

The Economic Impacts of the Shale Revolution

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Growth in US natural gas and oil production from shale has had major economic impacts at the local, national, and international levels. These impacts have occurred through a variety of pathways, and although precisely quantifying their effects is difficult, the broad effects for the United States and for regional economies have been mostly positive to date.

Macro Effects

For the US economy as a whole, the shale revolution has had two major effects: reducing energy prices for consumers, and increasing the importance of the domestic oil and gas industry. For consumers, lower energy prices are a clear economic benefit. Without the shale revolution, natural gas prices—and likely oil prices—would be far higher, increasing the costs of residential and commercial heating, transportation, manufacturing, electricity, and more. These lower prices have, on average, saved each US household thousands of dollars in heating, cooling, and transportation costs.

The second major effect—a larger domestic oil and gas industry—has more complex implications. In simple terms, a larger oil and gas industry means more exposure to the upside and the downside of volatile oil and gas prices (explored in more detail below). For example, oil and gas extraction grew from 0.4% of gross domestic product in 1998 to 1.7% in 2014, representing an additional \$294 billion in 2014 alone, larger than the state of Arizona or the nation of Chile. However, the subsequent downturn in prices that has

benefited consumers has shrunk the industry's share of GDP back to 0.9% in 2016.

Finally, reduced imports of crude oil and natural gas, coupled with recently increased exports of domestic resources, have substantially strengthened the US balance of trade. However, the United States is still one of the world's largest importers of oil, second only to China.

Regional and Local Effects

The regional and local economic effects of the shale revolution have also been large. Although some studies using modeling techniques known as “input-output” analysis have over-estimated the regional economic and employment benefits of the shale boom, others using more careful techniques consistently find positive, but notably more modest, benefits in terms of both income and employment. One straightforward analysis from Pennsylvania found that counties with the largest number of Marcellus shale wells consistently outperformed their counterparts with fewer wells across metrics including employment, income, and business profits.

These economic benefits occur through a variety of pathways. First, local landowners benefit from oil and gas leases, which generate “bonus” payments and

RFF’s Alan Krupnick and Isabel Echarte published *Economic Impacts of Unconventional Oil and Gas Development* (www.rff.org/oilgasecon), which reviews the literature on local economic impacts of fracking. The report finds strong evidence for local employment and wage gains, though some studies initially overstated potential benefits. The literature on the long-term economic growth of areas with significant resources remains inconclusive.

* This is one of a series of issue briefs based on *The Fracking Debate: The Risks, Benefits, and Uncertainties of the Shale Revolution* (Columbia University Press, 2017) by Daniel Raimi. Raimi is a senior research associate at Resources for the Future.

royalty revenues once production begins. Second, local workers may benefit from increased demand for labor working directly or indirectly for the oil and gas industry, leading to higher rates of employment and increased wages. Third, business owners will tend to see an increase in sales as both population and income grows with the industry.

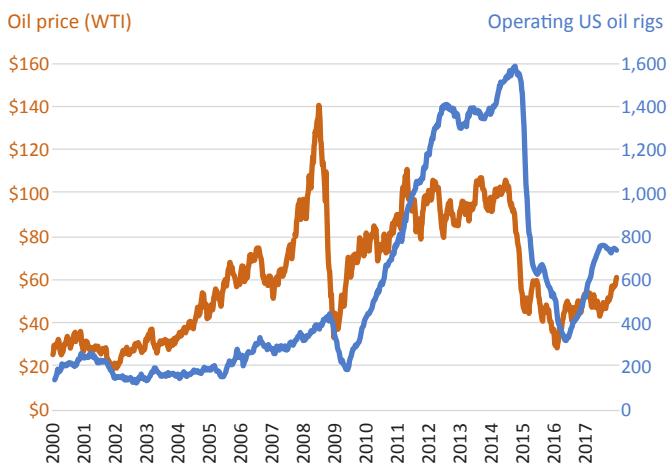


However, a rising tide does not necessarily lift all boats. For example, residents who do not own land or do not control their mineral property rights may experience the risks and hassles of living near oil production without directly benefiting from leasing revenue. In addition, a community's most vulnerable citizens such as the elderly or disabled are unlikely to benefit from the employment opportunities of a boom, but may still suffer increased costs of living due to higher housing and other costs. Finally, shale development in some regions, such as Pennsylvania and Ohio, has relied heavily on out-of-state workers and these states have struggled to develop a local workforce, reducing local benefits (but contributing to benefits elsewhere).

The Challenge of Volatility

Generally speaking, rural regions have experienced the most acute "booms" from the shale revolution, leading some communities in places like North Dakota and south Texas to expand rapidly. In more densely populated regions, such as metro Fort Worth, Texas, or Denver, Colorado, larger and more diverse economies mute the relative economic impact of the oil and gas industry.

By the same token, rural regions are also subject to the greatest risk of a "bust" when commodity prices decline, reducing drilling activity. As the figure (right) shows, sharp increases or decreases in oil (or gas) prices are quickly reflected by the number of operating



Data source: US EIA and Baker Hughes

drilling rigs, which in turn affects the level of economic activity in drilling regions. For predominately rural communities where the oil and gas industry is a large component of the local economy, this volatility can create its own set of challenges.

This economic uncertainty tends to deter investment, as business owners struggle to anticipate demand for their products or services. Over the longer term, researchers have sought to determine whether the challenge of volatility and the potential for the oil and gas industry to "crowd out" other sectors outweighs the economic benefits generated by the presence of the oil and gas industry. The results of this research are mixed, with some studies finding net economic benefits, and others finding weaker economic performance for regions that are highly dependent on the oil and gas industry.

Summing Up

In the near term, the economic benefits of shale development have been positive for most host communities and for energy consumers across the United States and, indeed, the world. Over the longer term, economic diversification can help insulate producing regions from the challenges inherent to an industry reliant on historically volatile commodity prices. While many regions are working to achieve this goal, it remains unclear whether they will succeed and thrive in the decades to come.