

Preliminary Comments on a report by the Empire Center for New York State Policy (A project of the Manhattan Institute for Policy Research), titled "The Economic Effects of Hydrofracturing on Local Economies: A Comparison of New York and Pennsylvania," May 2013

**Comments prepared by:
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This Empire Center report is a puff piece for the shale gas industry. Referencing flawed research, it is selectively narrow, and its findings are based on sloppy econometrics and analysis that drives it to invalid conclusions.

The first few paragraphs manifest the authors' bias. In the first sentence, the authors state that it is estimated that "up to 489 trillion cubic feet of natural gas" is contained in the Marcellus Shale, but entirely omit the well-publicized, vastly different and substantially lower estimates offered by various qualified researchers.

Indeed, the only research referenced in the report was conducted by individuals with financial ties to the gas industry. The authors cite a report done by the Yale Graduates in Energy Study Group. This group appears to be a group of former Yale undergraduates who now work in some way with or for the oil & gas industry. The Empire Center paper also references work by Considine and Watson, which has been widely and highly criticized due to its bias, flawed methodology and the fact that it was funded by the gas industry. In addition, the authors were connected with the short-lived organization at Buffalo State University which pretended to produce peer-reviewed research, until it was revealed to be an industry-backed group. They have frequently been referred to as "frackademics."

The final piece of research that is referenced is the New York State DEC's SGEIS. It is now well known that the firm hired by the DEC to do the economic assessment is a member of a major gas industry lobbying organization in New York State. The DEC's economic assessment had been highly criticized by multiple independent economists and it was suspected of being biased well before the lobbying connection was subsequently confirmed. No explanation for the initial non-disclosure or the selection of this firm has been offered.

The brief and benign description of hydraulic fracturing in the Empire Center's report does not mention the body of knowledge that exists regarding economic costs associated with extractive industries, including shale gas development. There is no mention of the fact that many chemicals (including carcinogens and endocrine disruptors) are used in the process, that much waste (including flowback fluid, produced water and drill cuttings) results from the process and that the waste includes many harmful chemicals in addition to radioactive material. The impacts of harmful substances being released into the water, air and land will include high

economic costs, including costs associated with mortality and morbidity. The authors of the Empire Center's report instead paint a rosy picture, stating that many Pennsylvania counties are "bustling" with unconventional drilling, while neglecting to mention downsides.

There is no mention of the fact that extractive industries, including shale gas development, are characterized by their boom and bust cycles and that peer reviewed research shows that areas that were once the site of thriving extractive industries end up worse off in the long run with higher levels of unemployment and long term poverty [1,2,3,4,5]. There is no mention of the research that shows negative impacts on property values. And, peer reviewed research has also concluded that even in the short-run, economic gains are only modest, at best [6].

It's curious that the authors insist that Pennsylvania and New York are directly comparable, without giving a good explanation. While the states share a border and they share the Marcellus Shale (along with a few other states), there may be some significant differences. There are a number of industries in New York State that are vital to the upstate economy and that shale gas development in New York would likely devastate. Examples of these industries include tourism, agriculture, organic farming, hunting, fishing, outdoor recreation and wine and beer making. Before claiming that New York State and Pennsylvania are directly comparable with respect to the economic impact of shale gas development, the size and strength of each of these industries should be compared between the states. We already know of negative impacts on both dairy farming and fishing in Pennsylvania. We also know that according to data from the Bureau of Labor Statistics, employment in the leisure and hospitality sector in New York State is larger than in Pennsylvania (even after subtracting out New York City tourism). We further know that upstate New York is home to some well-known viticulture areas. And, as stated in a recent study of the Pennsylvania wine making industry compared to other states, "New York has, by far, the largest wine industry among the comparison states based on both wine production (25.18 million gallons) and number of wineries (261), and ranked second only to California in U.S. wine production in 2011." [7] All of this begs the question whether the New York State economy would have more to lose than Pennsylvania from shale gas development. Clearly, New York State would not fare as well as Texas.

Even if there is a large positive economic impact in Texas, comparing Texas to New York is comparing apples to oranges for the purposes of estimating economic impacts from gas drilling. Texas has a labor force with the requisite skill sets. The rural counties in upstate New York would have to import the labor, who in many cases will be temporary and transient, and most of their income will be spent in their home states (probably not in New York), greatly reducing the multiplier effect in New York State relative to Texas. In addition, Texas has a very large support industry network for oil and gas activities with all requisite machinery, equipment, etc, many of which are probably manufactured there or at least distributed and contracted for there. Note also

that the major gas companies are not headquartered in New York (for example, Chesapeake Energy is in Oklahoma City and XTO is in Fort Worth). New York would have to import most gas industry services, machinery, equipment, and management, and much of this would probably come from established businesses in other states such as Texas, so it is even possible that Texas would derive greater economic benefit from drilling in New York State than would New York.” [8]

And, speaking of the economic impact of fracking on Texas:

There are many uncertainties regarding the long-term impacts on local and regional economies. Long-term impacts on the number of jobs created, unemployment rates, and income and poverty levels should each be considered. There are likely to be significant local costs, and these must also be considered. As horizontal, high-volume slick-water hydraulic fracturing for natural gas is still in its early stages, it is premature to analyze and attempt to make definitive conclusions regarding the long-term economic impacts of shale gas development in the United States. However, since the Barnett Shale play in Texas has been active for about a decade, some early indications of economic health are emerging. According to the Texas Railroad Commission, there are four core gas-drilling counties in the Barnett Shale: Denton, Johnson, Tarrant, and Wise counties. While there are many reasons why economic data and trends in certain counties differ from state-level data, it is interesting to examine unemployment rates, growth in median household income, and the number of people in poverty in these core gas-drilling counties as compared to statewide data. The data indicate that the residents of these counties are not experiencing great economic prosperity relative to the rest of Texas. Data were obtained from the U.S. Census Bureau, Small Area Estimates Branch, and the Bureau of Labor Statistics. For the period from 2003 to 2010, median household income increased by 21.2 percent in the state of Texas, but in the four core counties, median household income increased between 10 percent and 16 percent. And for the same period, the increase in the unemployment rates for the four counties ranged from 1.8 to 2.4 percentage points, a little higher than the increase in the state-level unemployment rate, which was 1.5 percentage points. Finally, the number of people in poverty in the four-county areas increased, in percentage terms, just as much as statewide. [1]

The Empire Center authors focused on per capita income. Per capita personal income is calculated as the total personal income of the residents of a state divided by the population of the state. This is a curious choice of economic indicators on which to focus, given that in a small, poor county, per capita income may increase dramatically if only one large landowner hits the jackpot with gas lease royalties, hardly a benefit for the general population of the county, but it suggests why a shale gas supporter would find it a useful basis for rosy economic conclusions.

A closer look at per capita income is equally revealing. Averaging the growth in per capita income across the eleven Pennsylvania counties with more than 100 wells each, it appears that the increase over the four-year period from 2007 to 2011 was 15.6 %. Included in this average is a serious outlier. It is Greene County, which shows an increase on the order of 31.7%. All statisticians know how properly to deal with outliers. In this case, if Greene County is simply omitted from the analysis (and I'll mention more on Greene County below), the average increase in per capita income across the remaining ten counties was 14%. Comparing this average increase in per capita income to the average increase in per capita income in the New York State counties included in the Empire Center's report, the New York State counties averaged a higher growth in per capita income at 14.8%. To be completely fair for comparison purposes, if we omit the New York county with the highest growth in per capita income (Yates County), the average increase was 14.5%, still higher than the Pennsylvania counties, each with over 100 shale gas wells. If we include only the five counties in Governor Cuomo's New York State sacrifice zone (Broome, Chemung, Chenango, Steuben, Tioga), the increase for the same time period was 14.2%. Thus, growth in per capita income has been no better in the gas intensive Pennsylvania counties than it has been in New York State Marcellus counties without gas drilling.

In order to get a feel for how the overall population of a county is affected by shale gas development, unemployment rates and the percent of the population in poverty are better indicators. Again, per capita income in a small and/or low-income county can be skewed if just one landowner makes a killing on a gas lease. I said I would mention Greene County, Pennsylvania again. Greene County was the subject of a case study titled "Pollution Unchecked" in which it was described it as "a predominantly low-income Appalachian community in the southwestern corner of Pennsylvania, [that] suffers form serious air and water pollution." [9] This was written in 2004, years before fracking came to the area. More research is required to confirm why Greene County is such an outlier with respect to growth in per capita income between 2007 and 2011, but it is quite possible that one or two landowners with gas leases skewed the result, as would a population decrease because of shale gas extraction.

Because New York State has a long history of conventional, vertical gas drilling, we can get an idea of what will happen to unemployment rates and poverty levels in New York counties if shale gas development is permitted. Some time ago, I had analyzed data for NYS. I looked at the top ten gas producing counties in NY for the period from 2006 to 2008. The gas intensive counties were not better off than neighboring counties without gas drilling when you look at the number of families below poverty level, median household income, or unemployment rates. [8]

Finally, the authors state that they have performed a regression analysis and that their analyses "make clear the economic benefits of hydraulic fracturing." An experienced, unbiased econometrician would not base any conclusions on the equation that was estimated. Any student of introductory econometrics would

recognize that the estimation results presented here indicate that the equation is only explaining 50% of the variation in the dependent variable. This is a red flag for the equation. It indicates that there may be important variables that have been omitted. Omitted variables may have an influence on the variables that are included, causing the coefficients on the included variables to be erroneously significant. It is also possible that entirely incorrect variables are included and that omitted variables should replace them. There is no statistical basis to draw any conclusions from this equation. In addition, the complexity of how income growth may be impacted by shale gas development cannot be captured in a simple, single equation regression model.

I can think of only two explanations for why the authors would draw conclusions from the substandard econometric results presented here. Either the authors are not competent econometricians and did not take a critical look at the regression results, or the authors were trying to produce a report with conclusions that would appeal to the gas industry and other supporters of hydraulic fracturing and shale gas development.

[1] "The Economic Impact of Shale Gas Development on State and Local Economies: Benefits, Costs, and Uncertainties," J.M. Barth, *NEW SOLUTIONS*, Vol. 23(1) 85-101, 2013.

[2] W. R. Freudenburg and L. J. Wilson, "Mining the Data: Analyzing the Economic Implications of Mining for Nonmetropolitan Regions," *Sociological Inquiry* 72 (4) (2002): 549-575.

[3] A. James and D. Aadland, "The Curse of Natural Resources: An Empirical Investigation of U.S. Counties," *Resource and Energy Economics* 33 (2) (2011): 440-453, doi: 10.1016/j.reseneeco.2010.05.006.

[4] Headwaters Economics, "Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-Focusing Counties Benefiting?" *Energy and the West Series*, Bozeman, MT (Sept 2008 – revised 7/11/09), <http://www.headwaterseconomics.org/energy> (accessed March 10, 2010).

[5] J. Peach and C. M. Starbuck, "Oil and Gas Production and Economic Growth in New Mexico," *Journal of Economic Issues* 45 (2) (2011): 511-526, doi: 10.2753/JEI0021-3624450228.

[6] J. G. Weber, "The Effects of a Natural Gas Boom on Employment and Income in Colorado, Texas, and Wyoming," *Energy Economics* 34 (2012): 1580-1588, doi: 10.1016/j.eneco.2011.11.013.

[7] J.D. Dombrosky and S. Gajanan, "Pennsylvania Wine Industry – An Assessment,"

March 2013.

http://www.rural.palegislature.us/documents/reports/pa_wine_industry_2013.pdf

[8] "Unanswered Questions About The Economic Impact of Gas Drilling in the Marcellus Shale: Don't Jump to Conclusions," Jannette M. Barth, March 27, 2010

[9] "Pollution Unchecked: A Case Study of Greene County, Pennsylvania," Natural Resources Defense Council, December 2004.

<http://www.nrdc.org/water/pollution/greene/execsum.asp>