



Unconventional Oil and Natural Gas Production Tax Rates: How Does Oklahoma Compare to Peers?

Prepared by Headwater Economics in conjunction with Oklahoma Policy Institute, August 2013

This report compares Oklahoma's oil and natural gas tax policies to other leading oil and natural gas producing states. Oil comparison states are Colorado, Montana, New Mexico, Texas, North Dakota, and Wyoming. Natural gas comparison states are Arkansas, Louisiana, New Mexico, Pennsylvania, Texas and Wyoming.

Our analysis applies state tax policies to average production data for typical unconventional oil and natural gas wells to determine comparable effective tax rates. Both unconventional oil and natural gas wells typically feature high initial rates of production that decline steeply and quickly, and eventually stabilize at relatively low levels. The respective production profiles for unconventional oil and natural gas wells are consistent enough across shale plays to offer a sound basis for comparing how states tax policies raise revenue from these new resources.

The findings are summarized here followed by a detailed discussion of methods, findings, and data sources.

Major Findings:

Oklahoma currently has a low effective tax rate compared to peer states.

- Oklahoma's effective tax rate on unconventional oil production is 3.3 percent, the lowest of seven peer oil-producing states (Figure 1).
- Oklahoma's effective tax rate on unconventional natural gas is 2.6 percent, ranking fifth lowest of seven peer natural gas-producing states (Figure 2).

Oklahoma's low effective tax rate results from a four-year severance tax "holiday" that reduces the tax rate for newly completed horizontal wells from seven to one percent.

- The use of tax holidays varies widely among states. Oklahoma is one of only two oil-producing states reviewed in this study with tax holidays for oil. Four of the seven natural gas producing states utilize a tax holiday incentive.

Removing the tax holiday incentive would increase Oklahoma's effective tax, but the state would remain on the low end of effective tax rates compared to peers.

- Oklahoma's effective production tax rate would rank sixth lowest among seven peer oil-producing states without the tax holiday.
- Oklahoma's effective production tax rate would rank third (along with Texas) among seven natural gas-producing states without the tax holiday incentive.

The combination of unconventional wells and tax breaks directly impact Oklahoma's fiscal situation.

- For a typical unconventional oil well, nearly two-thirds (64 percent) of cumulative production over the first ten years will come in the first 48 months after a well is completed (Figure 3).
- As a result, cumulative gross production tax revenue over ten years will be \$630,000, which is less than half of what the state would collect (\$1.4 million) without the tax break (Figure 6).

Figure 1: Effective Tax Rate on a Typical Unconventional Oil Well After 10 Years of Production

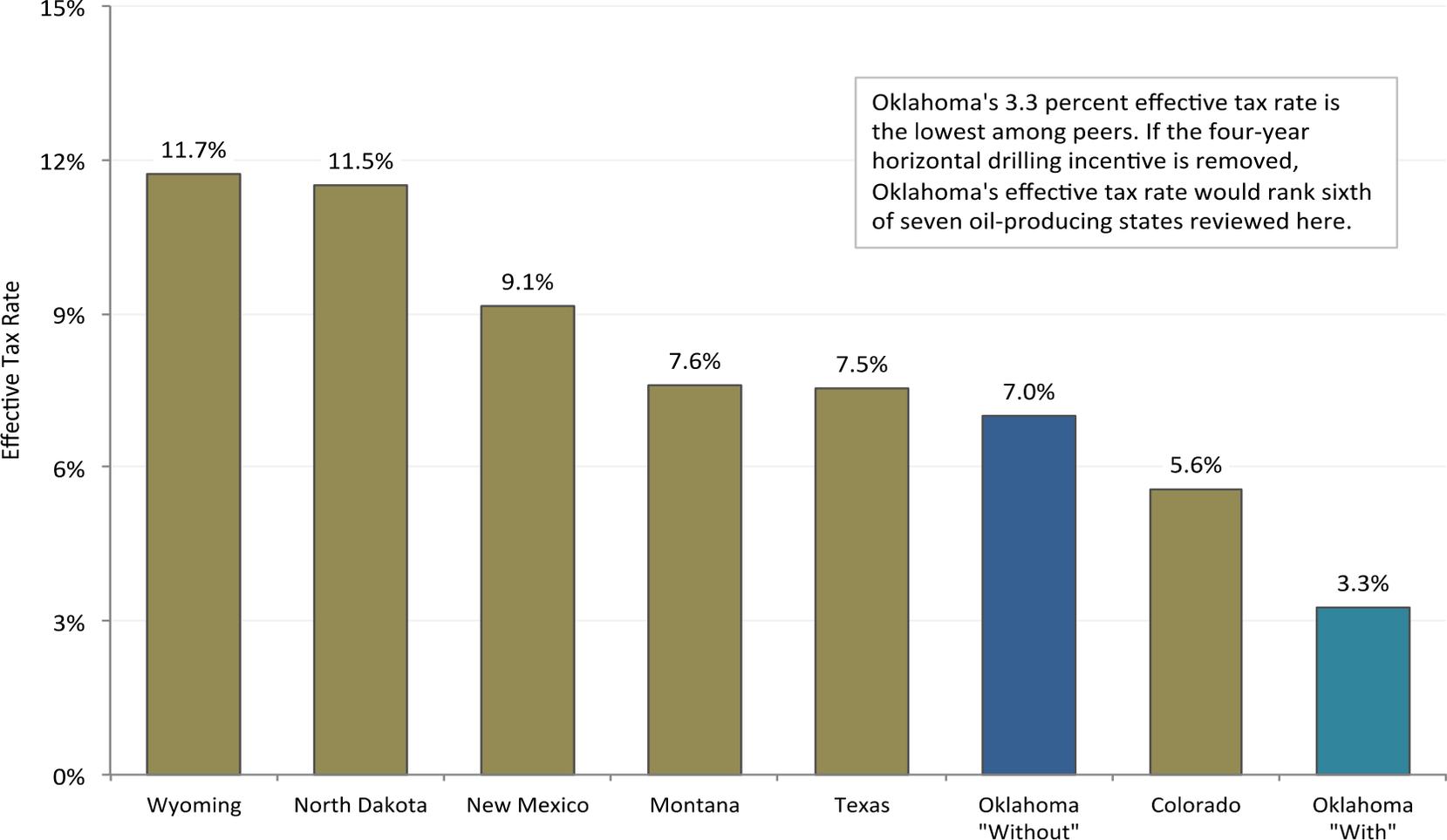
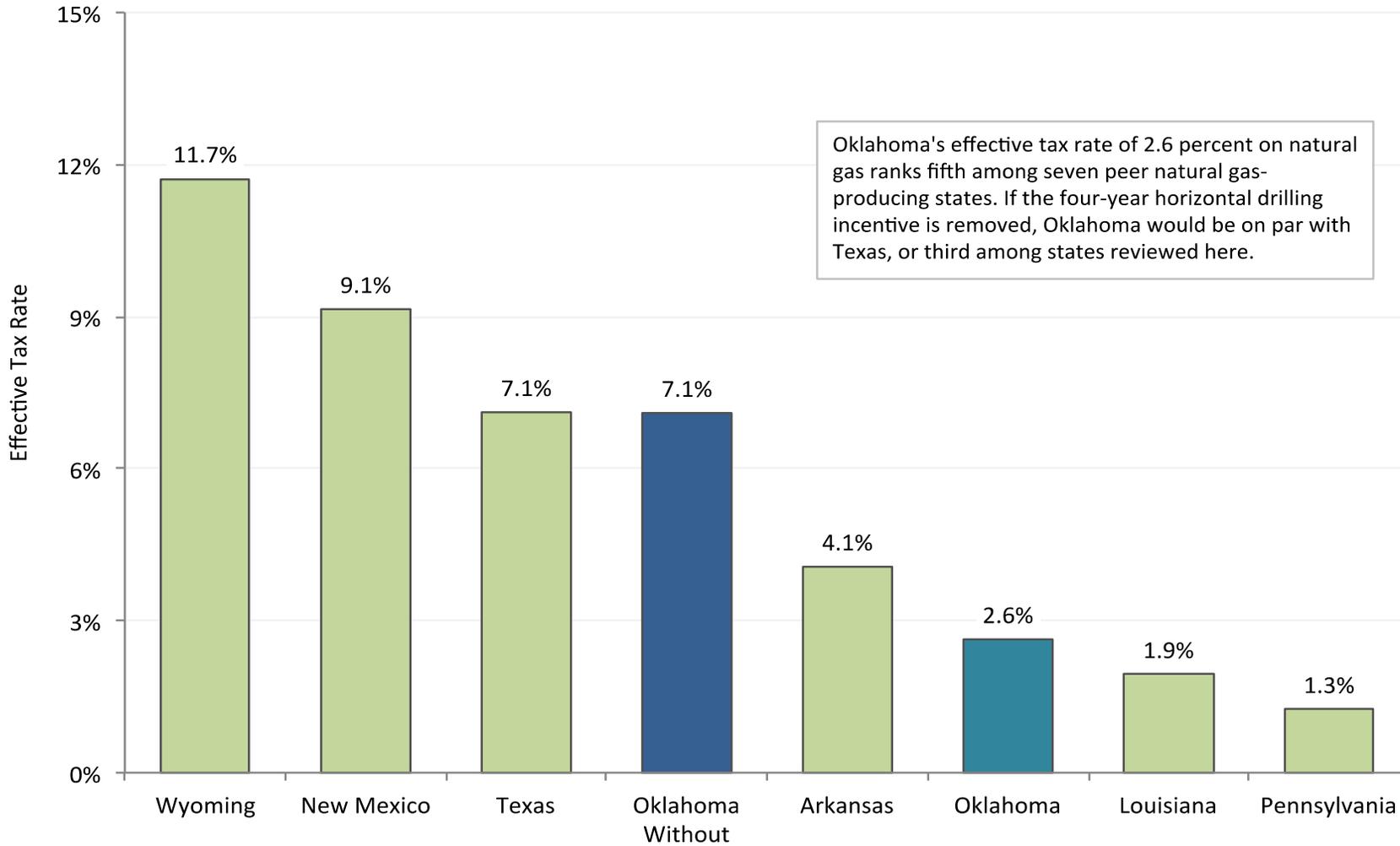


Figure 2: Effective Tax Rate on a Typical Unconventional Natural Gas Well After 10 Years of Production



Methods

This brief is part of Headwaters Economics ongoing efforts to understand the community costs and benefits from unconventional oil and natural gas development across the West. Tax policy is important to communities seeking to manage boomtown impacts of unconventional oil and natural gas development and to generate long-term benefits as a result of natural resource extraction.¹

From the perspective of community impacts and benefits, the key features of fiscal policy are the timing, amount, volatility, and distribution of revenue collections.² Many existing comparative state oil and natural gas tax rate studies fail to adequately capture these factors. Often they do not include all production taxes, fail to consider incentives, and do not attempt to consider timing and distribution of revenue to communities.

We use declines curves as a way to compare production taxes across states in amount, timing, and volatility. The method also allows for easy assessment of all production taxes, drilling incentives, and the timing of revenue collections.

The analysis focuses on production taxes, including severance, gross production, property taxes, and assessments on the value of oil and natural gas production. We exclude sales taxes on services, corporate income, and ad valorem taxes on production equipment.

This report also does not compare state distribution of revenue collections. This is not an important factor in understanding the relative tax rate industry faces across states, but it does have significant bearing on the benefits of tax policy to communities where drilling and related industrial and population growth impacts occur.

Selection of States

We selected states based on current production volumes from unconventional resources using data from the U.S. Energy Information Administration. The states with significant production from unconventional oil are North Dakota, Texas, Wyoming, Montana, Colorado, New Mexico, and Oklahoma. Alaska and California have significant oil production from conventional oil fields, but little unconventional production to date so they are excluded from this analysis. The states with significant production from unconventional natural gas are Texas, Louisiana, Arkansas, Oklahoma, Pennsylvania, Wyoming, Colorado, and New Mexico and Oklahoma.

Tables 1 and 2 illustrate state tax policy related to new horizontally completed oil and natural gas wells.

¹ Headwaters Economics. 2012. Benefiting from Unconventional Oil: State Fiscal Policy is Unprepared for the Heightened Community Impacts of Unconventional Oil Plays. Bozeman, MT. With the Bill Lane Center for the American West, Stanford University. http://headwaterseconomics.org/wphw/wp-content/uploads/ND_Unconventional_Oil_Communities.pdf.

² Headwaters Economics. 2012. Oil and Gas Fiscal Best Practices: Lessons for State and Local Governments. Bozeman, MT. <http://headwaterseconomics.org/energy/energy-fiscal-best-practices/>.

Table 1. State Oil Tax Policy Related to New Horizontal Well Drilling

| State | Tax Type | Base Tax Rate | Incentives for Unconventional Production | Stripper Well Deductions | Timing of Collections |
|--------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------|
| Colorado | Severance Tax | 2% for annual taxpayer production under \$25,000; \$500 + 3% for \$25,000 to \$100,000; \$2,750 + 4% for \$100,000 to \$300,000; \$10,750 + | 87.5 percent of property taxes paid to local governments are deducted from severance tax liability | Less than 15 barrels per day averaged over the entire tax year pays a severance tax of | Annual |
| | Ad Valorem Production Tax | Oil is assessed at 87.5% of production value. Average levy in 2011 was 73.218 | | | Annual |
| Montana | Oil production tax | Working interest 9.0%; Royalty interest 14.8% | 0.5% for first 18 months from new horizontal wells and 12 months on new vertical wells on working interest only | 5.76% below 10 bbls/day when price is below \$30/bbl | Quarterly |
| | Privilege and license fee | 0.09% | | | Quarterly |
| | Local impact tax | 0.17% | | | Quarterly |
| New Mexico | Ad Valorem Production Tax | Assessed value is 1/3rd of production value of natural gas extracted. Taxable value equals 150 percent of the value of the products after deducting: (1) royalties paid to the U.S. government, the State of New Mexico, and/or Indian tribes; and (2) trucking expenses (i.e. allowable transportation and processing expenses). Local levies vary between 8 and 11 percent on taxable value. The effective tax rate on production for FY 2011 and 2012 is about 1.2%. | | | Monthly |
| | Oil and Gas Severance Tax | 3.75% | | | Monthly |
| | Oil and Gas Emergency School Tax | 4.00% | | | Monthly |
| | Oil and Gas Conservation Tax | 0.19% | | | Monthly |
| North Dakota | Oil extraction tax | 6.50% | | 0% below 30 bbls/day | Monthly |
| | Gross production tax | 5% | | | Monthly |
| Oklahoma | Gross production tax | 7% (4% if price drops below \$17/bbl, and 1% if | Horizontal wells pay 1% for first 48 months | | Monthly |
| | Petroleum excise tax | 0.095% | | | Monthly |
| Texas | Production tax | 4.60% | | Tax credit when price is below \$25 in 2005 dollars for wells below 15 | Monthly |
| | Local ad valorem tax | Effective rate of 2.12% for all property | | | Annually |
| | Texas oilfield cleanup regulatory fee | 0.63% | | | Monthly |
| | Regulatory tax | 0.19% | | | Monthly |
| Wyoming | Severance tax | 6% | | 4% below 10 bbls/day if average price is over \$20/bbl, 15 bbls/day if average price is under \$20/bbl. | Monthly |
| | Local ad valorem tax | Effective rate is 5.7% in FY 2011 | | | Annually |

Table 2. State Natural Gas Tax Policy Related to New Horizontal Well Drilling

| State | Tax Type | Base Tax Rate | Incentives for Unconventional Production | Stripper Well Deductions | Timing of Collections |
|--------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Arkansas | Property Tax | \$1,376/mcf annual average daily production for 2012. Working interest is .875. Value is reduced by .13 for transportation costs, and assessed value is .2 of the annual value after reductions. Working interest is .125 using the same calculation. Assessed value is subject to local tax levy. | | | Annually |
| | Severance Tax | 5% on natural gas | 1.5% on high-cost gas wells for 36 months | "Marginal High Cost Gas Well" shall mean a high cost gas well which is incapable of producing more than 100 Mcf per day | Monthly |
| Louisiana | Severance Tax | \$0.148/mcf for the period 7/1/12 to 6/30/13. Works out to a 4.13% tax rate when the price is \$3.58 /mcf | No tax for two years or until the well cost is paid, whichever comes first. | | Monthly |
| | Oilfield site restoration fee | \$.003/mcf | | | Quarterly |
| New Mexico | As Valorem Production Tax | Assessed value is 1/3 of production value of natural gas extracted. Taxable value equals 150 percent of the value of the products after deducting: (1) royalties paid to the U.S. government, the State of New Mexico, and/or Indian tribes; and (2) trucking expenses (i.e. allowable transportation and processing expenses). Local levies vary between 8 and 11 percent on taxable value. The effective tax rate on production for FY 2011 and 2012 is about | | | Monthly |
| | Oil and Gas Severance Tax | 3.75% | | | Monthly |
| | Oil and Gas Emergency School Tax | 4.00% | | | Monthly |
| | Oil and Gas Conservation Tax | 0.19% | | | Monthly |
| Oklahoma | Gross Production Tax | 7% (4% if price drops below \$2.10/mcf, and 1% if price drops below \$1.75/mcf) | 1% for first 48 months for horizontal wells | | Monthly |
| | Petroleum excise tax | 0.095% | | | Monthly |
| Pennsylvania | Natural Gas Impact Fee | Annual fee schedule set by the Public Utility Commission. Fees are based on the price of natural gas. | | | Annually |
| Texas | Production Tax | 7.50% | 0% to 7.4% for high cost gas wells for 120 months or until the value of the incentive exceeds 50 % of well completion costs. The Texas Legislative Budget Board provides an example of a Barnett Shale well eligible for the high cost well incentive that will pay 2.56 percent effective tax rate. We apply this effective rate to our typical well. | | Monthly |
| | Local ad valorem tax | Effective rate of 2.12% for all property statewide | | | Annually |
| | Texas oilfield cleanup regulatory fee | 0.63% | | | Monthly |
| | Regulatory tax | 0.19% | | | Monthly |
| Wyoming | Production Tax | 6% | | | Monthly |
| | Ad Valorem | Effective rate is 5.7% in FY 2011 | | | Annually |

Decline Curve Analysis

The analysis is based on a typical decline curve for a horizontally completed shale or “tight” oil well. We provide the analysis for the typical oil well to illustrate the analysis.

The typical oil well is based on a production decline curve for the average horizontal well completed in Montana’s Elm Coulee field, part of the Bakken Formation. These data are available to the public at no cost from the Montana Department of Natural Resources, Board of Oil and Gas.

Similarly, tax projections for a typical unconventional natural gas well is based on a production decline curve for the average horizontal well completed in the greater Haynesville shale play in East Texas and Louisiana. We were not able to obtain free public data on natural gas production trends and so adapted data from a recent EIA analysis of production in the Haynesville.³

The following figures illustrate the characteristics of the typical horizontally completed natural gas and oil well, and how tax policy was applied to the production decline curve using the oil well production data as an example.

³ U.S. Energy Information Administration. July 2011. Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays. <http://www.eia.gov/analysis/studies/uss halegas/pdf/uss haleplays.pdf>

Figure 3: Production Decline Curve for an Average Unconventional Oil Well Based on MT Production from 2000 to 2012

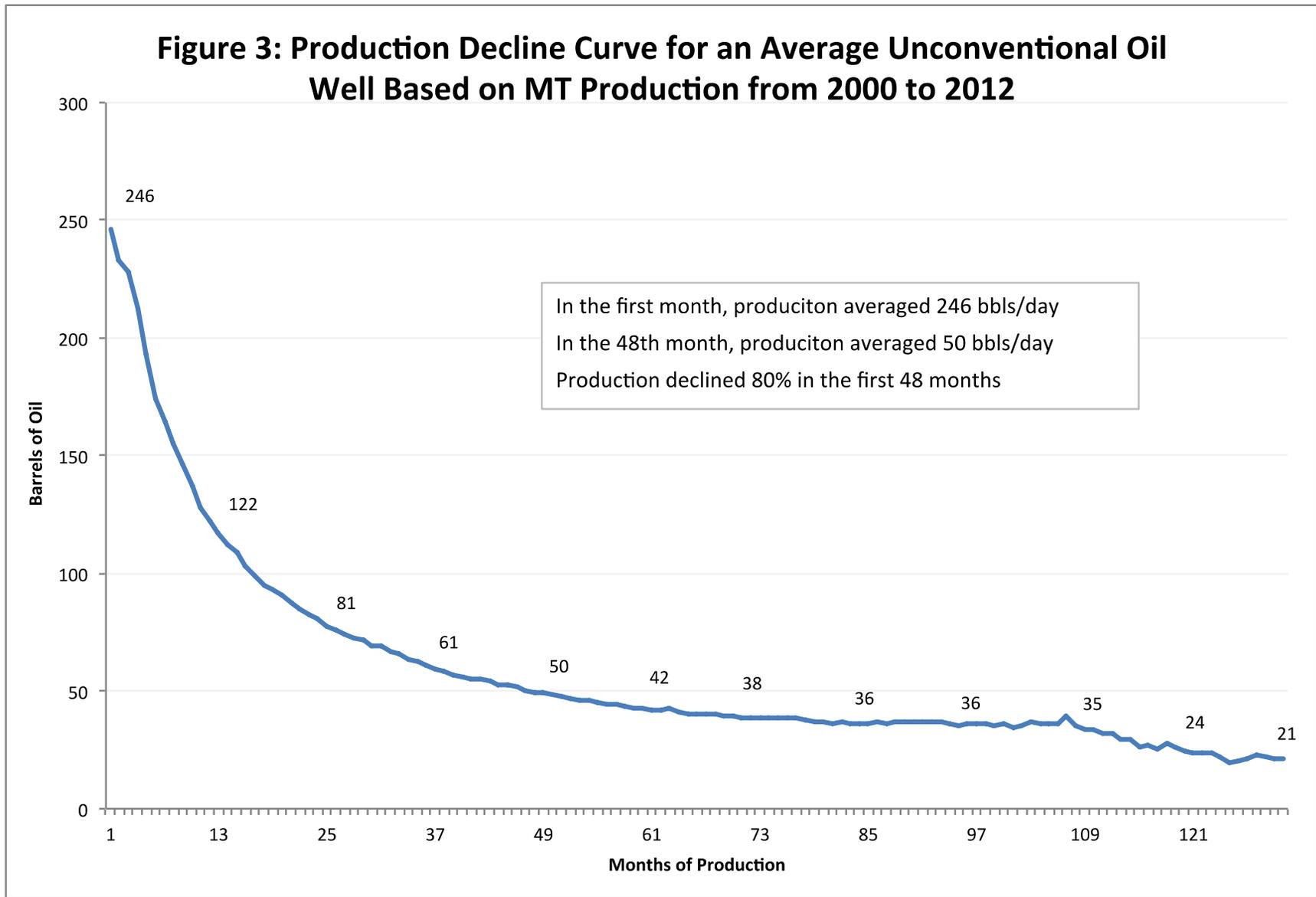


Figure 4: Cumulative Production from an Average Unconventional Oil Well Based on MT Production from 2000 to 2012

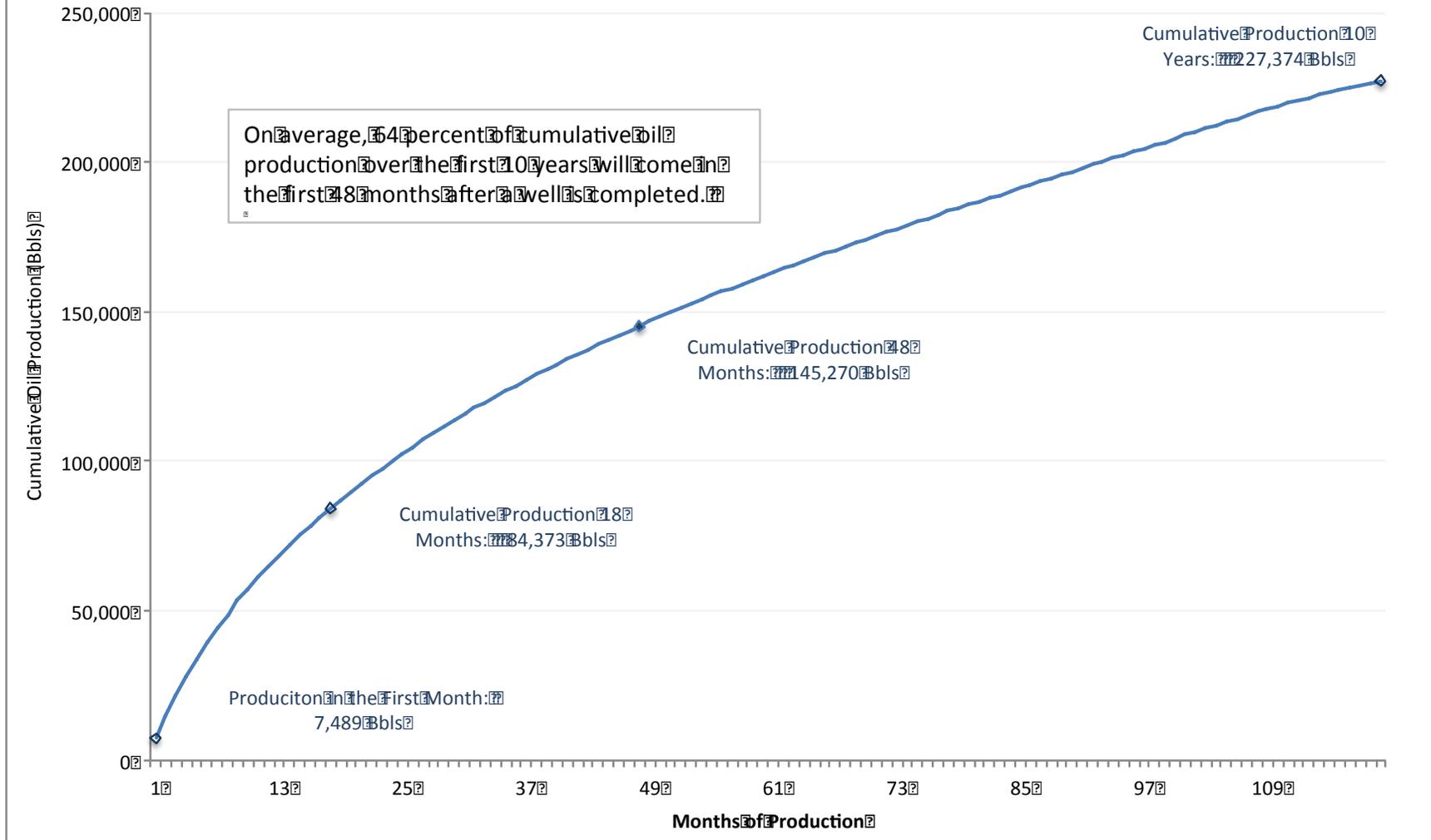


Figure 5: Cumulative Production Value from an Average Unconventional Oil Well is 19.3 Million After 10 Years of Production

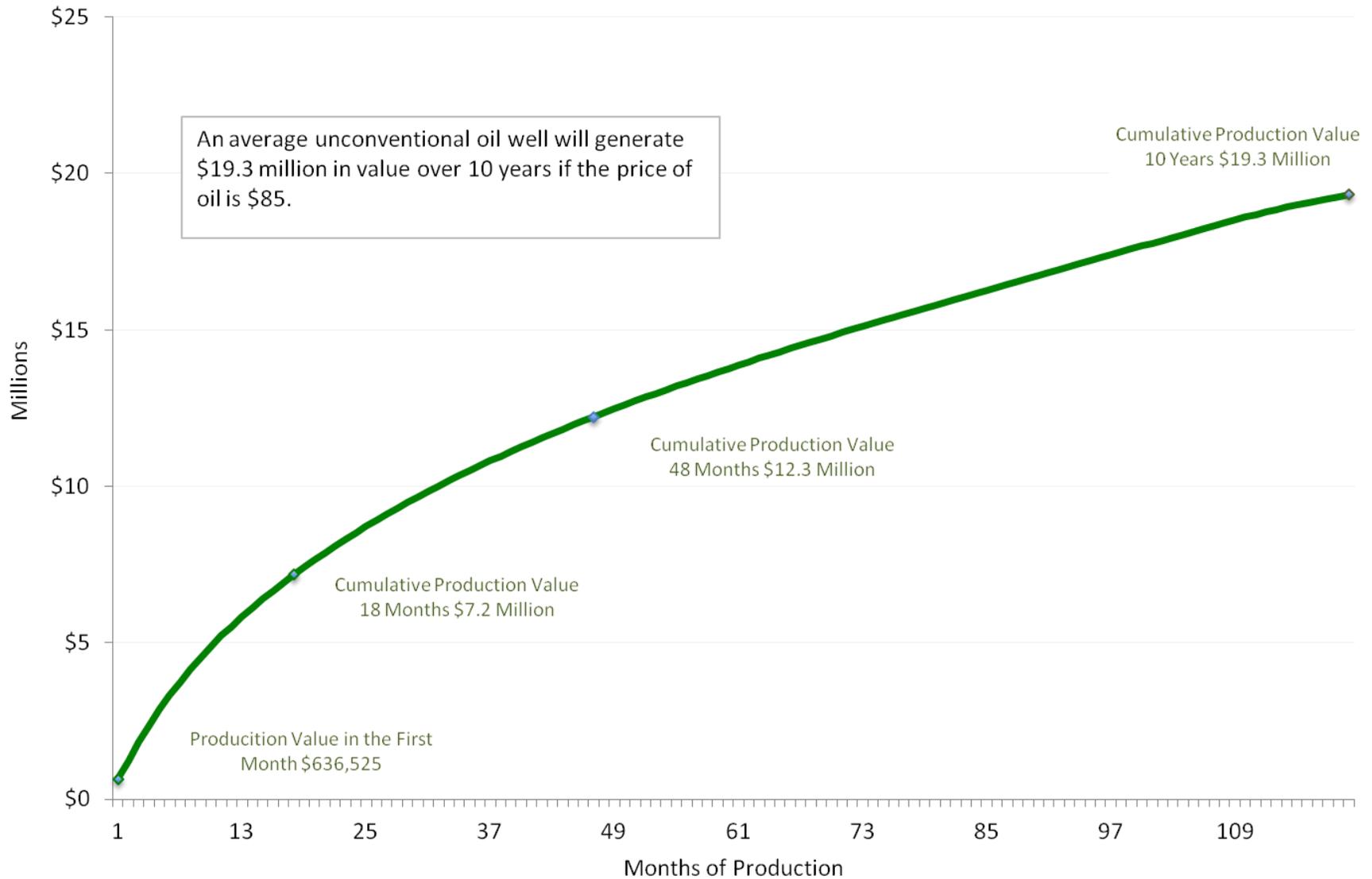


Figure 6: Cumulative Gross Production Tax Revenue from a Typical Unconventional Oil Well in Oklahoma

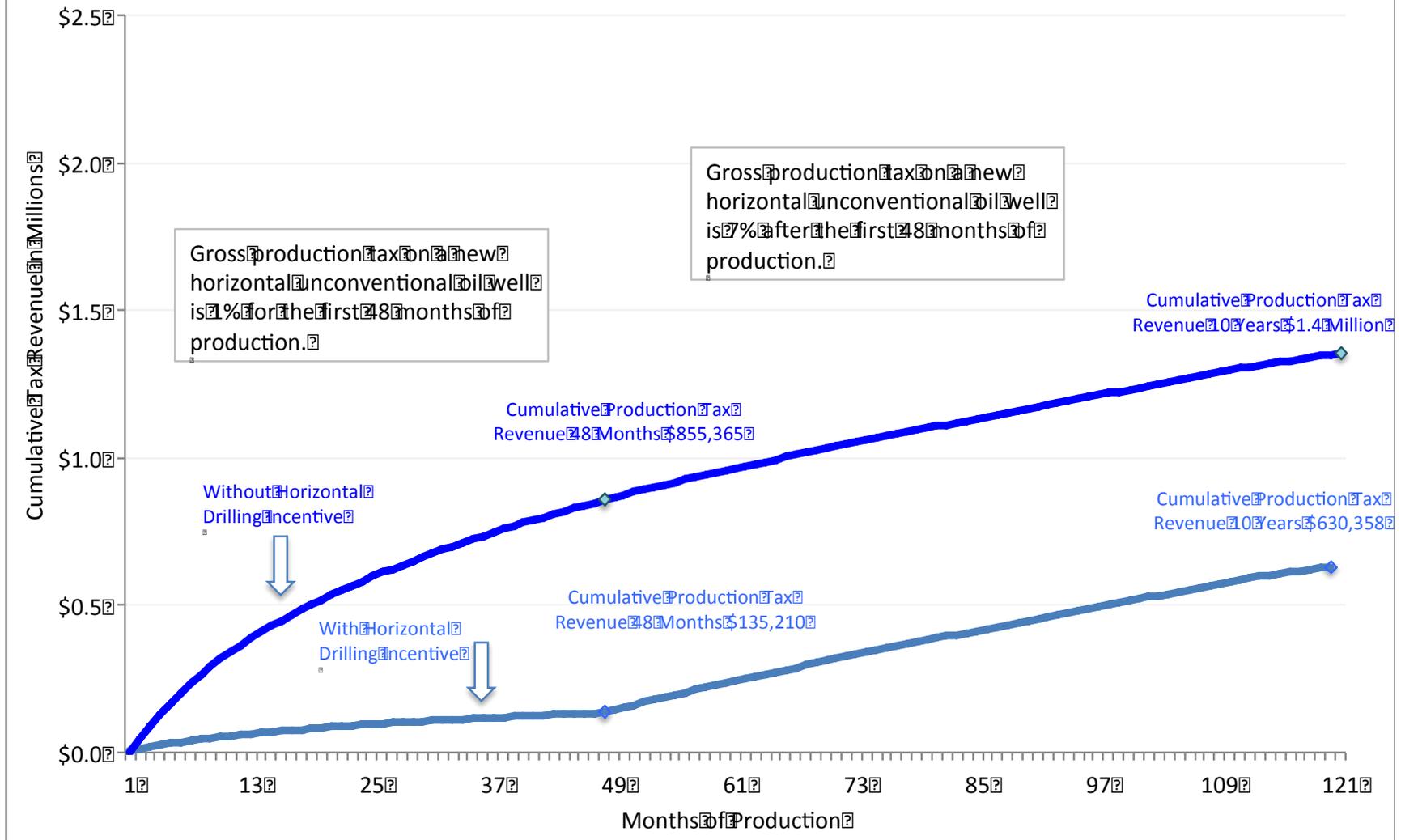


Figure 8: Comparison of Cumulative Production Tax Revenue from a Typical Shale Oil Well, Seven States

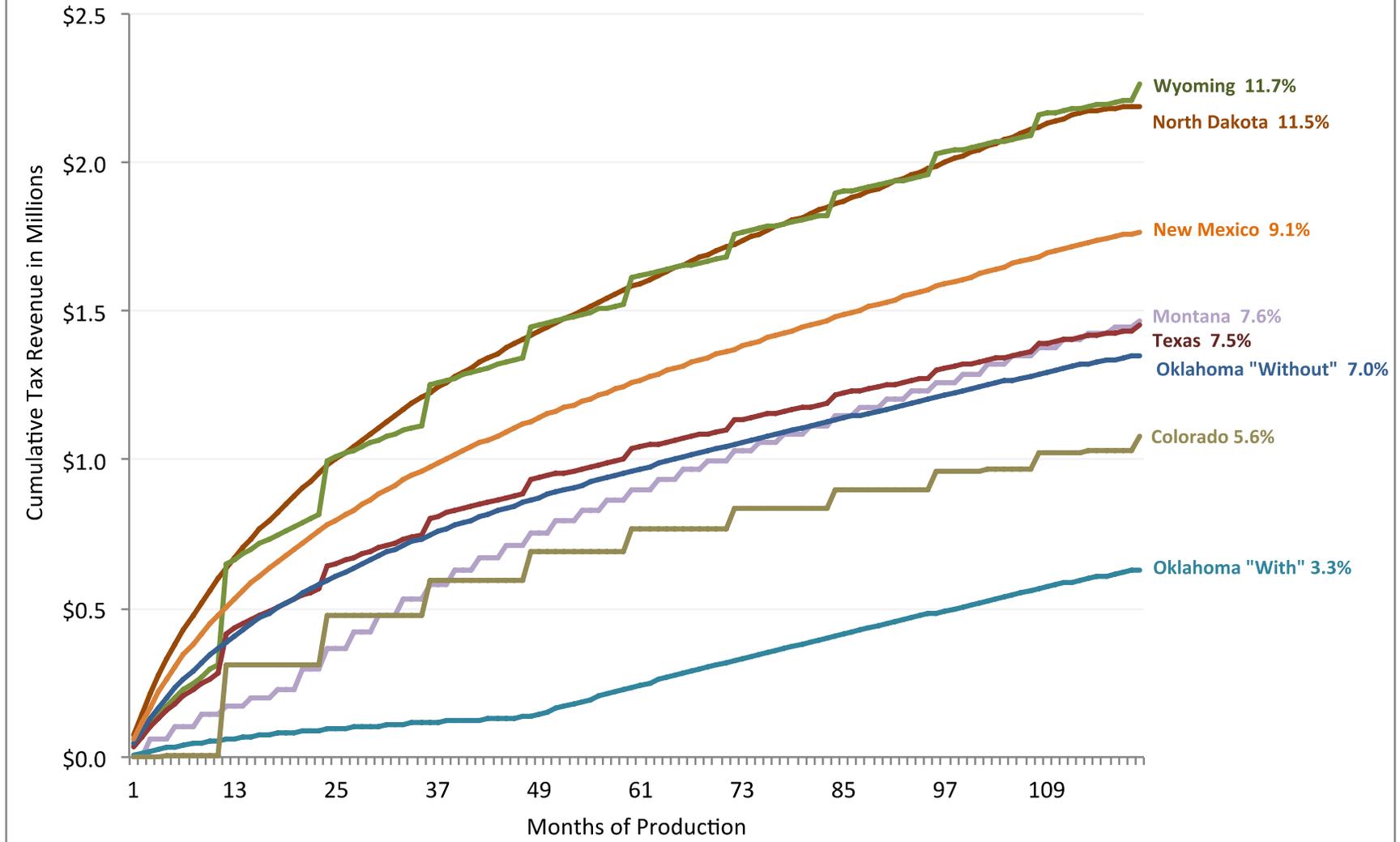
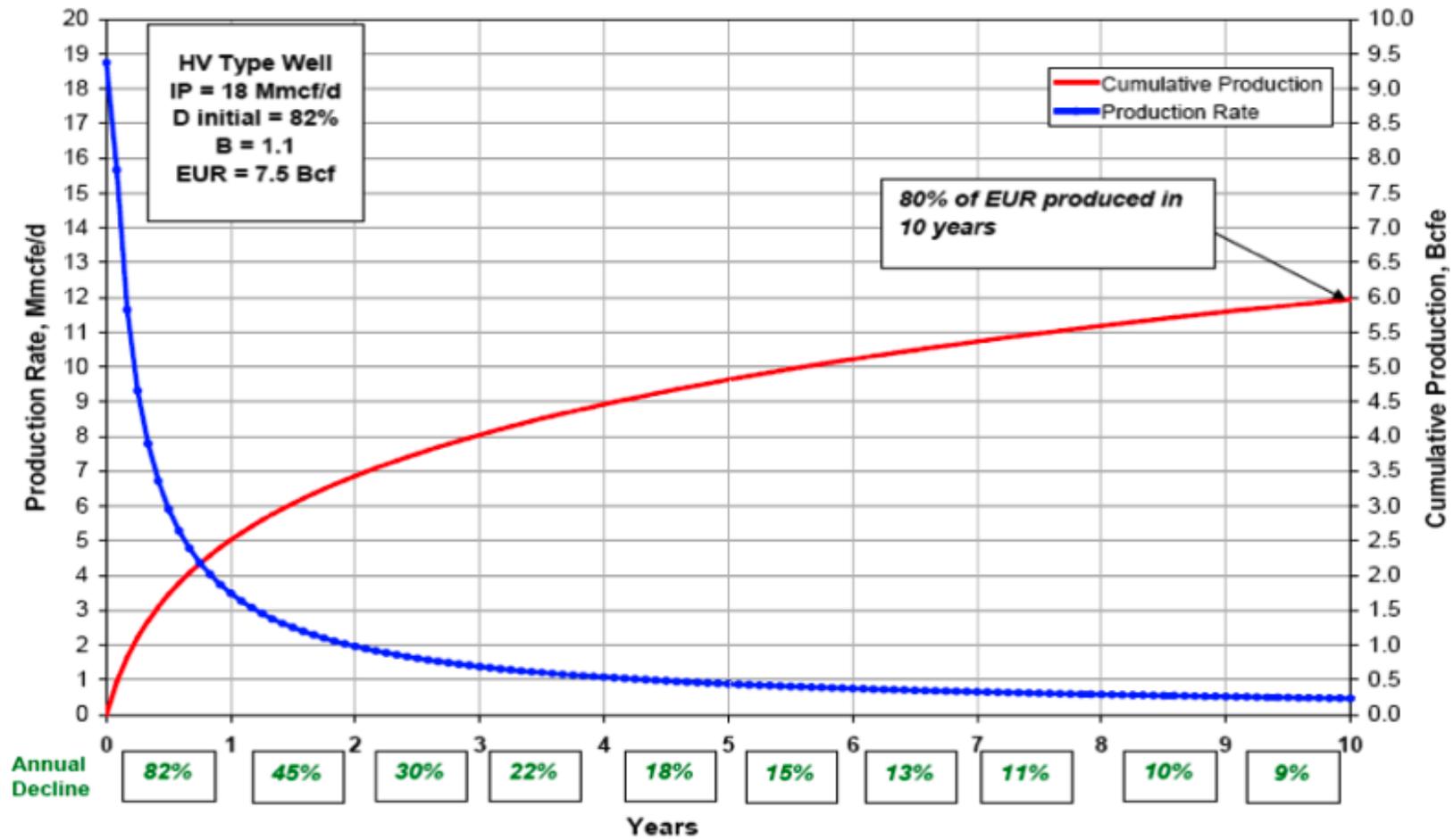


Figure 9: Haynesville Natural Gas Well Type Curve⁴



⁴ U.S. Energy Information Administration. July 2011. Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays. Page 28.
<http://www.eia.gov/analysis/studies/usshalegas/pdf/usshaleplays.pdf>

Discussion

State tax policy is responsive to changes in well productivity, price, and the shape of the decline curve. Using a typical well decline curve to compare state tax policies does not allow for a comparison of how these other key variables change the effective tax rate for each state. We offer the following brief observations on the potential impacts of these variables here.

Production decline curves:

Tax holiday incentives provide a reduced rate or a total exemption from production taxes for a defined period of time. Because of the steep production profiles characteristic of unconventional wells, the incentive comes at a time when wells are producing the highest rates. If the well profile were flatter – meaning if production declined more slowly with a larger share of cumulative production coming after the first several years, tax holiday incentives would be relatively less valuable.

In general, horizontally completed wells in oil and natural gas shale plays perform very similarly with high initial production, steep annual declines, and a flattening production curve after the first several years. Comparing state tax policies based on the different productivity of wells across fields does not change the effective tax rate or state comparison in a significant way.

Price thresholds:

Several states base production tax rates on the annual average price of oil and natural gas. Others offer incentives or deductions that are only available when prices fall below legislated thresholds. In this analysis we used fixed prices for oil of \$85/barrel and for natural gas of \$3.58/mcf. These prices are well above thresholds defined in state tax policy for specific incentives and deductions. For example, North Dakota has a “holiday” incentive that lowers the extraction tax rate from 6.5 percent to two percent when prices fall below a statutory limit. The trigger price for 2013 is \$52.20,⁵ well below current and projected oil prices.

Louisiana’s and Pennsylvania’s natural gas production tax and impact fee respectively generate effective tax rates that are volatile relative to price. Louisiana charges a per/mcf severance tax on natural gas that is adjusted annually. For FY 2012 (covering the period from July 2012 to January 2013) the rate is 14.8 cents/mcf.⁶ Based on the average natural gas spot price at the Henry Hub for the first 8 months (July 2012 to February 2013) of \$3.14⁷, the rate works out to be about 4.6 percent. The table shows historic effective tax rates for the Louisiana natural gas severance tax have varied from a low of 2.5 percent in 2002 to a high of 7.8 percent in 2009.

Table 3: Louisiana Natural Gas Severance Tax Effective Rate, FY 2000-2012.

⁵ State of North Dakota, Office of the State Tax Commissioner. Annual Oil Trigger Price Adjustment. December, 31, 2012. <http://www.nd.gov/tax/oilgas/pubs/trigger.pdf?20130405155048>.

⁶ Louisiana Department of Revenue. Policy Documents: Severance Tax. www.revenue.louisiana.gov/sections/lawspolicies/pd.aspx?category=SEV.

⁷ U.S. Energy Information Administration. Henry Hub Gulf Coast Natural Gas Spot Price (Dollars/Mil. BTUs). www.eia.gov/dnav/ng/hist/rngwhhdM.htm.

| Fiscal year (July-June) | Average price/mcf (Henry Hub spot price) | Severance tax/mcf | Effective tax rate |
|----------------------------|------------------------------------------------|----------------------|-----------------------|
| 2000 | \$2.82 | 0.097 | 3.4% |
| 2001 | \$2.77 | 0.199 | 7.2% |
| 2002 | \$4.88 | 0.122 | 2.5% |
| 2003 | \$5.42 | 0.171 | 3.2% |
| 2004 | \$6.30 | 0.208 | 3.3% |
| 2005 | \$9.03 | 0.252 | 2.8% |
| 2006 | \$6.87 | 0.373 | 5.4% |
| 2007 | \$8.30 | 0.269 | 3.2% |
| 2008 | \$5.93 | 0.288 | 4.9% |
| 2009 | \$4.25 | 0.331 | 7.8% |
| 2010 | \$4.16 | 0.164 | 3.9% |
| 2011 | \$3.04 | 0.164 | 5.4% |
| 2012* | \$3.19 | 0.148 | 4.6% |
| Average | \$5.15 | \$0.21 | 4.4% |

*For the period July 2012 to February 2013

Pennsylvania does not levy a production tax, but imposes an impact fee for all wells drilled in the state. The impact fee schedule charges a fixed fee annual for 15 years. Because the fee schedule is fixed (it rises with price but is relatively flat), the effective rate when compared to total production value from a typical natural gas well tends to fall as prices rise. This means the fee is a larger share of production value at low prices, and a smaller share at high prices.

Average daily production:

Most states have deductions for low-producing “stripper” wells. The definition of a stripper well tends to fall well below initial rates of production, and by the time an unconventional well qualifies for stripper well status, most of the well’s cumulative production, at least over the first 10 year period, has already occurred.

For example, North Dakota has a relatively generous deduction that defines a stripper well as any well producing less than 30 barrels per day. Based on our typical well, North Dakota’s stripper well deduction becomes active in the 113th month of production after the typical well in our analysis has produced more than 95 percent of the total oil it will produce over the first ten years.

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