity of the oil and gas industry.

To gauge the significance of oil and gas-related income tax payments in Oklahoma relative to the states with no income tax, potential income tax receipts are calculated in Figure 12 for each state based on the prevailing 2.62% average income tax rate in Oklahoma. Among the states with no personal income tax, Texas would derive \$1.87 billion in personal income tax revenue at Oklahoma's average rate. Alaska would raise an additional \$54 million, while Wyoming would collect \$28 million. California would lose \$110 million in income tax due to its high average tax rate. Louisiana would gain more than \$40 million because of its lower average income tax rate.

Effective Personal Income Tax Rates. Figure 13 illustrates the wide variation in effective income tax rates on oil and gas production across the sixteen producing states. The effective rate is calculated as estimated income tax paid on household earnings from the oil and gas industry divided by the total value of oil and gas production in FY2016. Across all sixteen states, the effective income tax rate relative to production is 0.84%. Oklahoma has an effective income tax rate relative to production of 1.7%, 6th highest among the sixteen states and double the overall average rate. Colorado has the highest effective rate at 3.9%, more than double Oklahoma's rate. California and Louisiana have effective rates just below 3%, while Kansas and Montana have effective rates of approximately 2.5%.

All other states have an effective income tax rate of 1% or less, with Alaska, Texas, and Wyoming having zero percent effective rates. The gas-producing states of Ohio and Pennsylvania both have effective

Figure 13. Effective Income Tax Rate on Oil and Gas Production (FY2016)



Notes: Income tax is calculated as average household earnings in the oil and gas sector in the 2015-2016 period times the average income tax rate in the state in FY2016. The effective income tax rate is income tax related to oil and gas activity divided by total value of oil and gas production. Household earnings is defined by Bureau of Economic Analysis as employee compensation plus proprietors' income. Proprietor's income consists primarily of the income of sole proprietors and partnerships. The share of household earnings in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

income tax rates of approximately 0.5%. Large oil producer North Dakota (0.2%) has the lowest effective income tax rate among the states that have an income tax in place.

Particularly noteworthy is that many of the states with a combined severance and ad valorem effective tax rate higher than Oklahoma's have very low personal income tax rates. These include North Dakota, New Mexico, and West Virginia, plus the three producing states with no income tax – Texas, Alaska, and Wyoming. This, again, underscores the importance of including personal income taxes when using these states to evaluate the oil and gas-related tax contribution in Oklahoma.

Oil and Gas-Related Sales Tax. Firms in the oil and gas industry also pay significant amounts of sales tax, with many state and local governments highly dependent upon these taxes to fund government activities.¹⁵ Sales taxes are an especially critical source of revenue at the local level in Oklahoma, given that ad valorem tax revenue cannot be used to fund general municipal expenditures.

The differential in both sales tax rates and the propensity to tax economic activity across the states results in great variation in the sales tax contribution of oil and gas activity across the producing states. Sales tax rates vary considerably as well. Based on the ongoing annual survey produced by the Tax Foundation, Oklahoma has the 6th highest average state and local sales tax rate among all states at 8.86% in 2017, and the 3rd highest rate among energy-producing states.¹⁶

Louisiana (9.98%) and Arkansas (9.30%) have the highest average rates among the major energy-producing states, as well as the highest and 3rd highest rates, respectively, across all fifty states. Other producing states with rates above 8% include Kansas (8.62%), California (8.25%), and Texas (8.19%). However, other producing states have much lower rates. The average sales tax rate is only 7.55% in New Mexico, 7.50% in Colorado, 7.14% in Ohio, 6.78% in North Dakota, 6.76% in Utah, 6.34% in Pennsylvania, 6.29% in West Virginia, and 5.40% in Wyoming. Alaska (1.76%) has the lowest rate, while Montana has no general sales tax.

In comparing the overall effective tax burden across the producing states, many states are much less reliant than Oklahoma on sales taxes. Of the five states with the highest effective severance and ad valorem tax rates (New Mexico, Wyoming, Montana, Louisiana, and North Dakota), four have sales tax rates that are between 1.3% and 3.3% lower than in Oklahoma. Levied across the broad retail base of a state, these sales tax rate differentials can produce significantly different amounts of revenue.

Differences in the overall level of oil and gas activity across the states also produces much different sales tax contributions. States with larger oil and gas industries, in general, tend to generate relatively more sales tax revenue from oil and gas activity than states with a smaller industry. States with more drilling activity also tend to produce significantly more sales tax revenue. Oklahoma has both a large oil and gas industry and high levels of drilling activity.

Collecting comparable state-level data on sales tax paid by the oil and gas industry from state tax agencies is generally not possible. Differences in tax law, reporting standards, payment processes,

collecting and remitting parties, and treatment of out-of-state purchases makes assembling comparative sales tax data related to oil and gas activity virtually impossible in most states. The most significant hurdle is that it is not possible in most states to differentiate between sales tax payments remitted by the oil and gas industry on their own taxable sales versus taxes paid in conjunction with their own taxable purchases. As a result, the sales tax payable on many of the purchases by the oil and gas industry are remitted by firms in other industries and cannot be tracked. The tax comparison in this report is most concerned with estimates of sales taxes paid directly by oil and gas firms, not necessarily the amount remitted by the oil and gas industry based on the purchases of others. This is a common misuse of sales tax data reported at the industry level. Comparative overall measures of sales tax burden are further complicated by differences in the share of the tax that is paid by residents versus nonresidents, particularly by tourists.

Comparative state-level estimates of the sales tax contribution of the oil and gas industry are formed by apportioning total state and local sales tax receipts to each industry based on its average contribution to state GDP in the 2015 to 2016 period (for consistency with FY2016 tax data). This follows the approach commonly used to apportion state and local taxes at the industry level in widely-used economic impact models.¹⁷ This is also consistent with the basic approach used in Colorado’s overall assessment of oil and gas industry tax burden (Carey, 2014). The underlying assumption is that sales tax payments related to the oil and gas industry are proportional to the overall size of the industry. Hence, the amount of purchases made by the industry, income paid to workers, and earnings of proprietors who operate oil and gas-related businesses would be closely related to sales taxes paid. This approach is applied consistently to each state whereby the oil and gas industry’s share of total state economic activity determines the overall share of state sales tax payments derived from the industry.¹⁸ It also accounts for overall differences in the size of the taxable sales base across the producing states. The overall estimates are not highly sensitive to the choice of GDP to apportion the data. The relative sizes of the cross-state estimates are essentially unchanged when using other measures of economic activity such as total household earnings share, wage and salary income share, or total compensation share in place of GDP.

All sales tax data used in the analysis are derived from the Census Bureau’s State and Local Government Finance database.¹⁹ The database provides a standardized measure of tax collections by type of tax at both the state and local level. Total sales taxes at the state and local level are based on FY2016 data at the state level and FY2015 data at the local level. These measures reflect the most recently available data on a consistent basis across the states. Only general sales and gross receipts are included. Targeted sales taxes such as alcohol, pari mutuel, tobacco, and motor fuel taxes are excluded.

Because oil and gas activity is a component of the broader mining sector, we remove non-oil and gas-related mining activity from GDP using the same approach used with oil and gas-related household earnings in the prior section of the report. The share of GDP in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

Oklahoma's estimated total sales tax contribution is second highest among the sixteen states, behind only the \$3.14 billion estimate for Texas. Louisiana (\$300.0 million), Colorado (\$210.7 million), and New Mexico (\$208.6 million) are the only other states estimated to collect more than \$200 million. North Dakota is estimated to generate only \$110.3 million, roughly one-fifth the total in Oklahoma, which reflects both a smaller oil and gas industry and lower average sales tax rates.

Sales Tax Payments. Figure 13 details estimated sales tax payments for the sixteen producing states in the sample. Texas produces the largest amount at \$3.14 billion. Oklahoma ranks 2nd with \$536.4 million in estimated state and local sales tax payments (out of a total of \$4.56 billion statewide) in FY2016. The state's high share of GDP from oil and gas activity is reflected in the estimated sales tax total.

Oklahoma's oil and gas sector comprises the second largest share of total state GDP (11.8%) among the producing states, trailing only Alaska (13.9%), and is considerably higher than Wyoming (9.7%), North Dakota (8.9%), Texas (7.9%), and New Mexico (6.8%).

Other states producing more than \$200 million in estimated sales tax from oil and gas activity include Louisiana (\$300.0 million), New Mexico (\$208.6 million), and Colorado (\$210.7 million).

Figure 13. Oil & Gas Sector Sales Tax Contribution and Effective Rate (FY2016)

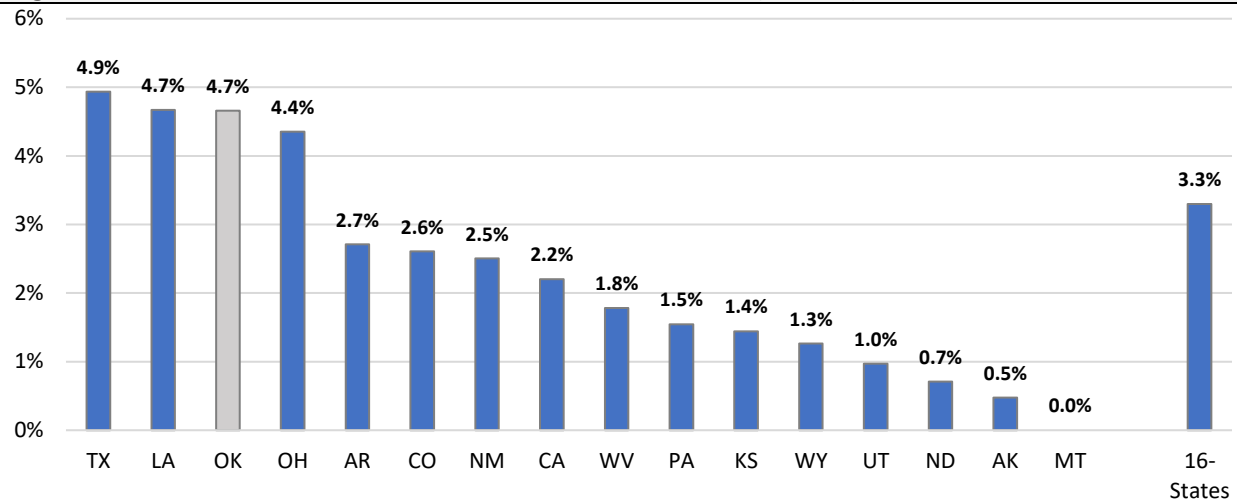
State	Oil & Gas Share of GDP (2015-16 avg.) ¹	FY2016 Total State and Local Sales Tax ²	FY2016 Oil & Gas-Related Sales Tax	FY2016 Oil & Gas Production Value	Effective Sales Tax Rate
Alaska	13.9%	\$231,195,000	\$32,042,117	\$6,704,000,405	0.5%
Arkansas	1.4%	4,398,654,000	61,395,130	2,265,993,926	2.7%
California	0.3%	50,668,814,000	171,938,465	7,804,566,938	2.2%
Colorado	3.2%	6,614,809,000	210,727,019	8,085,748,405	2.6%
Kansas	0.7%	4,208,361,000	30,226,613	2,095,423,520	1.4%
Louisiana	4.1%	7,363,508,000	300,005,145	6,422,504,345	4.7%
Montana	1.1%	0	0	991,287,508	0.0%
North Dakota	8.9%	1,239,506,000	110,340,583	15,546,573,903	0.7%
New Mexico	6.8%	3,068,551,000	208,579,820	8,329,094,006	2.5%
Ohio	1.1%	14,486,920,000	162,944,461	3,742,552,340	4.4%
Oklahoma	11.8%	4,564,158,000	536,442,228	11,514,670,836	4.7%
Pennsylvania	1.6%	11,079,520,000	182,638,361	11,819,866,993	1.5%
Texas	7.9%	39,534,846,000	3,139,486,542	63,591,098,355	4.9%
Utah	0.7%	2,837,403,000	19,381,583	1,996,888,030	1.0%
West Virginia	4.3%	1,302,750,000	56,616,453	3,177,522,760	1.8%
Wyoming	9.7%	879,911,000	84,967,844	6,717,027,690	1.3%
16-States	3.2%	\$152,478,906,000	\$5,307,732,364	\$160,804,819,959	3.3%

Source: Bureau of Economic Analysis, Census Bureau, and RegionTrack calculations.

Notes: Oil and gas-related sales tax is calculated by multiplying the share of GDP in the oil and gas sector by total state and local sales taxes.

1 The share of GDP in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)). GDP is averaged in the 2015-16 period for consistency with FY2016 tax data.

2 Includes both state and local sales and use tax, as well as general gross receipts. Based on the definition in the Census State and Local Government Finance database. State sales tax is for FY2016, the latest year available. Local sales tax is for FY2015, the latest year available.

Figure 14. Effective Sales Tax Rate on Oil and Gas Production (FY2016)

Notes: Includes both state and local sales and use tax, as well as gross receipts tax. Based on the definition used in the Census Bureau State and Local Government Finance Database. State sales tax is for FY2016, the latest year available. Local sales tax is for FY2015, the latest year available. The effective rate is state and local sales tax from oil and gas activity divided by total value of oil and gas production. Household earnings is defined by Bureau of Economic Analysis as employee compensation plus proprietors' income. Proprietor's income consists primarily of the income of sole proprietors and partnerships. The share of household earnings in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

Several of the key producing states generate much less estimated sales tax revenue. These include Arkansas (\$61.4 million), West Virginia (\$56.6 million), Alaska (\$32.0 million), Kansas (\$30.2 million), and Utah (\$19.4 million). Montana produced none. Most of the low sales tax-producing states have relatively small levels of oil and gas employment and low average state and local sales tax rates.

Effective Sales Tax Rates. Figure 14 ranks the sixteen producing states by effective sales tax rates on oil and gas production in the period. The effective rate is calculated as estimated oil and gas-related sales tax divided by total value of oil and gas production in FY2016.

The effective sales tax rates vary from a low of zero in Montana to a high of 4.9% in Texas. Oklahoma's effective sales tax rate of 4.7% is just below Texas, 3rd highest among the 16 states, and 1.4% above the average rate of 3.3% across all 16 states. Louisiana (4.7%) and Ohio (4.4%) are the only other states with an effective sales tax rate above 2.7%.

Four states – Arkansas, Colorado, New Mexico, and California – form a middle tier with effective sales tax rates between 2.2% and 2.7%. Five additional states – West Virginia, Pennsylvania, Kansas, Wyoming, and Utah – have an effective rate between 1% and 2%. States with an effective sales tax rate below 1% include North Dakota (0.5%), Alaska (0.3%), and Montana (0.0%). Alaska, Montana, North Dakota, and Wyoming are all traditionally viewed as high tax states, yet they receive relatively little contribution from oil and gas activity in the form of sales taxes.

Overall Effective Tax Rate. Figure 15 summarizes total tax payments across all four tax categories examined - severance, ad valorem, personal income, and sales – along with the combined effective tax

rate on production for the sixteen producing states. Oklahoma's oil and gas industry contributed an estimated \$1.22 billion in FY2016 across the four taxes using the methodology described in each section of the report. Payments include \$536 million in sales tax, \$331 million in severance tax, \$191 million in personal income tax, and \$158 million in ad valorem taxes.

Oklahoma has the third largest total tax contribution, trailing only Texas (\$7.65 billion) and North Dakota (\$1.62 billion). Three other states produced more than \$1 billion across the four taxes including New Mexico (\$1.15 billion), Louisiana (\$1.12 billion), and Colorado (\$1.04 billion).

Effective tax rates on production across the four taxes range from a low of 3.5% in Pennsylvania to a high of 17.4% in Louisiana. Louisiana's rate is more than 3.5% above New Mexico, the state with the second highest rate. Oklahoma's effective rate of 10.6% ranks 8th among the sixteen states, slightly below the overall average rate of 10.8%. The state's overall rate is just below Wyoming (11.4%) and California (11.3%) and just above the rate in North Dakota (10.4%). Both Wyoming and North Dakota are traditionally viewed as high tax states. The overall rate in Texas (12.0%) is fifth highest and 1.4% higher than in Oklahoma.

Figure 16 illustrates the relative contribution share of each tax category across the states. Oklahoma's tax burden is divided into 44% sales tax, 27% severance tax, 16% income tax, and 13% ad valorem tax.

The tax shares across the sixteen states are relatively balanced in three of the four categories, with a 38% severance tax share, a 30% sales tax share, and a 25% ad valorem tax share, along with a smaller 7% share for income tax. The small income tax share across the states reflects in large part the lack of a

Figure 15. Oil and Gas-Related Tax Payments and Combined Effective Tax Rate (FY2016)

State	Oil and Gas-Related Taxes (\$millions)					2016 Oil & Gas Production Value (\$mil.)	Combined Effective Rate
	Severance	Ad Valorem	Personal Income	Sales	Total		
Louisiana	\$442.9	\$197.6	\$178.2	\$300.0	\$1,118.7	\$6,422.5	17.4%
New Mexico	717.6	165.0	55.1	208.6	1,146.3	8,329.1	13.8%
Colorado	79.0	434.7	316.7	210.7	1,041.1	8,085.7	12.9%
Montana	95.4	4.2	25.5	0.0	125.1	991.3	12.6%
Texas	2,282.7	2,229.8	0.0	3,139.5	7,652.0	63,591.1	12.0%
Wyoming	370.4	307.0	0.0	85.0	762.4	6,717.0	11.4%
California	85.2	400.0	224.1	171.9	881.3	7,804.6	11.3%
Oklahoma	330.7	157.6	190.7	536.4	1,215.5	11,514.7	10.6%
North Dakota	1,483.3	0.0	28.0	110.3	1,621.7	15,546.6	10.4%
West Virginia	134.4	105.0	30.6	56.6	326.6	3,177.5	10.3%
Kansas	43.8	68.6	48.2	30.2	190.8	2,095.4	9.1%
Ohio	34.3	30.3	17.2	162.9	244.8	3,742.6	6.5%
Arkansas	31.9	37.6	11.6	61.4	142.5	2,266.0	6.3%
Alaska	244.1	111.7	0.0	32.0	387.9	6,704.0	5.8%
Utah	\$23.9	\$45.4	\$15.9	\$19.4	\$104.6	\$1,996.9	5.2%
Pennsylvania	173.3	0.0	56.9	182.6	412.8	11,819.9	3.5%
16-States	\$6,572.9	\$4,294.7	\$1,198.7	\$5,307.7	\$17,374.0	\$160,804.8	10.8%

Notes: Base year is FY2016 for severance tax; approximately FY2016 for ad valorem tax subject to reporting variability; FY2015/16 for sales tax; and FY2016 for personal income tax.

personal income tax in dominant-producer Texas. Again, an additional \$1.87 billion in personal income tax on oil and gas-related household earnings would be collected in Texas at Oklahoma's average personal income tax rate. This would far exceed the \$1.2 billion in total oil and gas-related personal income tax paid in the thirteen producing states with an income tax (see Figure 15).

More than half (60%) of oil and gas-related revenue in Oklahoma is derived from sales and personal income taxes rather than from traditional severance and ad valorem taxes. This is the second highest share among the sixteen states. Sales and income tax payments are critical sources of tax revenue in other producing states as well. States deriving more than half of total oil and gas-related tax payments from sales and income taxes include Ohio (74%), Pennsylvania (58%), Arkansas (51%), and Colorado (51%). Focusing solely on severance and ad valorem taxes in these states can result in significant misstatement of the total tax burden of the industry. Other states with relatively high income and sales tax shares include California (45%), Louisiana (43%), Kansas (41%), and Texas (41%).

Figure 16 also illustrates the high degree of dependence of many of the producing states on traditional severance and ad valorem taxes. These states include Alaska (92%), North Dakota (92%), Wyoming (89%), Montana (80%), New Mexico (77%), and West Virginia (73%). These states are frequently compared to Oklahoma in terms of oil and gas tax burden yet have much different tax codes from a structural perspective. These states derive only roughly 10-25% of total oil and gas-related tax revenue from personal income and sales taxes. Comparisons of tax burden based solely on severance and ad valorem taxes present few issues when used among these states, yet they provide highly limited comparative information when evaluating the tax burden in Oklahoma and many other producing states.

Figure 16. Share of Tax Payments by Tax Type and Effective Rate (FY2016)

State	Total Tax Payments (\$millions)	Share of Total Oil and Gas-Related Tax Payments					Effective Rate
		Severance	Ad Valorem	Sales	Income	Total	
Louisiana	1,118.7	39.6%	17.7%	15.9%	26.8%	100.0%	17.4%
New Mexico	1,146.3	62.6%	14.4%	4.8%	18.2%	100.0%	13.8%
Colorado	1,041.1	7.6%	41.8%	30.4%	20.2%	100.0%	12.9%
Montana	125.1	76.3%	3.4%	20.4%	0.0%	100.0%	12.6%
Texas	7,652.0	29.8%	29.1%	0.0%	41.0%	100.0%	12.0%
Wyoming	762.4	48.6%	40.3%	0.0%	11.1%	100.0%	11.4%
California	881.3	9.7%	45.4%	25.4%	19.5%	100.0%	11.3%
Oklahoma	1,215.5	27.2%	13.0%	15.7%	44.1%	100.0%	10.6%
North Dakota	1,621.7	91.5%	0.0%	1.7%	6.8%	100.0%	10.4%
West Virginia	326.6	41.2%	32.1%	9.4%	17.3%	100.0%	10.3%
Kansas	190.8	22.9%	36.0%	25.3%	15.8%	100.0%	9.1%
Ohio	244.8	14.0%	12.4%	7.0%	66.6%	100.0%	6.5%
Arkansas	142.5	22.4%	26.4%	8.2%	43.1%	100.0%	6.3%
Alaska	387.9	62.9%	28.8%	0.0%	8.3%	100.0%	5.8%
Utah	104.6	22.8%	43.4%	15.2%	18.5%	100.0%	5.2%
Pennsylvania	412.8	42.0%	0.0%	13.8%	44.2%	100.0%	3.5%
16-States	17,374.0	37.8%	24.7%	6.9%	30.5%	100.0%	10.8%

Notes: Base year is FY2016 for severance tax; approximately FY2016 for ad valorem tax subject to reporting variability; FY2015/16 for sales tax; and FY2016 for personal income tax.

Figure 17 provides a visual gauge of the relative contributions of the four taxes across the sixteen states. Again, Oklahoma ranks 8th among the states and falls just above the midpoint of the states between Wyoming and North Dakota, two states with a much different tax structure. Oklahoma has a more balanced use of all four taxes, while North Dakota oil and gas-related tax revenue comes almost entirely from severance tax revenue. Wyoming derives almost all its revenue from a combination of severance and ad valorem taxes.

Many of the states with the highest overall effective rates tend to levy very large severance taxes relative to the other tax categories. Three of the four states with the highest overall effective rate – Louisiana, New Mexico, and Montana – have among the highest effective severance tax rates.

Like Oklahoma, other states have a relatively balanced share of all four taxes, with at least a 1% effective rate for each tax category. These states include Louisiana, Colorado, West Virginia, California, and Kansas.

By component of the overall effective rate in Figure 17, the 10.8% average across the sixteen states is comprised of a 4.1% severance tax rate, a 3.3% sales tax rate, a 2.7% ad valorem tax rate, and a 0.7% personal income tax rate. Relative to the group of sixteen states, Oklahoma has a lower than average effective rate for severance and ad valorem taxes and a higher than average effective rate for sales and income taxes.

Figure 17. Effective Severance, Ad Valorem, Sales, and Income Tax Rate by State (FY2016)

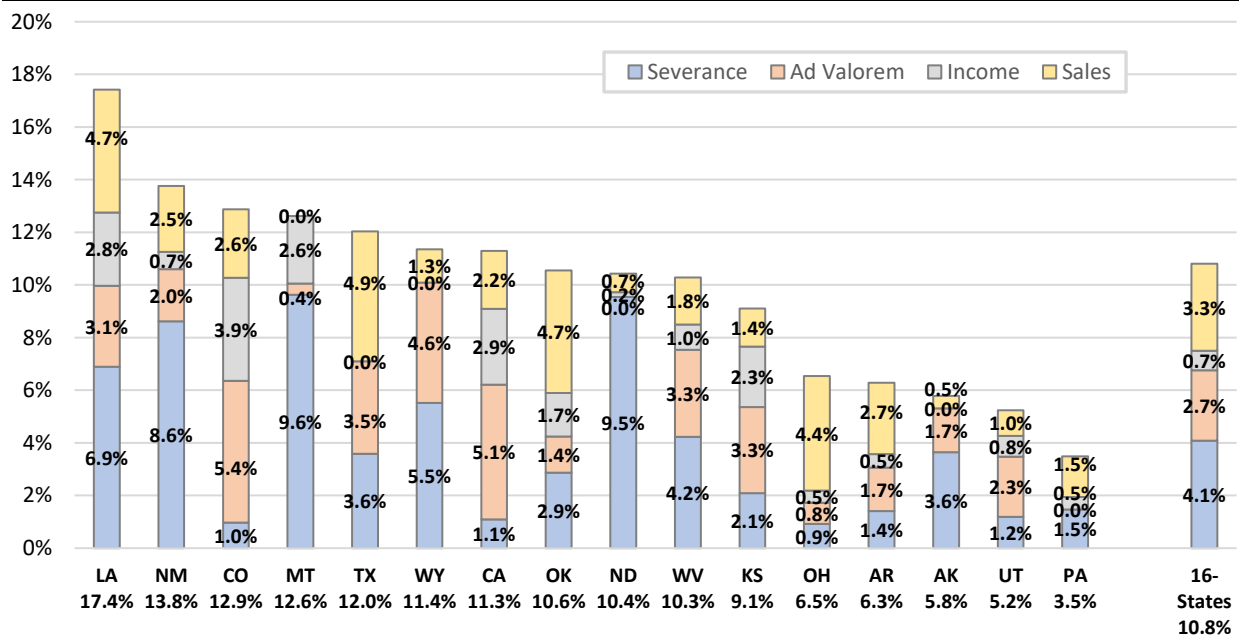
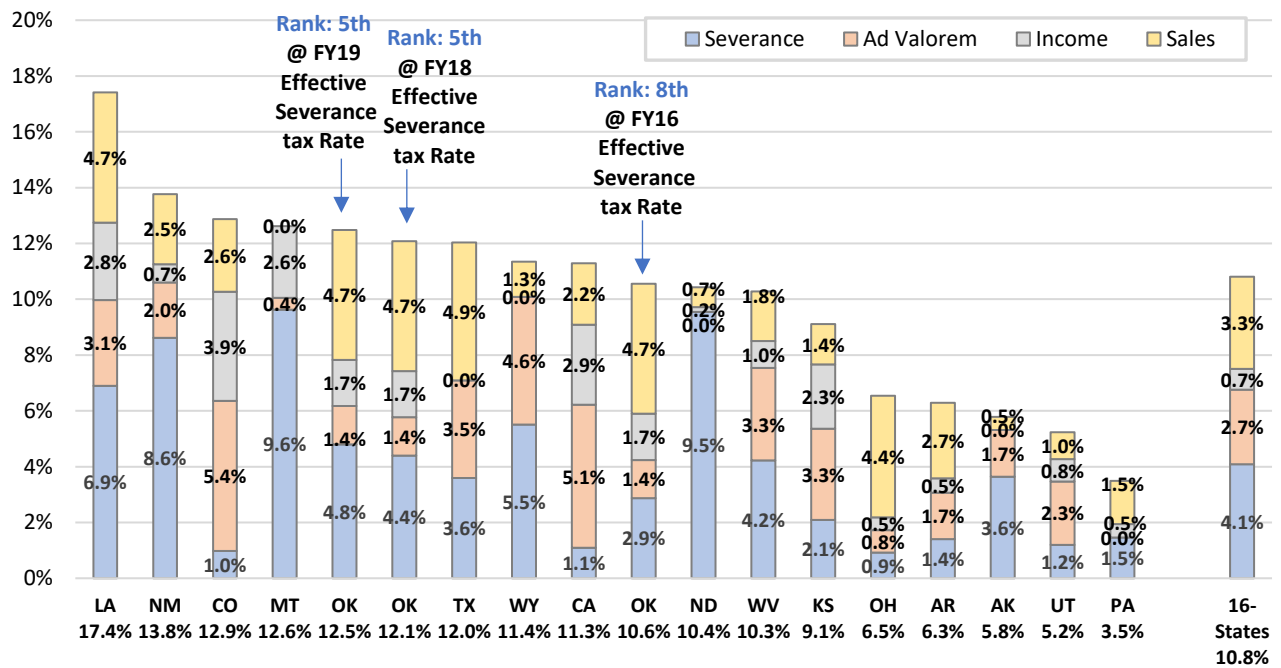


Figure 18. Projected Overall Effective Rate in Oklahoma – FY2018/FY2019 Effective Severance Tax Rates

Effect of Recent Tax Law Change. Given recent increases in severance tax rates in Oklahoma, the state's overall effective rate will rise sharply in both FY2018 and FY2019 as more producing wells move into the 7% tax bracket. Figure 18 illustrates the overall effective tax rate and relative ranking of Oklahoma based on both FY2016 severance tax rates and projected severance tax rates in FY2018 and FY2019. The effective severance tax rate for the state is projected to rise to 4.4% in FY2018 and 4.8% in FY2019.

While the state's FY2016 overall effective rate of 10.6% ranks just above the midpoint of the sixteen states, the overall rate is projected to rise to 12.1% in the current tax year (FY2018) and to 12.6% in FY2019. Given constant tax policy in other states, Oklahoma would have the 5th highest overall effective tax rate among the sixteen states this fiscal year and next. The state's rate will exceed the 10.8% overall rate across the sixteen states and move 0.6% above the 12.0% overall effective rate in Texas by FY2019.

In short, based on tax law changes already implemented, Oklahoma is projected to have the 5th highest overall effective tax rate among the sixteen states this fiscal year. Of the four states with a higher effective rate, only Louisiana will exceed Oklahoma's FY2019 rate by more than approximately one percentage point. The effective rate in Oklahoma already exceeds the effective rate in North Dakota and is projected to soon exceed the rate in Wyoming and roughly match the rate in Montana. North Dakota, Wyoming, and Montana are all traditional producing states long viewed as having high oil and gas taxes.

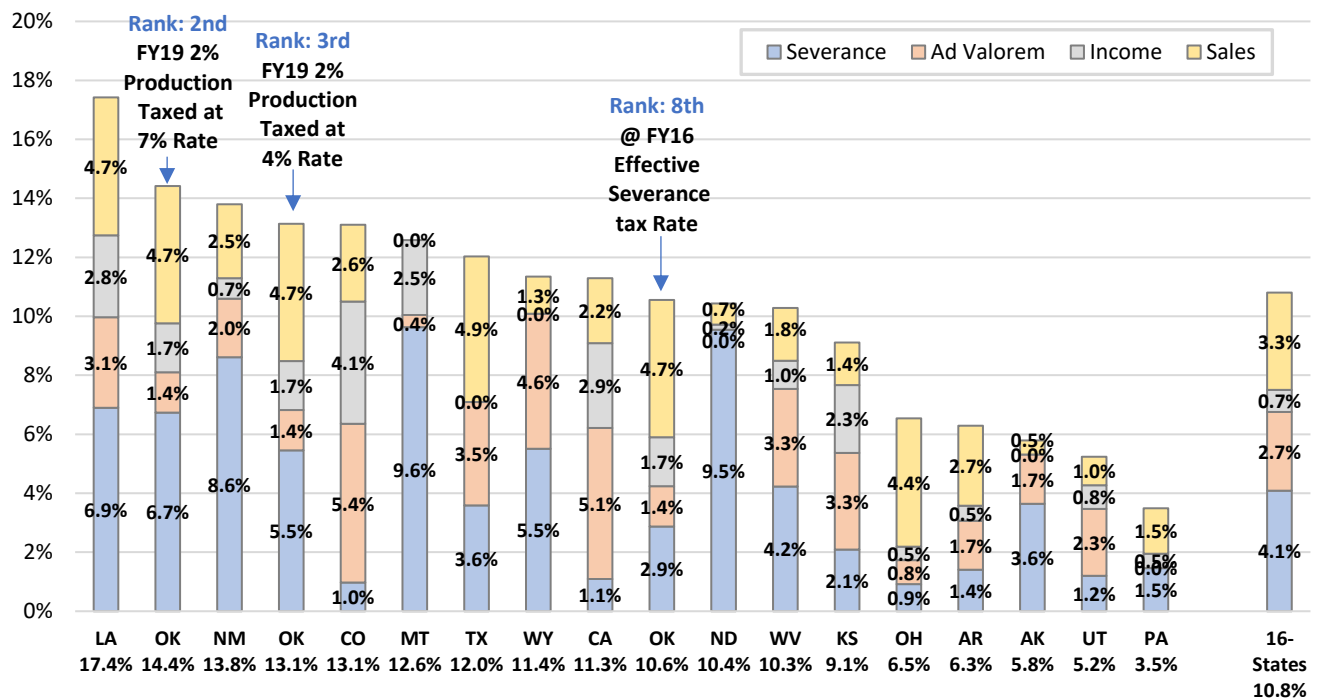
Higher Severance Tax Rate Scenarios. Given recent policy debates over the sufficiency of overall tax revenue in Oklahoma, it is important to understand the resulting effect on the overall effective tax rate faced by the oil and gas industry if severance tax rates are increased further. Although

Oklahoma is often cast as a low-tax state when viewed simply by severance and ad valorem taxes, the overall effective rate in the state is already above the midpoint of the major producing states when income and sales taxes are included, and the rate will rise further under recent tax law changes. The recent increase in the state's severance tax rate will push the overall effective rate in Oklahoma to 5th highest among the major producing states this fiscal year.

Raising severance tax rates further has the potential to greatly shift the overall oil and gas tax burden in the state even higher relative to competing states. We examine two potential scenarios for raising severance tax rates: 1) raising the severance tax rate on production taxed at the 2% rate to 4%, and 2) taxing all production at 7%. Figure 19 provides estimates of the overall effective Oklahoma oil and gas tax rate under the two scenarios assuming constant tax policy in other producing states. The estimates assume the changes are implemented in FY2019, the upcoming fiscal year. The projected overall effective rate is based on FY2019 estimates for severance taxes and FY2016 estimates of the effective rates for ad valorem, sales, and personal income taxes used in the prior cross-state comparisons.

Both proposed scenarios would produce significant increases in both the effective severance tax rate and the overall effective tax rate paid by the state's oil and gas industry. Based on Oklahoma Tax Commissions estimates of oil and gas production by bracket detailed in Figure 2, a doubling of the severance tax rate on production in the 2% bracket to 4% would raise total severance tax revenue by \$133.363 million in FY2019. Total severance tax collections would reach \$855.3 million in FY2019. This tax rate increase would increase Oklahoma's effective severance tax rate in FY2019 to 5.46% and the

Figure 19. Projected FY2019 Overall Effective Rate in Oklahoma – Increased Severance Tax Rates



Notes: Assumes FY2019 production in the 2% tax rate bracket is taxed at either 4% or 7%. Total projected severance taxes assuming an increased rate on 2% production are \$855.3 million in FY2019 at a 4% severance tax rate and \$1,055.4 million in FY2019 at a 7% severance tax rate.

overall effective tax rate to 13.1%. Oklahoma would have the 3rd highest overall tax rate among the producing states, trailing only Louisiana (17.4%) and New Mexico (13.8%). Severance taxes would become the largest component of tax contribution, exceeding the contribution of sales taxes.

In the second scenario of raising all production to a 7% tax rate, total severance taxes would increase by \$333.408 million in FY2019. Total severance tax collections would reach \$1.055 billion in FY2019. This shift in tax rates would increase the state's effective severance tax rate in FY2019 to 6.73%, nearly double the current effective rate in Texas. Shifting all production to a 7% rate would also increase the overall effective tax rate in Oklahoma to 14.4%. Under this scenario, Oklahoma's oil and gas sector would have the second highest overall effective tax rate among the sixteen largest producing states, trailing only Louisiana. Nearly half (47%) of the industry's total tax contribution across the four taxes would come from severance tax payments.

Oil and Gas Share of Total State and Local Taxes. A final measure of the tax contribution of the oil and gas industry is the overall dependency of state and local government on oil and gas-related taxes. Figure 20 illustrates the share of total state and local taxes that are derived from the four oil and gas-related tax sources in the sixteen major producing states in FY2016.

In Oklahoma, the oil and gas-related taxes evaluated account for 9.0% of total state and local tax collections, the fifth highest share among the sixteen states. The share in Oklahoma is more than two

Figure 20. Oil and Gas-Related Tax Payments and Share of Total State & Local Tax Revenue (FY2016)

State	Oil and Gas-Related Taxes (\$millions)					FY2015/16 Total State & Local Tax Revenue (\$mil.)	Oil & Gas Share of Total State & Local Tax Revenue
	Severance	Ad Valorem	Personal Income	Sales	Total		
North Dakota	\$1,483.3	\$0.0	\$28.0	\$110.3	\$1,621.7	\$4,919.1	33.0%
Wyoming	370.4	307.0	0.0	85.0	762.4	3,304.6	23.1%
New Mexico	717.6	165.0	55.1	208.6	1,146.3	8,108.1	14.1%
Alaska	244.1	111.7	0.0	32.0	387.9	2,763.5	14.0%
Oklahoma	330.7	157.6	190.7	536.4	1,215.5	13,543.4	9.0%
Texas	2,282.7	2,229.8	0.0	3,139.5	7,652.0	110,232.3	6.9%
Louisiana	442.9	197.6	178.2	300.0	1,118.7	18,061.0	6.2%
West Virginia	134.4	105.0	30.6	56.6	326.6	7,119.0	4.6%
Colorado	79.0	434.7	316.7	210.7	1,041.1	25,042.4	4.2%
Montana	95.4	4.2	25.5	0.0	125.1	3,959.8	3.2%
Kansas	43.8	68.6	48.2	30.2	190.8	12,944.8	1.5%
Arkansas	31.9	37.6	11.6	61.4	142.5	11,782.5	1.2%
Utah	23.9	45.4	15.9	19.4	104.6	11,230.2	0.9%
Pennsylvania	173.3	0.0	56.9	182.6	412.8	64,650.5	0.6%
Ohio	34.3	30.3	17.2	162.9	244.8	51,654.5	0.5%
California	85.2	400.0	224.1	171.9	881.3	232,723.1	0.4%
16-States	\$6,573	\$4,295	\$1,199	\$5,308	\$17,374	\$582,038.9	3.0%

Source: Total state and local tax revenue is from the Census Bureau State and Local Government Finance Database.

Notes: Base year is FY2016 for severance tax; approximately FY2016 for ad valorem tax subject to reporting variability; FY2015/16 for sales tax; and FY2016 for personal income tax. Total state government revenue is FY2016 and local government revenue is FY2015, the latest available years.

percentage points above the 6.9% share in dominant-producer Texas and triple the 3.0% rate across the group of states.

Only four states have a higher share of total taxes derived from the four taxes than Oklahoma – North Dakota (33.0%), Wyoming (23.1%), New Mexico (14.1%), and Alaska (14.0%). North Dakota, Wyoming, and Alaska are all very small states (less than 800,000 in population) with very large oil and gas sectors that have long been heavily dependent upon oil and gas activity to fund state and local government. Alaska's share has fallen considerably in recent years as severance taxes in the state declined. The fourth state, New Mexico, has approximately half the population of Oklahoma but a large and highly active oil and gas sector.

Other neighboring states have much lower tax contribution shares, including Louisiana (6.2%), Kansas (1.5%), and Arkansas (1.2%). Large-producer Colorado is also much less reliant upon oil and gas-related taxes than Oklahoma, with a 4.2% share of total taxes. The large natural gas-producing states of Pennsylvania and Ohio have very low total oil and gas tax shares of only 0.6% and 0.5%, respectively. California, generally considered a high overall tax state, receives only about 0.4% of total state and local revenue from oil and gas activity.

The oil and gas share of total taxes in Oklahoma will increase sharply in the current fiscal year and next following the recently enacted increase in the severance tax rate. The state's oil and gas tax share would rise to 11.9% based on Oklahoma Tax Commission projections for severance tax revenue in FY2019.²⁰ The scenarios of further increases in the severance tax would raise the share considerably next fiscal year. The state's oil and gas share would rise to 12.8% of total state and local taxes if production in the 2% bracket was taxed at 4% beginning in FY2019, and to 14.3% if all production was taxed at 7% beginning in FY2019. This would push the oil and gas share of total state and local taxes in Oklahoma to third among the states, trailing only the small states of North Dakota and Wyoming, and above the share in both New Mexico and Alaska.

Further Study. We believe this analysis pushes forward the policy debate concerning state-level oil and gas industry tax contribution and overall effective tax rates. While not an exhaustive review of oil and gas industry taxation, it demonstrates the relative importance of examining a broad range of taxes when measuring the overall tax burden of the oil and gas industry, particularly in Oklahoma. The state's large oil and gas sector coupled with a state tax structure that is heavily reliant upon income and sales taxes makes a broader view of taxation critical to tax burden analysis. Further study and additional data collection would undoubtedly increase the precision of the state-level estimates. Adding additional tax streams to the analysis would likewise extend the usefulness of the findings in the report. Nevertheless, much like Oklahoma is not described well by severance and ad valorem taxes, certain producing states invariably have unique characteristics that cannot be captured well by the methodology used in the report. These states will require analysis customized to the particular state tax system in question.

Measuring Total Taxes. Based on the standardized format used in the report to calculate the overall effective rate, Oklahoma's oil and gas industry contributed an estimated \$1.22 billion in tax revenue

from the four tax sources studied. It is important to note that the estimates of taxes paid are designed to facilitate a cross-state comparison of the oil and gas industry based on the four key tax categories, not serve as a full accounting of the tax revenue paid by the industry. As a result, the estimated total across the four categories considerably understates the full tax contribution of the industry in several ways. The personal income tax calculations are based on the average tax rate for the state, which understates the true rate given that the average earnings of oil and gas workers in Oklahoma far exceed the state average. Based on income tax payment schedules by income bracket provided by the Oklahoma Tax Commission, the high average wages in the oil and gas industry would be taxed at marginal rates well above the state average. This is true in other states as well. The total tax contribution in the report also greatly understates the full range of ad valorem taxes paid by the industry on real and personal property, including office buildings and other structures. Corporate income taxes and franchise taxes paid by the industry are similarly excluded from the analysis. Corporate income taxes are subject to tremendous uncertainty due to the ongoing restatement of taxable income over time and must be estimated across the states. The total also excludes motor vehicle taxes and motor fuel taxes, both of which the oil and gas industry pays significant shares of the statewide total.

V. Systematic Labor Market and Tax Effects

The overall effective tax rate calculations in the report provide a highly useful bottom-up approach to evaluating the tax contribution of the oil and gas industry. A complementary approach is a top-down evaluation of the overall sensitivity of the state economy and total tax base to changes in oil and gas activity. Producing states with an overall economic cycle influenced by oil and gas activity must give special consideration to both the direct and spillover activity generated by oil and gas tax policy decisions. In this section, we examine the sensitivity of both the labor market and overall tax revenue during the recent energy price cycle for the sixteen producing states used in the tax rate analysis.

Systematic Labor Market Effects. The most recent energy price cycle made clear that several producing states continue to have an overall economic cycle that remains closely tied to the oil and gas industry. Viewed from the labor market, Oklahoma and four other states – North Dakota, Louisiana, Alaska, and Wyoming – experienced systematic downturns in employment that began in early 2015 as oil prices collapsed and extended through at least late 2016 (see Figure 21).

These five states all experienced meaningful oil and gas-driven recessions at the state level and far underperformed relative to the nation in hiring. North Dakota experienced the largest job downturn among all states, followed by Wyoming. Wyoming’s downturn was aided by an already weak coal sector.

A second group consisting of Oklahoma, Louisiana, and Alaska experienced severe, but smaller, job downturns. More recently, none of the five states with the largest downturns had rebounded back to their pre-2015 trend job growth rate by late 2017.

Four additional states – Texas, West Virginia, Kansas, and New Mexico – showed possible signs of systematic drag on the state labor force. For Texas, it was merely a slowing in the rapid pace of job growth in the state. West Virginia’s slowing is tied to slowing oil and gas and coal activity and began as far back as 2012. Job growth in Kansas slowed minimally in 2015 and 2016 before softening in 2017 as other producing states were recovering. New Mexico was already weak entering 2015 but slowed a bit further in 2015 and 2016. Despite possible signs of oil and gas-related slowing, none of these four states experienced a major shift in state economic activity commensurate with energy price movements. However, Kansas, West Virginia, and New Mexico underperformed the U.S. in hiring growth in 2015 and 2016, while Texas began to more closely track the national hiring trend.

None of the remaining producing states in the sample – Utah, Colorado, California, Montana, Ohio, Arkansas, and Pennsylvania – showed signs of a systematic link from energy prices to the labor market.

Systematic Tax Revenue Effects. The presence of systematic labor market effects in Oklahoma are important because it suggests that the influence of the oil and gas industry extends to the overall tax base of the state. Figure 22 illustrates the trend in total state tax revenue in each of the sixteen states in the sample. The states with significant labor market weakness generally reflect a similar degree of tax revenue weakness.

Tax revenue reductions are largest in North Dakota and Alaska and reflect the widespread weakness across the oil and gas industry in the period in these states.

Oklahoma and six additional states – Texas, New Mexico, Montana, West Virginia, Louisiana, and Wyoming – also experienced overall tax revenue weakness in FY2016 which is believed to be closely tied to oil and gas activity. Wyoming and West Virginia were simultaneously experiencing weakness from contracting coal activity. While numerous factors can influence the overall level of tax revenue at the state level, these states all exhibited a systematic reaction to weakness in the oil and gas sector.

Seven additional states – Colorado, California, Utah, Arkansas, Kansas, Ohio, and Pennsylvania – did not exhibit weakness in tax revenue in the period. None experienced labor market weakness either.

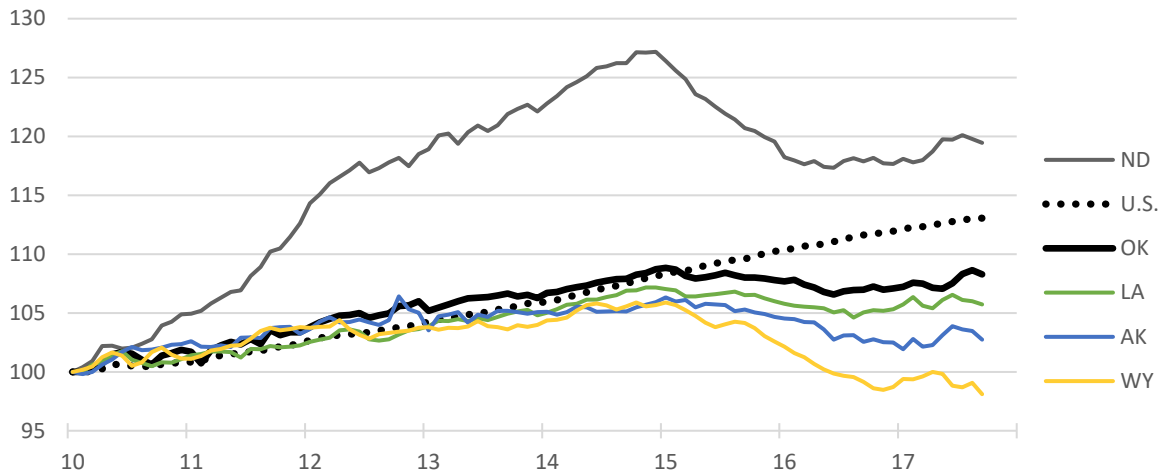
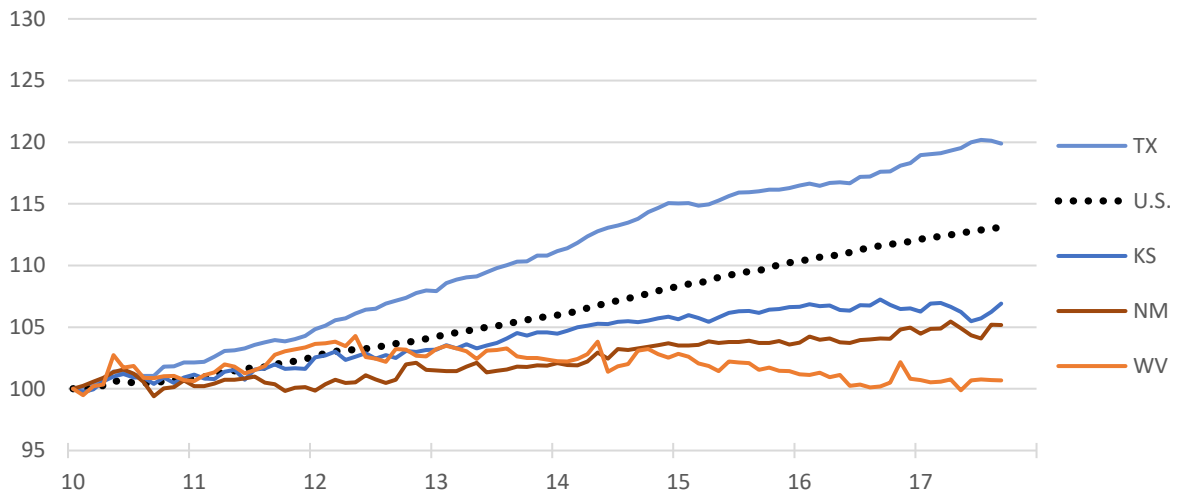
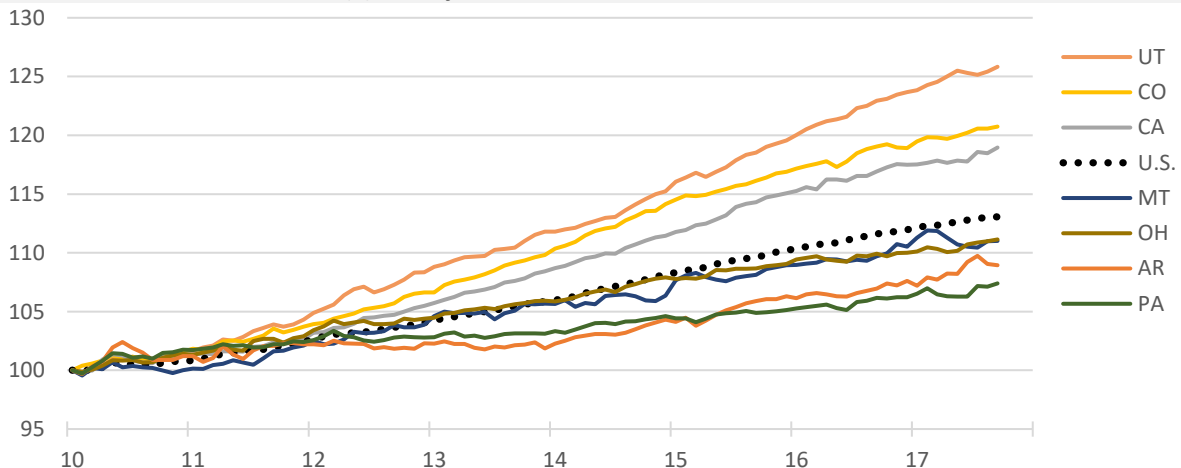
Systematic Oil and Gas Risk in Oklahoma. In summary, Oklahoma continues to have an overall economic cycle that is closely tied to oil and gas activity. This widespread influence is visible in both the labor market and total state tax revenue, just as it is in other major producing states.

Based on shifts in employment and tax revenue in the latest energy price cycle, Figure 23 provides a potential tiering structure for categorizing the overall economic sensitivity of the oil and gas producing states to energy price fluctuations. Alaska and North Dakota remain the most sensitive overall and comprise a top tier of states. North Dakota is most sensitive from a labor market view, while Alaska is most sensitive from a tax revenue perspective. A second tier including Louisiana, Oklahoma, and Wyoming has both a labor market and total tax revenue that is influenced in a systematic way by oil and gas activity. A third tier including New Mexico, Texas, and West Virginia has a smaller systematic link to the oil and gas industry through either the labor market or tax revenue. Conversely, Arkansas, California, Colorado, Kansas, Montana, Ohio, Pennsylvania, and Utah showed limited systematic economic risk originating from the oil and gas sector in the recent energy price cycle.

Figure 23. Degree of Systematic Labor Market and Tax Revenue Risk (16 Largest Producing States)

Level of Labor Market & Tax Revenue Risk	State
Tier 1 – Very high systematic risk	Alaska and North Dakota
Tier 2 – High systematic risk	Louisiana, Oklahoma , and Wyoming
Tier 3 – Low systematic risk	New Mexico, Texas, and West Virginia
Tier 4 – Little or no systematic risk	Arkansas, California, Colorado, Kansas, Montana, Ohio, Pennsylvania, and Utah

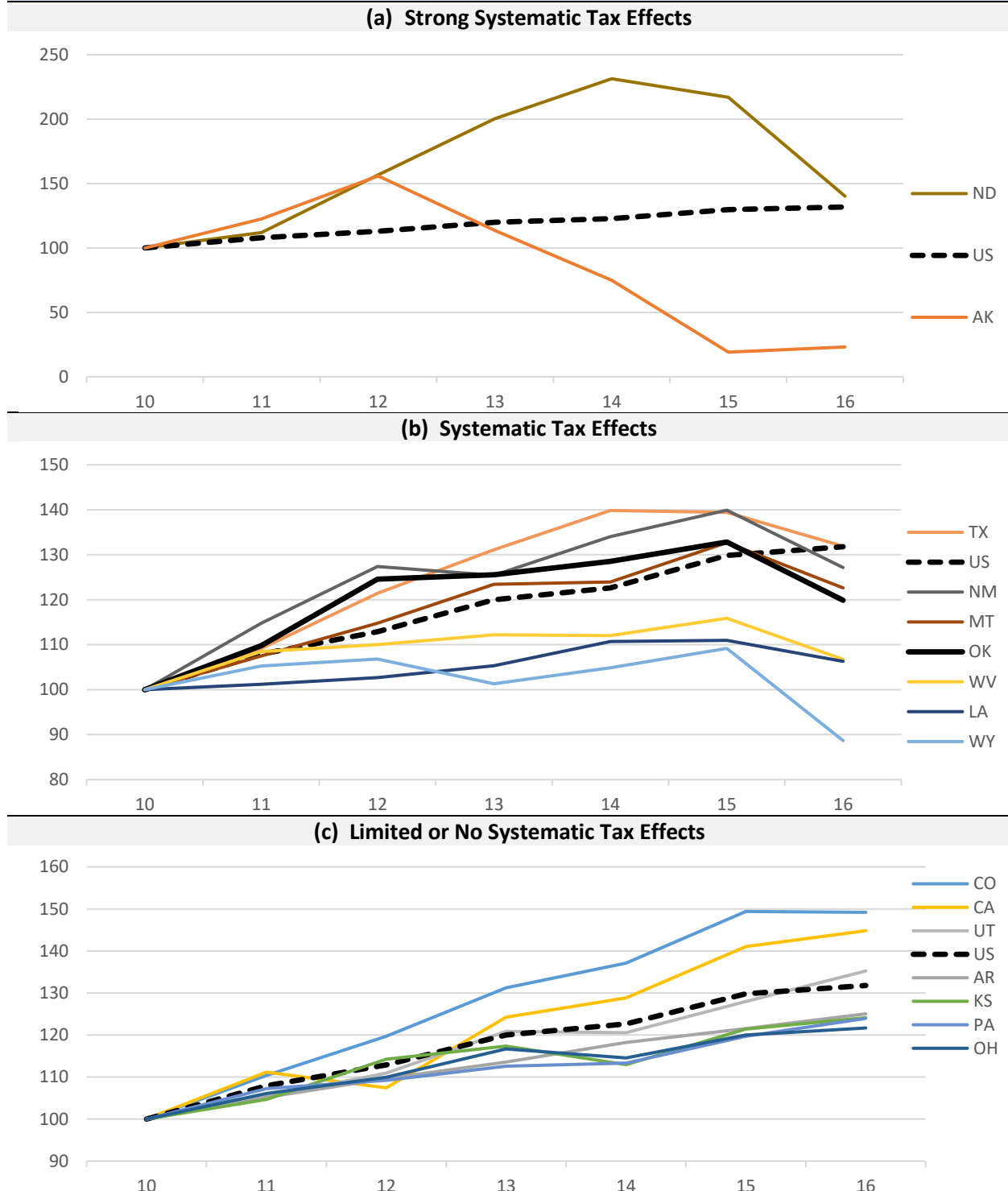
Notes: Refer to Figures 21 and 22 for changes in employment and total tax revenue in the producing states in the recent energy price cycle. Tier 1 states had very large responses in both employment and total state tax revenue. Tier 2 states had a large response in both employment and total state tax revenue. Tier 3 states had a small response in either employment or total state tax revenue. Tier 4 states had little or no response in either employment or total state tax revenue.

Figure 21. Systematic Labor Market Effects in Energy-Producing States*Index of total wage and salary employment (Jan-2010=100.0)***(a) Systematic Labor Market Effects****(b) Possible Systematic Labor Market Effects****(c) No Systematic Labor Market Effects**

Source: Bureau of Labor Statistics and RegionTrack calculations

Figure 22. Systematic Tax Revenue Effects in Energy-Producing States

Index of total state tax revenue (FY2010=100.0)



Source: Census Bureau State and Local Government Finance database and RegionTrack calculations

Notes: Data is in fiscal years.

VI. Appendix

Figure A1. Severance Tax Payments, Production Value, and Effective Rate

State	Fiscal Year	Volume		Value			Severance Tax	Effective Rate
		Crude Oil	Natural Gas	Crude Oil	Natural Gas	Total		
AK	2012	202,707	355,558	20,358,032,933	1,082,970,408	21,441,003,341	6,136,700,000	28.6%
	2013	186,168	343,692	17,680,685,240	1,184,305,350	18,864,990,590	4,120,062,888	21.8%
	2014	187,552	335,043	18,015,151,067	1,442,639,318	19,457,790,384	2,727,066,796	14.0%
	2015	174,792	345,661	10,737,326,900	1,157,676,299	11,895,003,199	524,009,352	4.4%
	2016	179,017	336,517	5,945,154,570	758,845,835	6,704,000,405	244,127,946	3.6%
	2017	180,236	349,642	7,152,215,070	1,048,926,000	8,201,141,070	0	0.0%
AR	2012	4,329	1,127,047	385,410,870	3,432,797,321	3,818,208,191	52,588,803	1.4%
	2013	4,666	1,149,259	411,583,972	3,960,154,971	4,371,738,943	47,684,575	1.1%
	2014	4,704	1,136,986	444,904,320	4,895,672,218	5,340,576,538	72,076,246	1.3%
	2015	4,806	1,080,471	299,221,560	3,618,677,458	3,917,899,018	74,282,076	1.9%
	2016	4,991	924,988	180,145,986	2,085,847,940	2,265,993,926	31,858,962	1.4%
	2017	5,233	750,548	221,460,560	2,251,644,000	2,473,104,560	38,152,523	1.5%
CA	2012	196,496	244,384	20,879,992,453	744,352,933	21,624,345,387	515,814,119	2.4%
	2013	197,692	249,956	20,191,107,677	861,306,717	21,052,414,393	421,036,187	2.0%
	2014	201,497	248,327	20,469,912,316	1,069,254,674	21,539,166,990	475,583,097	2.2%
	2015	205,285	242,214	13,479,697,383	811,215,055	14,290,912,438	258,355,049	1.8%
	2016	194,206	216,057	7,317,358,403	487,208,535	7,804,566,938	85,207,117	1.1%
	2017	178,566	201,269	7,941,574,045	603,807,000	8,545,381,045	84,722,451	1.0%
CO	2012	43,520	1,710,882	3,802,813,867	5,211,061,425	9,013,875,292	163,046,000	1.8%
	2013	56,480	1,652,386	4,779,478,800	5,693,846,758	10,473,325,558	136,084,000	1.3%
	2014	79,064	1,605,729	7,207,935,447	6,914,001,453	14,121,936,899	235,200,000	1.7%
	2015	113,028	1,668,598	6,767,080,550	5,588,412,802	12,355,493,352	284,673,000	2.3%
	2016	120,310	1,697,551	4,257,770,900	3,827,977,505	8,085,748,405	79,024,000	1.0%
	2017	113,740	1,685,143	5,014,512,250	5,055,429,000	10,069,941,250	70,700,000	0.7%
KS	2012	42,636	301,116	3,775,702,040	917,149,150	4,692,851,190	125,709,000	2.7%
	2013	45,269	292,017	3,892,341,793	1,006,241,913	4,898,583,705	122,928,000	2.5%
	2014	47,768	288,982	4,550,459,293	1,244,308,328	5,794,767,622	151,273,000	2.6%
	2015	49,183	294,855	3,109,062,359	987,518,538	4,096,580,897	121,429,000	3.0%
	2016	41,397	259,784	1,509,610,600	585,812,920	2,095,423,520	43,770,874	2.1%
	2017	36,285	230,798	1,578,004,413	692,394,000	2,270,398,413	42,090,000	1.9%
LA	2012	70,372	3,100,734	7,632,429,833	9,444,318,975	17,076,748,808	878,260,000	5.1%
	2013	71,531	2,731,767	7,486,911,333	9,413,213,788	16,900,125,121	825,760,000	4.9%
	2014	70,198	2,096,921	7,246,481,042	9,028,992,339	16,275,473,381	854,990,000	5.3%
	2015	66,615	1,860,306	4,640,123,338	6,230,474,845	10,870,598,183	719,550,000	6.6%
	2016	59,648	1,779,479	2,409,779,200	4,012,725,145	6,422,504,345	442,880,000	6.9%
	2017	53,158	1,815,223	2,495,280,818	5,445,669,000	7,940,949,818	359,280,000	4.5%
MT	2012	24,758	71,752	2,106,059,902	218,544,633	2,324,604,535	227,704,000	9.8%
	2013	28,469	63,534	2,404,705,258	218,927,575	2,623,632,833	206,437,000	7.9%
	2014	29,239	61,521	2,622,056,057	264,899,173	2,886,955,229	230,293,000	8.0%
	2015	30,442	54,837	1,774,844,705	183,658,253	1,958,502,958	188,421,000	9.6%
	2016	25,629	50,510	877,387,458	113,900,050	991,287,508	95,429,000	9.6%
	2017	21,499	47,210	895,970,825	141,630,000	1,037,600,825	98,104,000	9.5%
ND	2012	197,479	129,558	16,935,469,908	394,612,075	17,330,081,983	1,713,225,000	9.9%
	2013	275,473	204,249	23,768,040,001	703,808,013	24,471,848,013	2,457,530,000	10.0%
	2014	350,445	264,789	31,969,929,200	1,140,137,303	33,110,066,503	3,247,807,069	9.8%
	2015	428,557	413,644	25,899,128,033	1,385,362,697	27,284,490,730	2,800,985,013	10.3%
	2016	410,258	514,953	14,385,354,888	1,161,219,015	15,546,573,903	1,483,340,852	9.5%
	2017	366,710	531,513	15,737,970,833	1,594,539,000	17,332,509,833	1,454,871,000	8.4%

Figure A1. (Continued) Severance Tax Payments, Production Value, and Effective Rate

State	Fiscal Year	Volume		Value			Severance Tax	Effective Rate
		Crude Oil	Natural Gas	Crude Oil	Natural Gas	Total		
NM	2012	77,671	1,232,825	7,016,992,318	3,754,979,479	10,771,971,797	1,051,484,000	9.8%
	2013	93,826	1,186,945	8,026,423,358	4,090,014,646	12,116,438,004	942,620,000	7.8%
	2014	112,756	1,198,119	10,663,898,700	5,158,900,728	15,822,799,428	1,174,454,000	7.4%
	2015	139,394	1,238,619	8,594,801,717	4,148,341,468	12,743,143,184	1,011,872,000	7.9%
	2016	145,805	1,242,137	5,528,075,071	2,801,018,935	8,329,094,006	717,572,000	8.6%
	2017	154,165	1,253,245	6,947,445,725	3,759,735,000	10,707,180,725	843,200,000	7.9%
	2018	154,165	1,253,245	6,947,445,725	3,759,735,000	10,707,180,725	843,200,000	7.9%
OH	2012	4,888	81,701	450,604,353	248,847,629	699,451,983	2,531,325	0.4%
	2013	5,599	98,515	507,857,295	339,466,271	847,323,566	3,022,775	0.4%
	2014	11,307	295,575	1,072,393,570	1,272,696,688	2,345,090,258	8,520,075	0.4%
	2015	20,907	758,070	1,229,488,403	2,538,902,775	3,768,391,178	21,042,450	0.6%
	2016	26,993	1,265,427	889,014,455	2,853,537,885	3,742,552,340	34,334,975	0.9%
	2017	18,353	1,541,400	797,820,204	4,624,200,000	5,422,020,204	40,370,300	0.7%
	2018	18,353	1,541,400	797,820,204	4,624,200,000	5,422,020,204	40,370,300	0.7%
OK	2012	77,859	1,959,400	7,090,619,130	5,968,005,833	13,058,624,963	895,066,072	6.9%
	2013	109,530	2,017,638	9,667,391,625	6,952,444,275	16,619,835,900	529,365,106	3.2%
	2014	128,588	2,128,929	12,540,544,700	9,166,813,453	21,707,358,153	686,092,649	3.2%
	2015	164,114	2,463,850	10,724,713,138	8,251,844,292	18,976,557,430	560,102,003	3.0%
	2016	154,697	2,501,532	5,873,716,176	5,640,954,660	11,514,670,836	330,738,937	2.9%
	2017	153,570	2,425,144	6,980,652,325	7,275,432,000	14,256,084,325	424,763,280	3.0%
	2018	153,570	2,425,144	7,924,212,000	7,469,443,520	15,393,655,520	638,748,000	4.4%
PA	2012	3,652	1,778,349	324,422,377	5,416,554,663	5,740,977,039	202,472,000	3.5%
	2013	4,715	2,742,305	408,456,521	9,449,525,979	9,857,982,500	225,752,000	2.3%
	2014	6,249	3,805,016	561,092,503	16,383,764,727	16,944,857,229	223,500,000	1.3%
	2015	7,126	4,577,398	399,525,128	15,330,468,802	15,729,993,930	187,712,000	1.2%
	2016	6,811	5,131,812	247,630,933	11,572,236,060	11,819,866,993	173,259,000	1.5%
	2017	5,899	5,330,850	259,560,916	15,992,550,000	16,252,110,916	181,993,000	1.1%
	2018	5,899	5,330,850	259,560,916	15,992,550,000	16,252,110,916	181,993,000	1.1%
TX	2012	655,811	7,304,386	60,993,155,546	22,247,942,358	83,241,097,904	3,807,555,500	4.6%
	2013	824,780	7,533,112	75,274,921,333	25,957,848,433	101,232,769,767	4,486,090,000	4.4%
	2014	1,031,150	7,797,716	99,805,867,792	33,575,665,477	133,381,533,268	5,773,652,000	4.3%
	2015	1,248,215	8,076,424	79,856,634,983	27,049,290,047	106,905,925,030	4,159,630,000	3.9%
	2016	1,218,694	7,606,547	46,438,334,870	17,152,763,485	63,591,098,355	2,282,701,440	3.6%
	2017	1,187,821	6,836,102	53,897,377,875	20,508,306,000	74,405,683,875	3,090,098,096	4.2%
	2018	1,187,821	6,836,102	53,897,377,875	20,508,306,000	74,405,683,875	3,090,098,096	4.2%
UT	2012	27,915	477,941	2,330,925,763	1,455,728,629	3,786,654,392	65,541,000	1.7%
	2013	32,252	480,534	2,588,921,793	1,655,840,075	4,244,761,868	53,164,000	1.3%
	2014	38,567	467,910	3,337,684,598	2,014,742,475	5,352,427,073	89,160,000	1.7%
	2015	40,686	446,236	2,382,199,205	1,494,518,737	3,876,717,942	69,685,000	1.8%
	2016	32,676	385,158	1,128,356,740	868,531,290	1,996,888,030	23,880,583	1.2%
	2017	31,384	334,877	1,319,043,367	1,004,631,000	2,323,674,367	15,731,108	0.7%
	2018	31,384	334,877	1,319,043,367	1,004,631,000	2,323,674,367	15,731,108	0.7%
WV	2012	2,362	464,954	205,062,935	1,416,172,392	1,621,235,327	99,234,290	6.1%
	2013	4,107	619,178	353,913,880	2,133,584,192	2,487,498,072	115,014,548	4.6%
	2014	7,379	887,938	682,354,578	3,823,313,038	4,505,667,616	229,466,901	5.1%
	2015	8,525	1,257,240	463,063,792	4,210,706,300	4,673,770,092	215,361,550	4.6%
	2016	7,506	1,315,043	212,100,795	2,965,421,965	3,177,522,760	134,408,900	4.2%
	2017	7,985	1,457,173	316,744,988	4,371,519,000	4,688,263,988	165,000,000	3.5%
	2018	7,985	1,457,173	316,744,988	4,371,519,000	4,688,263,988	165,000,000	3.5%
WY	2012	56,598	2,146,385	4,672,872,375	6,537,530,979	11,210,403,354	635,771,668	5.7%
	2013	60,251	1,919,133	4,817,368,705	6,613,012,463	11,430,381,168	522,039,355	4.6%
	2014	67,862	1,806,863	6,003,524,933	7,780,050,934	13,783,575,868	597,120,076	4.3%
	2015	84,719	1,807,038	4,988,819,513	6,052,071,435	11,040,890,948	682,187,766	6.2%
	2016	80,160	1,753,398	2,763,115,200	3,953,912,490	6,717,027,690	370,400,807	5.5%
	2017	70,953	1,575,865	3,057,069,133	4,727,595,000	7,784,664,133	292,340,986	3.8%
	2018	70,953	1,575,865	3,057,069,133	4,727,595,000	7,784,664,133	292,340,986	3.8%

Figure A1. (Continued) Effective Severance Tax Rate - 16-State Average

Fiscal Year	Price (avg.)		Production		Production Value			Severance Tax	Effective Rate	
	Crude 1st Purch.	Henry Hub	Crude Oil	Natural Gas	Crude Oil	Natural Gas	Total		16-State simple average	Value-weighted average
Units	\$/bbl	\$/mil Btu	million bbls	bcf	\$million	\$million	\$million	\$million		
2012	91.20	3.05	1,689.1	22,487.0	158,960.6	68,491.6	227,452.1	16,572.7	6.3%	7.3%
2013	88.76	3.45	2,000.8	23,284.2	182,260.1	80,233.5	262,493.7	15,214.6	5.0%	5.8%
2014	93.99	4.31	2,374.3	24,426.4	227,194.2	105,175.9	332,370.0	16,776.3	4.5%	5.0%
2015	61.15	3.35	2,786.4	26,585.5	175,345.7	89,039.1	264,384.9	11,879.3	4.3%	4.5%
2016	35.57	2.26	2,708.8	26,980.9	99,962.9	60,841.9	160,804.8	6,572.9	4.0%	4.1%
2017	43.36	3.00	2,585.6	26,366.0	114,612.7	79,098.0	193,710.7	7,201.4	3.3%	3.7%

Figure A2. Ad Valorem Taxes and Effective Tax Rates

State	FY2016 Severance Tax Revenue	Effective Severance Tax Rate	FY2016 Base ¹ Ad Valorem Tax Revenue	Effective Ad Valorem Tax Rate	FY2016 Severance & Ad Valorem Tax Revenue	FY2016 Value of Oil and Gas Production	Effective Severance & Ad Valorem Tax Rate
AK	\$244,127,946	3.6%	\$111,736,765	1.7%	\$355,864,711	\$6,704,000,405	5.3%
AR	31,858,962	1.4%	37,593,551	1.7%	69,452,513	2,265,993,926	3.1%
CA	85,207,117	1.1%	400,000,000	5.1%	485,207,117	7,804,566,938	6.2%
CO	79,024,000	1.0%	434,700,000	5.4%	513,724,000	8,085,748,405	6.4%
KS	43,770,874	2.1%	68,619,000	3.3%	112,389,874	2,095,423,520	5.4%
LA	442,880,000	6.9%	197,640,000	3.1%	640,520,000	6,422,504,345	10.0%
MT	95,429,000	9.6%	4,194,203	0.4%	99,623,203	991,287,508	10.0%
ND	1,483,340,852	9.5%	0	0.0%	1,483,340,852	15,546,573,903	9.5%
NM	717,572,000	8.6%	165,000,000	2.0%	882,572,000	8,329,094,006	10.6%
OH	34,334,975	0.9%	30,335,573	0.8%	64,670,548	3,742,552,340	1.7%
OK	330,738,937	2.9%	157,616,844	1.4%	488,355,781	11,514,670,836	4.2%
PA	173,259,000	1.5%	0	0.0%	173,259,000	11,819,866,993	1.5%
TX	2,282,701,440	3.6%	2,229,800,000	3.5%	4,512,501,440	63,591,098,355	7.1%
UT	23,880,583	1.2%	45,439,000	2.3%	69,319,583	1,996,888,030	3.5%
WV	134,408,900	4.2%	105,000,000	3.3%	239,408,900	3,177,522,760	7.5%
WY	370,400,807	5.5%	307,016,808	4.6%	677,417,615	6,717,027,690	10.1%
16-States	\$6,572,935,393	4.1%	\$4,294,691,744	2.7%	\$10,867,627,137	\$160,804,819,959	6.8%

VII. References

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VIII. Endnotes

¹ In Oklahoma, gross production taxes include the severance tax and the Petroleum Excise Tax.

² For additional discussion, see: Overview of State Issues. October 2016. Oklahoma State Senate Staff.

http://appropriation.oksenate.gov/appropriations/publications/overview_of_state_issues_2016.pdf. The severance tax rate change is described as: “During the 2010 legislative session, HB 2432 changed the incentive for horizontally-drilled wells and certain deep-drilled wells. In lieu of the rebate of 6/7ths of the tax, the wells were taxed at an up-front reduced rate for a specific time period (1% for horizontal and 4% for deep). HB 2432 also addressed then-current budget issues by suspending the payment of rebates due on certain production. That amount was later repaid over a three-year period beginning in FY’13.”

³ See: [http://webserver1.lsb.state.ok.us/cf_pdf/2017-](http://webserver1.lsb.state.ok.us/cf_pdf/2017-18%20SUPPORT%20DOCUMENTS/BILLSUM/House/HB2377%20CS%20BILLSUM.PDF)

18%20SUPPORT%20DOCUMENTS/BILLSUM/House/HB2377%20CS%20BILLSUM.PDF

⁴ See: Major Oklahoma Tax Revenues, Apportionment Meeting, Oklahoma Tax Commissioners, December 14, 2017. Estimates include the excise tax.

⁵ The use of Henry Hub will slightly overstate the value of natural gas in most states and subsequently produce a slight understatement of the effective rate on natural gas production in most states.

⁶ Sources for severance tax data for the sixteen producing states are:

AK: <http://tax.alaska.gov/programs/programs/reports/Annual.aspx?60650&Year=2016>

AR: http://www.arkleg.state.ar.us/assembly/2017/Summary%20Budget%20Manuals/2016_B_BOOK.PDF

CA: http://www.conservation.ca.gov/dog/for_operators/Pages/assessments.aspx; and

<https://castatelands.opengov.com/transparency#/>

CO: <https://www.colorado.gov/pacific/sites/default/files/2016%20Annual%20Report.pdf>

KS: <https://www.ksrevenue.org/pdf/ar16complete.pdf>

LA: <http://assets.dnr.la.gov/TAD/OGTABLES/table28.htm>

MT: http://revenue.mt.gov/Portals/9/publications/revenuecollections_report/FY-2017/2017-06-RMR.pdf

ND: <https://www.nd.gov/tax/data/upfiles/media/2016-state-and-local-taxes-guide-web.pdf?20171219190905>

NM:

https://www.nmlegis.gov/Entity/LFC/Documents/Revenue_Reports/Monthly_Revenue_Tracking/2017/May%202017%20Revenue%20Report.pdf; and <https://www.nmlegis.gov/lcs/handouts/rstpjul21.11.oilandgas.pdf>

OH: https://www.tax.ohio.gov/communications/publications/annual_reports/2016annualreport.aspx

OK: https://www.ok.gov/tax/Forms_&Publications/Publications/Annual_Reports/index.html

PA: <https://www.act13-reporting.puc.pa.gov/Modules/PublicReporting/Overview.aspx>

TX: <https://comptroller.texas.gov/transparency/reports/revenue-by-source/history.php>

UT: <https://tax.utah.gov/commission/reports/fy16report.pdf>

WV: <https://tax.wv.gov/Documents/Reports/SeveranceTaxes.TaxData.FiscalYears.2004-2016.pdf>

WY: <http://revenue.wyo.gov/dor-annual-reports>

⁷ All states in the analysis except Texas (Aug. 31) have a fiscal year ended June 30.

⁸ California does not levy a traditional severance tax on oil and gas production, but does apply an Oil and Gas Production Assessment Fee based on the production of crude oil and natural gas. For FY 2016 that fee was \$0.3243123 per barrel of oil and 10,000 cubic feet of gas produced. We also include state land revenue in severance taxes.

⁹ See more discussion at: <https://www.eia.gov/todayinenergy/detail.php?id=24512>

¹⁰ See Oklahoma Ad Valorem Statistics yearbooks prepared by the Oklahoma Tax Commission. Available online at:

https://www.ok.gov/tax/Forms_&Publications/Publications/Ad_Valorem_Publications/index.html

¹¹ Sources for ad valorem data for the sixteen producing states are:

AK: <http://tax.alaska.gov/programs/programs/reports/Annual.aspx?60018&Year=2016>

AR: https://www.arkansas.gov/acd/statewide_values_rates.html

CA: <http://assessor.co.kern.ca.us/>; and

ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2016/2016_Annual_Report_Final_Corrected.pdf

CO: <https://www.coga.org/wp-content/uploads/2015/12/Press-Release-CU-Oil-and-Gas-Economic-Study-Key-Economic-Driver.pdf>

KS: <https://www.ksrevenue.org/pdf/PVDHistoricTax.pdf>

LA:

http://www.latax.state.la.us/Menu_AnnualReports/UploadedFiles/2016%20LOUISIANA%20TAX%20COMMISSION%20ANNUAL%20REPORT.pdf

MT: https://revenue.mt.gov/Portals/9/publications/biennial_reports/2014-2016/2016-Biennial-Report-Property-Taxes.pdf

ND: none assessed

NM: <https://www.nmlegis.gov/lcs/handouts/rstpjul21.11.oilandgas.pdf>

OH: <https://energyindepth.org/wp-content/uploads/2017/02/Ohios-Oil-and-Gas-Industry-Property-Tax-Payments2.pdf>

OK: https://www.ok.gov/tax/Forms_&_Publications/Publications/Ad_Valorem_Publications/index.html

PA: none assessed

TX: <https://comptroller.texas.gov/taxes/property-tax/reports/index.php>

UT: <https://propertytax.utah.gov/annual-reports/2016annual.pdf>

WV: http://www.legis.state.wv.us/legisdocs/2015/committee/interim/TAX/TAX_20150914092710.pdf

WY: [https://0ebaeb71-a-84cef9ff-s-sites.googlegroups.com/a/wyo.gov/wy-](https://0ebaeb71-a-84cef9ff-s-sites.googlegroups.com/a/wyo.gov/wy-dor/2017AnnualReport.pdf?attachauth=ANoY7cpMYPkbY366ZS0yo9ukGGXL00kLI5VraKuwFuydzoGmT8sVsm39KzO50c72e0_44GMmFK9F3Z34Lvr7PRClqzvoCO65J8FDQ1ZKYy7vbZiZ3FWaZefDa3QjxvBGVVMwPCVIhTW4NUNmYcC54Pmt7Hfl78D4U05PY01kxAOOxefglypHKHx6cGS52dq6T6y4INV6jFDDNu72Ket-xfgPjEj9DrMi2mA%3D%3D&attredirects=0)

[dor/2017AnnualReport.pdf?attachauth=ANoY7cpMYPkbY366ZS0yo9ukGGXL00kLI5VraKuwFuydzoGmT8sVsm39KzO50c72e0_44GMmFK9F3Z34Lvr7PRClqzvoCO65J8FDQ1ZKYy7vbZiZ3FWaZefDa3QjxvBGVVMwPCVIhTW4NUNmYcC54Pmt7Hfl78D4U05PY01kxAOOxefglypHKHx6cGS52dq6T6y4INV6jFDDNu72Ket-xfgPjEj9DrMi2mA%3D%3D&attredirects=0](https://0ebaeb71-a-84cef9ff-s-sites.googlegroups.com/a/wyo.gov/wy-dor/2017AnnualReport.pdf?attachauth=ANoY7cpMYPkbY366ZS0yo9ukGGXL00kLI5VraKuwFuydzoGmT8sVsm39KzO50c72e0_44GMmFK9F3Z34Lvr7PRClqzvoCO65J8FDQ1ZKYy7vbZiZ3FWaZefDa3QjxvBGVVMwPCVIhTW4NUNmYcC54Pmt7Hfl78D4U05PY01kxAOOxefglypHKHx6cGS52dq6T6y4INV6jFDDNu72Ket-xfgPjEj9DrMi2mA%3D%3D&attredirects=0)

¹² Kern County is the hub of oil and gas production in California, producing slightly more than 70% of the total on-shore value of oil and gas. Kern County taxes for the oil and gas industry totaled an estimated \$285 million in FY2016. Hence, we assume Kern County comprises 71.25% of estimated total statewide taxes of \$400 million in FY2016.

¹³ See: <https://www.nmlegis.gov/lcs/handouts/rstpjul21.11.oilandgas.pdf>

¹⁴ Household earnings is defined by Bureau of Economic Analysis as employee compensation plus proprietors' income.

Proprietor's income consists primarily of the income of sole proprietors and partnerships. The share of household earnings in each state derived from oil and gas activity is calculated as the sum of NAICS 201 (Oil and gas extraction) plus a share of NAICS 203 (Support activities for mining). The share of NAICS 203 included is determined by the ratio of NAICS 201/(NAICS 201 + NAICS 202 (Mining – except oil and gas)).

¹⁵ Sales taxes are defined as used in the Census Bureau's State and Local Government Finance database. Use taxes are treated synonymously with sales taxes. Gross receipts taxes are included in many states, particularly New Mexico.

¹⁶ See estimates provided by the Tax Foundation: <https://taxfoundation.org/state-and-local-sales-tax-rates-in-2017/>

¹⁷ For more details on the tax apportionment approach used in the IMPLAN input-output model: see <https://implanhelp.zendesk.com/hc/en-us/articles/115009674528-Generation-and-Interpretation-of-IMPLAN-s-Tax-Impact-Report>

¹⁸ The accuracy of the share in each state can be affected by the availability of special sales tax exemptions on the purchases of oil and gas-related goods and services. Additional data on the presence and size of potential exemptions in Oklahoma and other states would increase the accuracy of the estimated shares.

¹⁹ Available online at: <https://www.census.gov/govs/>

²⁰ State severance tax revenue would rise from \$331 million in FY2016 to \$722 million in FY2019. As a result, total oil and gas-related taxes would increase from \$1.215 billion to \$1.606 billion, or an 11.9% share of the \$13.543 billion in total state and local taxes collected in FY2015/16. Severance taxes would rise by an additional \$133.4 million at a 4% severance tax rate on FY2019 production, and by \$333.4 million if all FY2019 production was taxed at 7%.