



# US state and local oil and gas revenue sources and uses



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## ABSTRACT

US state and local governments generate revenues from oil and gas production through a variety of mechanisms. In this paper, we quantify four leading sources: (1) state taxes levied on the value or volume of oil and gas produced; (2) local property taxes levied on the value of oil and gas property; (3) oil and gas lease revenues from state lands; and (4) oil and gas lease revenues from federal lands. We measure these revenues against the total value of oil and gas produced in the top 16 oil- and gas-producing states using fiscal year 2013 as a benchmark. On average, state and local governments collect roughly 10% of oil and gas revenue, ranging from a low of roughly 1% to a high of nearly 40% (not including income taxes). We also assess the use of these revenues, finding that there is substantial variation among states. The largest shares of revenue flow to state governments' current expenditures and education, followed by local governments. Some states also allocate a portion of oil and gas revenues to trust funds endowing future government operations and/or education expenditures.

## 1. Introduction

Oil and gas production has grown substantially in the United States over the past decade, with major implications for state and local governments in regions where production occurs. Over the coming decades, most projections forecast that US production will likely remain at or above historically high levels (BP, 2016; ExxonMobil, 2016; International Energy Agency, 2015; U.S. Energy Information Administration, 2016), suggesting that oil and gas will continue to play a major role in numerous state and regional economies.

While the US federal government levies taxes and imposes certain regulations on the oil and gas industry, the bulk of fiscal and regulatory policy is designed and implemented at the state level. However, as policymakers consider how to tailor their fiscal policies to best meet the needs of residents, businesses, and multiple levels of government, there is limited analysis that allows stakeholders to compare policies among states.

## 2. Background and related literature

Because mining activities such as oil and gas often generate economic rents, taxes on resource extraction have the potential to be less distortionary than other taxes (e.g., taxes on wages or corporate income), allowing governments to raise revenue with less distortion of private behavior. If the revenue is saved, taxes on non-renewable natural resources can also be used to compensate future generations, who

will not be able to produce resources extracted in previous decades. In addition, taxes on mining can be attractive to governments because, unlike many other industries (e.g., manufacturing), the opportunities for firms to shift their operations across borders are more limited since they can only mine in locations where the resource exists. Severance taxes may also be used to offset negative impacts to the environment or public services (e.g., road damage), though in practice, most revenue flows to state general funds (Raimi and Newell, 2016c).

Property taxes apply broadly to real and personal property, with bases and rates varying widely. Methodologies for assessing the value of oil and gas property also vary between states, with most states either taxing the value of the recoverable resource (based on discounted future cash flows or some other model), or taxing the gross value of the produced oil and gas.

Governments also generate revenue from leasing public lands. These revenues accrue to federal, state, or local governments as they would to private landowners, with lease terms negotiated between the two parties. Revenue from leases on federal lands is shared with the state government where the production occurred, helping to compensate states for revenue produced on lands it does not control.

A substantial body of literature examines fiscal policy for natural resource development (Heaps and Helliwell, 1985). In the domain of the oil and gas industry, this research often focuses on fiscal regimes for nations seeking to incentivize production while also achieving broader economic and development goals. Research in this context tends to focus on national (rather than subnational) policy, and because private

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mineral ownership is essentially unique to the United States, researchers in this field typically analyze situations in which governments are the mineral rights holders (e.g., Agalliu, 2011; International Monetary Fund, 2010; Khelil, 1995; Tordo, 2007). These analyses often refer to the notion of a government “take” ordinarily calculated as the sum of government revenue as a percentage of cash flow from an oil and gas well, project, or operator. Government take estimates typically include lease or concession payments, royalties, corporate income or profit taxes, production-sharing agreements, revenues to national oil companies, and other sources. These estimates generally do not include indirect or induced revenues such as sales or personal income taxes affected by oil and gas activity.

As production from shale and other tight resources has dramatically boosted output in the United States, a number of states have made substantial revisions to their fiscal treatment of oil and gas activity, and debate over the issue continues (Rabe and Hampton, 2015). States sometimes compete for oil and gas investment, seeking to grow their economies and provide local employment opportunities, although evidence suggests state oil and gas taxation generally plays a relatively minor role in firms’ investment decisions (Agalliu, 2011; Chakravorty et al., 2011; Gülen et al., 2013).

The fiscal treatment of the oil and gas industry at the state level has attracted attention from a range of researchers and government agencies in recent years. Some of this research outlines basic statutory elements of existing state oil and gas tax policies, highlighting relevant laws and briefly discussing revenue allocation (Brown, 2013). The Colorado Legislative Council Staff (2014) quantifies oil and gas firms’ effective tax rates across state and local jurisdictions, including severance, property, income, and sales taxes, finding that rates range across western states from 4.4% in Colorado to 12.0% in Wyoming. Weber et al. (2016) describe how collections have risen and fallen with the value of production, finding tax rates ranging from 0.1% in California to 8.6% in Montana, with an average of 3.4%.

In multiple reports, Headwaters Economics estimates severance and property taxes in western states based on revenues generated from single hypothetical wells. They discuss the allocations of these revenues and highlight the potential for a temporal gap between when funds are needed and when they are allocated (Headwaters Economics, 2012, 2014; Headwaters Economics and Oklahoma Policy Institute, 2013). Rabe and Hampton (2016) also examine revenue allocation, focusing on whether and how states utilize long-term savings funds in the context of newly abundant resource revenues. This work helps understand how states can utilize resource wealth to benefit future generations, along with minimizing near-term revenue volatility. Along similar lines, Morris (2016) and Saha and Muro (2016) focus on state reliance on revenues from fossil fuel production, highlighting the risks of heavy dependence on these volatile sources.

With the exception of the work by Headwaters Economics, the analyses noted above focus primarily or exclusively on severance taxes, which tax the value and/or volume of produced oil and gas or, in the case of Pennsylvania, an impact fee, which charges an annual fee for each shale well. While this body of research is valuable, it illuminates just one of multiple oil and gas revenue sources, providing a limited picture of how revenues are collected by, and flow to, state and local governments.

On a closely related topic, some recent research examines how oil and gas development affects state and local government spending patterns. James (2015) estimates that for every dollar in additional natural resource revenues, states tend to spend \$0.50, save \$0.30, and reduce non-resource revenues by \$0.20. Other recent research has examined how oil and gas development affects local public spending. Similarly, Marchand and Weber (2015) find that increased property values driven by oil and gas in Texas led to increased per student public education spending, with new revenues flowing to capital projects and debt service rather than teacher compensation. In a wide-ranging study, Bartik et al. (2017) find that growth in local government revenue modestly

outweighs increased expenditures, though per-student education spending remained roughly flat.

This study provides additional insight into fiscal policy in two key ways. First, we include revenues from sources not accounted for in most of the above analyses, notably local government property taxes and revenues from oil and gas leases on state and federal lands. In total, these revenues are similar in magnitude to severance taxes, underscoring their importance. Second, this report quantifies both how revenues are collected and to what purpose they are allocated, whereas most other work focuses only on revenue collection. It also provides a foundation for future research focused on whether and how revenue policies affect the quality of public services, industry investment decisions, economic growth trends, and more.

This paper does not address the costs incurred by state and local governments associated with oil and gas development, nor does it attempt to assess whether revenues collected by states and localities are sufficient to manage any increased demand for government services associated with the industry. We have addressed this topic in previous work (Raimi and Newell, 2016a; Newell and Raimi, 2015), where we find that for most local governments, near-term revenues associated with oil and gas development tend to outweigh near-term costs, including increased demand for services. (We have not examined this question for state governments.)

### 3. Methodology and data

This paper quantifies the revenues raised by state and local governments directly from oil and gas production in fiscal year (FY) 2013. Sources that are directly tied to the value or volume of oil and gas produced within the state are called *direct* revenues. Because of methodological issues and limited data availability, we do not include corporate income taxes from the oil and gas sector or estimate indirect revenues such as sales taxes, income taxes, and other sources that are often affected by changes in population or economic activity brought about by the oil and gas industry.

The major direct revenues for local and state governments associated with oil and gas production are (1) state taxes levied on the value or volume of oil and gas produced (often referred to as “severance” taxes); (2) local property taxes levied on the value of oil and gas property; (3) oil and gas lease revenues from state lands; and (4) oil and gas lease revenues from federal lands.

We focus on the top 16 oil- and gas-producing states: Alaska, Arkansas, California, Colorado, Kansas, Louisiana, Montana, North Dakota, New Mexico, Ohio, Oklahoma, Pennsylvania, Texas, Utah, West Virginia, and Wyoming. During FY 2013, these states accounted for 99% and 97% of US onshore oil and natural gas production, respectively. To make clear comparisons among states, we examine government revenues in a single year, FY 2013, and show the amount of revenues generated as a percentage of the total value of oil and gas produced during that period.

To calculate the total value of oil and gas produced in each state, we rely primarily on data from state and federal government agencies, along with a small set of proprietary natural gas pricing data. For each state, monthly crude oil and marketed natural gas production data are from the US Energy Information Administration (EIA). To estimate the value of production, we multiply these volumes by an estimated average monthly oil and gas price received by the producer. For Louisiana, oil and gas prices are from the state’s Department of Natural Resources (2013). For all other states, we use EIA’s crude oil first purchase price and regional prices at a variety of natural gas market hubs accessed via Bloomberg (Table 1). EIA does not currently report state-level natural gas wellhead prices. We sum estimated oil and gas revenues to derive the total value of oil and gas produced in each state, with summary statistics provided in Table 1.

Next, we gather data on revenues collected by state and local governments from four revenue sources: severance taxes (or similar fees),

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