The Economic Development of Natural Resources: Fracking and Self-Regulation in the Market for Land

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ABSTRACT

The purpose of this piece is to apply some of the lessons learned during the period of industrialization in 19th century Europe to the study of the effects and appropriate regulation of the contemporary process of hydraulic fracturing, or fracking, in the natural gas industry. An attempt is made to support the conclusion that the harmful side effects associated with the creation of self-regulating markets for land, labor and money during the 19th century is paralleled today by the self-regulating character of the process of hydraulic fracturing. As a result, the negative consequences associated with industrialization are been visited again on present day market economies.

Keywords: Development Studies, History, Hydraulic Fracturing

"I think the [natural gas] industry is destroying our water resource to extract a gas resource." Sherry Vargson, dairy farmer, Granville Summit, Pennsylvania

1. Introduction

Economic development in many developing countries continues to be dependent on the local supplies of natural resources. Bolivia, for example, which suffers from the lowest GDP per capita of any state in South America, possesses the second largest deposits of natural gas on the continent. She has experienced respectable growth, with an average GDP growth rate of 4.8 percent, under the Morales government since 2006. This development record is attributable, in large part, to the successful exploitation of her abundant natural resources.

Among the new methods of extraction in the natural gas industry is the process known as hydraulic fracturing. Debate regarding the benefits and costs associated with hydraulic fracturing, or fracking, has become quite heated recently. Stories of poisoned water supplies on farms that have been in a given family for generations alongside startling footage of homeowners able to set the water flowing from their kitchen taps on fire has generated an understandable amount of sympathy and support for the those less fortunate. In attempting to separate out the wheat from the chaff in this debate, this article suggests that the double movement argument proposed by the economic anthropologist Karl Polanyi provides a degree of clarity.

The balance of this piece proceeds as follows. First, a review of the argument regarding the gearing of land, labor and money into self-regulating markets during the 19th century in England and the industrializing countries that followed is presented. Given the novelty of hydraulic fracturing and the misleading rhetoric issuing from both sides of the debate, the next step will be to review some basic information about the process itself. That discussion will, in turn, be used to demonstrate the applicability of the double movement framework to the natural gas industry in the U.S. This discussion should give pause to developing countries in the midst of considering the use of this new technique in attempting to further exploit their natural resources.

2. On Self-Regulating Markets

The 19th was a crowded century. It included one of the watershed events in human history: the Industrial Revolution. Although similar events were occurring in all industrializing societies, England was the first country to experience industrialization and its attendant effects. As such, it suffered numerous penalties for taking the lead, as Veblen phrased it—it had no predecessor to learn from.

Although technological change had happened before, this period was unique in bearing witness to a unique double movement. By the beginning of the industrialization process most goods and services were organized on a commercial, monetary basis throughout Europe. They were bought and sold for an intended profit in individual markets. Markets had certainly existed for millennia. The novel, cataclysmic feature of the period was the attempt to erect not just markets, but a self-regulating market system, with the gearing of land, labor and money into a freely operating market setting. The latter commodities are distinct from most goods and services in that they are not produced for sale in the market. While one might have occasion to produce many goods for personal use, a hammer, an MP3 player or a pear are each produced in contemporary societies for sale in individual markets. This is not the case with land, labor and money.

The case is clearest in the case of labor. Labor is man and his social relationships. Humans are not created in the first instance as commodities to be bought and sold in a market setting. Yet, in a self-regulating market setting, labor has only economic value. It can be bought and sold similar to hammers, MP3 players and a piece of fruit. But, and this is the point of greatest significance, man is not an inanimate object that can be left on the shelf, like a hammer, for 6 months or a year. Gearing labor into a self-regulating market, free from any oversight, labor became a commodity. In the relationship between employer and employee, the employer "owed his employees wages, and once these were paid the men had no further claim on him" (Mantoux 1983).In a freely operating labor market there were no controls over the length of the working day, who could be hired and fired, or the character of working conditions.

Although the argument is most easily seen with respect to the market for labor, the adverse effects associated with valuing land solely as a commodity and nothing else are equally persuasive. The term land in this discussion is meant to refer to more than just the topsoil of family farms and urban settings. Land, in fact, is a label that can be employed for the whole of the physical human environment. The reference is to land writ large.

Each society that geared labor, land and money into a self-regulating market setting responded to the undesirable side effects associated with treating labor as a commodity with a set of basic protections. This set of protective responses forms the other half of the double movement of the 19th century. It should be made clear that the system of protections varied from one society to the next, but that a common pattern played itself out in all societies moving through the process of bundling labor, land and money into a self-regulating market system.

These protections did not amount to the creation of a welfare state in the relevant societies. Rather, they constituted the very most basic limitations on how land, labor and money were utilized in a market setting. In the United States, for example, the number of children engaged in full time industrial employment grew between 1890 and 1910, reaching approximately 2 million by the latter date. The basic protective response in this area entailed controlling who could be hired.

As an aside, it is commonplace for 21st century societies to consider the role of new media in disseminating information and generating change. Interestingly, the end of child labor in the U.S. was partly due to the novel photographic work of an American sociologist, Lewis Hine. Hine became the photographer for the National Child Labor Committee in 1908. In the years that followed he evidenced the use and abuse of child labor in America as part of the effort of the National Child Labor Committee to bring the practice of employing children to an end.

The burden of this article is to show that the double movement argument applies neatly, if unfortunately, to the gearing of hydraulic fracking technology into the United States economy.

3. Fracking 101

The use of hydraulic fracturing, or fracking, dates back to the 1940s. The process involves injecting a mixture of water, sand and chemicals into an intended natural gas well. That mixture is then pressurized to break open fissures in the surrounding subsurface rock. Wells today average more than a mile in depth. Sand is then used to keep open the subsurface fractures. The injected volume of material must be removed and, ideally, the located deposits yield their bounty.

For decades only vertical drilling of deep well shafts was possible. In the 1990s, however, it has become possible to engage in vertical drilling, combined with horizontal drilling deep below the surface of the earth. Horizontal drilling in deep shale deposits can extend for several thousand feet parallel to the ground surface.

The typical hydraulic fracturing operation has been described as follows:
[i]n a 2-hectare site, up to 16 wells can be drilled, cumulatively servicing an area of up to 1.5 square kilometers, and using 300 million liters or more of water and additives. Around one-fifth of the fracking fluid flows back up to the surface in the first two weeks, with more continuing to flow out over the lifetime of the well. Fracking also extracts natural salts, heavy metals, hydrocarbons and radioactive materials from the shale, posing risks to ecosystems and public health when these return to the surface. This flowback is collected in open pits or large tanks until treated, recycled or disposed of (Howarth and Ingraffea 2011).

The industry term for the fluids that return to the surface of a fractured well is 'produced water'. Produced water: must be stored on-site and later transported to treatment plants or reused. Most companies use open-air pits dug into the ground. Many states require the bottoms of the pits to be lined with synthetic materials to prevent leakage. Some also require the pits to be a sufficient distance from surface water. The problem is that even when proper precautions are taken pit linings can tear, and in heavy rains the pits can overflow (Mooney 2011).

Given the relative novelty of this process, there have only been a few reliable, peer-reviewed scientific studies addressing the side effects associated with hydraulic fracturing completed to this point in time. The findings, however, have not been encouraging. This question can be addressed directly:
[h]ave fracking-return fluids contaminated drinking water? Yes…Contamination can happen through blowouts, surface spills from storage facilities, or improper disposal of fracking fluids…some of the waste is treated in municipal sewage plants that weren't designed to handle these toxic and radioactive wastes. Subsequently, there has been contamination of tributaries of the Ohio River with barium, strontium and bromides from municipal wastewater treatment plants receiving fracking wastes (Howarth and Ingraffea 2011).

The failure to treat 'produced water' has been linked to the contamination of both the Monongahela and Allegheny Rivers in Pennsylvania, impacting the drinking water supplies of over a million people, including the population of Pittsburgh.

In a study of 68 private drinking wells in northeastern Pennsylvania and New York methane contamination was found to rise sharply with proximity to hydraulic fracturing sites. Investigators measured concentrations of gases and certain isotopes of carbon in methane and other hydrocarbons to distinguish the ancient thermogenic gas stores sought in drilling operations from methane generated by microbial degradation of organic matter. The closer the well was to an active drilling site, the more likely it was the methane detected was thermogenic (Holzmann 2011).

Researchers at Duke University found that 75% percent of the wells tested within 1 kilometer of gas drilling in the Marcellus Shale in Pennsylvania were contaminated with methane from deep shale formations (Howarth and Ingraffea 2011). There is more than just a single data point justifying concern in this arena. It might be noted, for example, that "[i]n 2011, oil companies is North Dakota reported more than 1,000 accidental releases of oil, drilling wastewater or other fluids, with many more releases likely reported" (Royte 2012).

The safety of drinking water is certainly of tremendous significance. An additional troubling aspect of the fracking process is the potential harm it can inflict on the nation's food supply. To produce healthy food "farmers need clean water, clean air and clean soil to produce healthful food" (Royte 2012). In a case study of 24 farmers in six shale gas states, livestock were found to have experienced neurological, reproductive and acute gastro-intestinal problems linked to hydraulic fracturing (Royte 2012). If hydraulic fracturing negatively affects water, air and soil, it cannot help but have a negative effect on our food supply.

It should be noted that, parallel to those who focused on the positive aspects of the industrialization process in the 19the century, there are numerous defenders of hydraulic fracturing. In the words of one observer, fracking techniques are "the greatest news for the economy and the environment that we have had for many years. And maybe the reason that we are not more aware of the upside is that good news doesn't sell" (Grealy 2013).

The defenders of fracking base their position on several points. First, hydraulic fracturing is regarded as a development that mimics natural processes. For these observers, fracking mirrors "high-pressure magma, water, petroleum and gases deep inside the Earth [that] can crack rock, helping to drive plate tectonics, rock metamorphism and the recycling of carbon dioxide between mantle and the atmosphere" (Engelder 2011). Natural gas is portrayed as cleaner than other energy sources, which should serve to reduce carbon dioxide emissions in the long run. In addition, natural gas supplies in shale formations are distributed widely across the planet, making them a more secure source of energy than traditional fossil fuels. There is considerable debate, however, over the quantity of natural gas within some U.S. subsurface formations. The Marcellus Shale formation, for example, lies beneath several states in the northeastern part of the United States. In August 2011 the U.S. Geological Survey released a study, which suggested that the Department of Energy had "overestimated the resource by some five-fold" (Howarth and Ingraffea 2011).Finally, fracking is seen as just too good an economic opportunity to pass up. One hears echoes in this justification of 19th century business arguments regarding the wages that must be paid to children as opposed to adult men.

4. The Self-Regulating Market of Fracking

The Bush Administration unveiled its national energy plan on May 17, 2001.As Vice President, Richard B. Cheney, formerly Chairman of Halliburton, a Dallas-based energy services firm until August 2000, spearheaded that effort. Along with a sweeping set of pro-industry changes, fracking was exempted from the nation's environmental laws, including the Clean Air Act (1970), the Clean Water Act (1972), the Toxic Release Inventory (1986), the Resource Conservation and Recovery Act (1976), and the Safe Drinking Water Act (1974). The exempting of hydraulic fracturing amounts to a 21st century version of the 19th creation of a self-regulating market for land.

The notion that hydraulic fracturing provides economic opportunities that are too attractive to pass up reminds one of the defense businessmen in the 19th century made for child labor. But short-term, industry-specific benefits should not be allowed to outweigh long run, societal costs. In short, "the technology to extract gas from shale has advanced faster, and with a lot more public funding, than has the study of its various effects" (Royte 2012).

The complete cessation of hydraulic fracturing does not, at the present point in time, appear justified. The practice has been banned, however, in France and Bulgaria—the European states with the largest shale gas reserves and the U.S. state of Vermont has banned fracking until at least 2016 in order to study the health and environmental impacts and develop rules for regulating the practice. The trouble with fracking does not appear to be related to the process itself. Future research regarding the contribution of fracking techniques to the prevalence of earthquakes may dispute this claim, but for the present, the primary problem appears to lie with the lack of regulation. If the initial policy actions were undertaken to foster the development of natural gas exploration in the U.S., that goal would seem to have been achieved. As the history of industrializing societies illustrated more than a century ago, the environment must be protected from the treatment of land as a pure commodity.

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