



BLESSING OR CURSE?

The effects of natural resource production on local economies



TERRY ROSS, president of Community Bank in Alva, Okla.

Innovation in the extraction of natural gas, tight gas, tight oil and coal seam gas from shale and tight sandstone formations has created a boom in the U.S. energy sector. According to the Energy Information Administration, total U.S. recoverable natural gas resources were estimated to be 2,327 trillion cubic feet in 2013, up from 1,259 trillion cubic feet in 2000. The abundance of natural gas is so great that estimates show current U.S. reserves at a 70-year supply.

From 2011, U.S. crude oil reserves increased year-over-year by 4.5 billion barrels, 15.4 percent, because of a large volume of extensions to existing fields. Production is expected to increase another 25 percent by 2016, which would make the United States the world's largest oil producer.

Federal Reserve Bank of Kansas City Economist Jason Brown says some theories suggest resource abundance may increase local economic development through higher demand for labor in the energy sector and spillover spending in the local economy.

Other theories suggest industries not closely related to the resource extraction industry may be harmed as energy production

expands, experiencing the “natural resource curse.” Brown says the curse phenomenon is when labor demand by the extraction industry may be high enough to bid up local wages, which in turn could pull employees from other lower-paying jobs and make it difficult for other industries to survive.

Advent of hydraulic fracturing

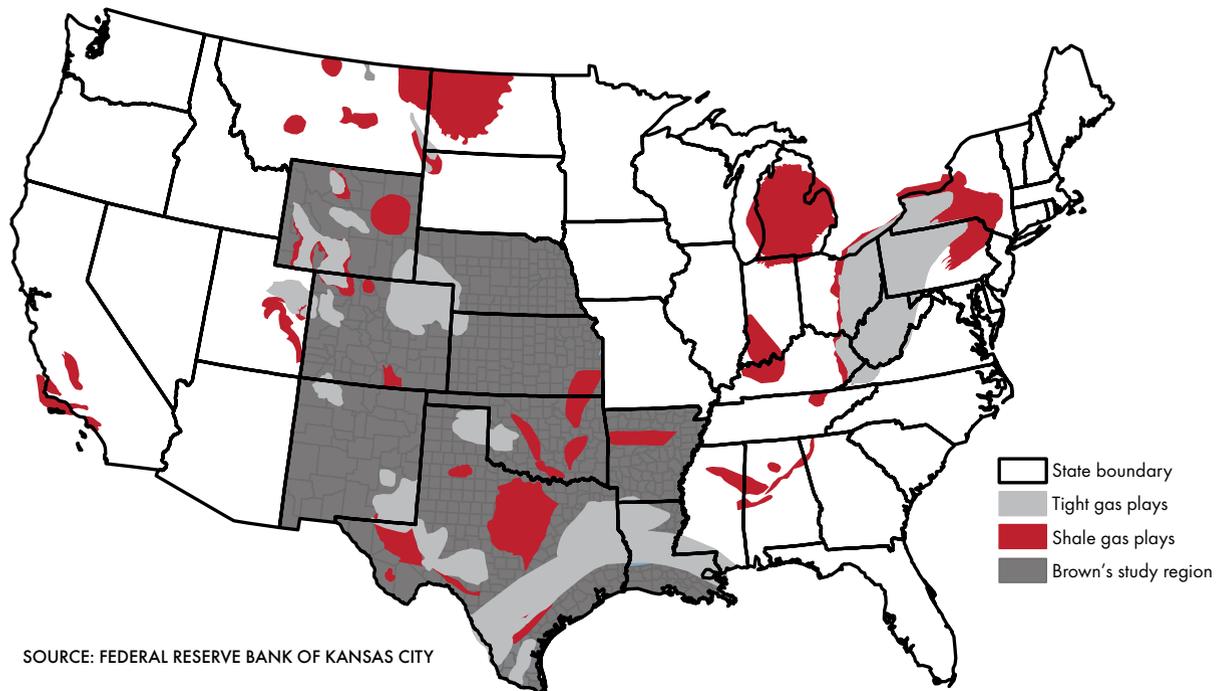
Before the boom, natural gas production in the United States leveled out in 2000. The industry roughly produced from 19 trillion to 20 trillion cubic feet of natural gas a year.

U.S. crude oil dropped steadily from 30 billion barrels in 1985 to nearly 21 billion barrels in 2008.

The technologies of hydraulic fracturing and horizontal drilling changed everything.

Mitchell Energy & Development Corporation experimented for 20 years to develop hydraulic fracturing, commonly known as fracking, after the company discovered that shale contained vast amounts of natural gas that normal drilling practices could not extract. Hydraulic fracturing consists of shooting a mixture of water, chemicals and sand into drilled wells to create fissures in rock formations to free the trapped gas.

SHALE AND TIGHT GAS FORMATIONS



SOURCE: FEDERAL RESERVE BANK OF KANSAS CITY

Devon Energy Corporation of Oklahoma City developed horizontal drilling techniques, which allows operators to drill a certain depth, then drill further at an angle or even sideways to expose more of the reservoir and extract greater amounts of the natural resource.

Devon acquired Mitchell Energy for \$3.5 billion in 2002, making it one of the largest oil and gas producers in the United States. The company combined the two technologies, allowing greater extraction of the once inaccessible resources.

By 2011, U.S. natural gas production grew 30 percent to 24.6 trillion cubic feet. Domestic oil production increased to 33 billion barrels in 2012.

Effects on local economies

Although increased natural gas production may have possible effects on local economies, a lack of data limits the scope of any analysis, Brown said.

Prior research on resource booms has had mixed results and most of the studies focused on

the national level.

In his research, *Production of Natural Gas From Shale in Local Economies: A Resource Blessing or Curse?*, Brown looked at 647 nonmetropolitan counties in a nine-state region comprised of Arkansas, Colorado, Louisiana, Kansas, Nebraska, New Mexico, Oklahoma, Texas and Wyoming, during the boom years of natural gas production, 2001-2011 (see map).

These states together accounted for 70 percent of U.S. natural gas production in 2011, and the region had a combined increase in production of 6,332 billion cubic feet, or nearly 50 percent. Arkansas and Louisiana had sharp increases in annual production, while Colorado, Oklahoma, Texas and Wyoming experienced more gradual growth.

Brown found a modest positive impact on local labor market outcomes and little evidence of a natural resource curse.

Analysis suggests that counties with increased production had faster growth in total employment and population compared to counties where production declined; however,

real personal income per capita and average wages per job varied among the counties.

Half the jobs created from increased natural gas production have been in the resource extraction sector, with some spillover to transportation, construction and service sectors. The gas and oil companies, in effect, filled many of the newly created jobs without depleting the local labor market.

“The ability to pull labor and people from outside of the county experiencing increased production was the primary reason,” Brown wrote.

The largest wealth effect in counties benefiting from this resource boom was an increase in average wages.

“These benefits, however, may fade once local production begins to decline or if perceived or potential environmental costs become a reality,” Brown wrote.

Changes in the community

Richard Ryerson says natural resource production is at an all-time high in his county.

He owns Starr Lumber in Alva, Okla., a town of 4,295 residents in the northwestern portion of the state. Alva is the county seat of Woods County and home to Northwestern Oklahoma State University, which has an enrollment of about 2,200 students.

Historically, the university, agriculture, the minimum-security prison and the local hospital were the main employers in the area.

Mineral-rich land changed the labor market.

“We have plenty of natural gas, but oil is the big thing now,” Ryerson said.

Alva and other communities in the area like Woodward and Medford have watched their local economies grow as the extraction industry has created more jobs, spurred new development and generated a lot of money.

“We’ve got people whose cars could barely start in the winter last year going down to the

car dealership and buying a new Cadillac,” he said.

“They’re paying in cash,” he added.

Ryerson’s lumber and supplies business is doing well; however, there aren’t enough qualified workers to keep up with the demand of the new economy.

“At the beginning, people came from all over the country to work in the fields,” Ryerson said. “But many of them couldn’t qualify for the jobs. They had poor driving records or criminal backgrounds, and many of them left because of it.”

Qualified workers had no problems finding a job, and many of them went from barely making a livable wage to earning \$20 to \$25 an hour, Ryerson said.

“I know a truck driver that makes about \$100,000 a year just hauling supplies,” he said.

Terry Ross says natural gas production started the boom, but oil has generated the largest profits.

“It’s a dirty business and not everyone wants to do it, but there’s good money in it,” he said.

Ross is president of Community Bank in Alva. In the past few years, the bank’s deposits have increased almost 50 percent due to oil and gas production royalties and other incomes related to natural resource production.

“I wish we had a healthier balance of loans to our deposits,” he said.

Several of the bank’s customers, who once had overdrawn accounts and were delinquent on loan repayments, are carrying six- to seven-figure balances.

“It’s hard to convince them to borrow money when they have money,” Ross said.

Besides oil and gas, land, regardless of whether it’s mineral rich, is the hottest commodity in the county, Ross said. Property that once sold for several hundred dollars an acre now sells for thousands.

Community Bank has done some lease financing and provided capital for development projects, such as funding the construction

of the Comfort Inn—one of two motels constructed in Alva to accommodate the influx of production workers. A third motel, an extended stay, is under construction and will open this year.

The motels have a 100 percent occupancy rate and charge an average of \$129 per room per night. The second motel has already changed owners, selling for a handsome profit, Ross said.

Hotel tax revenue is at record levels, so is the city's sales tax. Alva operates on a 2 percent sales tax, but with the increased demand for services, the city has looked for other ways, such as utility fees, to generate additional revenue.

Increased service demands and competition to keep qualified employees have affected wages in other sectors of the labor market, Ross said. Community Bank increased wages for part-time tellers in order to compete with other businesses.

"I think it's been beneficial, even though it's costing my bank money," Ross said of the natural resource boom. "I care about

our community and it's been economically beneficial to our community."

Sandridge Energy opened operational facilities near Alva and owns 1.85 million acres of leasehold in the Mississippian Oil Play of northern Oklahoma and southern Kansas.

Other energy companies, supply companies, construction companies, trucking businesses and equipment companies also have set up shop in the county. All of it is directly related to the natural resource boom.

"The biggest disappointment to me is that we weren't able to capture the full benefit of this economic growth," Ross said.

There are not enough rental properties in Alva to house all the newcomers, Ross said, and not enough single-family homes to entice workers to stay permanently.

"They don't want to move their families into hotels or old rental properties," he said. "We should have gotten ahead of this and developed affordable homes, with the right square-footage, to attract some of these young families."

RICHARD RYERSON is the owner of Starr Lumber Company in Alva, Okla.



Unforeseen costs

Proponents of hydraulic fracturing say natural gas could replace coal and oil as the major energy source in the United States and reduce CO₂ emissions by more than 50 percent. This also could reduce the country's dependence on foreign oil and reduce energy costs.

Extraction of this resource, however, has potential environmental consequences and subsequent economic implications.

A few cities in high resource production states have passed bans on hydraulic fracturing within city limits due to drilling-related issues.

The problems have primarily involved deep-injection wastewater wells from fracking and other forms of drilling. There have been reported cases in Ohio, Pennsylvania and Colorado where poorly cemented wastewater wells have leaked and contaminated groundwater, and flow-back water not recaptured by drilling companies has contaminated surface water.

Although the injection processes involved with fracking operations are exempt from the federal Safe Drinking Water Act, the Environmental Protection Agency and states have authority under the Clean Water Act to regulate discharge of waters produced by hydraulic fracturing operations.

Production companies have made improvements to wells and disposal processes to address environmental concerns. Some companies have established new wastewater and mineral disposal operations to lessen the risk of water contamination.

Oklahoma, however, has experienced more than 1,000 earthquakes since 2009. The state normally had about 50 reported earthquakes a year. The U.S. Geological Survey and Oklahoma Geological Survey said in a statement released May 5 that fracking wastewater disposal by injection into deep geologic formations is a "contributing factor" to the increase in earthquakes. Since 2009, Oklahoma has experienced 20 magnitude 4.0 to 4.8 quakes, plus one of the two largest

recorded earthquakes in Oklahoma's history—a magnitude 5.6 earthquake near Prague in 2011. This compares with a long-term average from 1978 to 2008 of only two magnitude 3.0 or larger earthquakes per year.

In Kansas, Gov. Sam Brownback appointed a panel to investigate minor earthquakes occurring along the Kansas and Oklahoma border. Scientists studying the matter suspect the cause is not fracking itself, but the re-injection of wastewater into formations deemed safe to hold it.

Brown says research shows that diesel truck exhaust and emissions of volatile organic chemicals from natural gas processing plants can decrease air quality.

A Dallas jury recently awarded a Texas family \$2.95 million in a lawsuit centered on air quality in relation to hydraulic fracturing. The family contended that a natural gas company's drilling operations near their land had contaminated the air and harmed their health.

It is unclear, however, whether these environmental and health hazards from fracking are any different from the possible health hazards of traditional drilling operations.

"More research is needed to determine any long-term environmental and health effects across multiple regions where extraction is occurring in shale and tight gas formations," Brown said.



BY KEVIN WRIGHT, EDITOR

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PRODUCTION OF NATURAL GAS FROM SHALE IN LOCAL ECONOMIES: A RESOURCE BLESSING OR CURSE?

By Jason P. Brown

<http://www.kansascityfed.org/publicat/econrev/pdf/14q1Brown.pdf>

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