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Potential Economic Impacts of Marcellus Shale in Pennsylvania:
Reflections on the Perryman Group Analysis from Texas

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The exploration and development of the Marcellus Shale natural gas play has significant potential to affect Pennsylvania communities. Good indications of the potential effects can be learned by studying the experience in the Barnett Shale region of north Texas. The Barnett Shale play is very similar in geology to the Marcellus, so is a good comparison of technological and industry needs. In addition, since development of the Barnett Shale started in earnest in 2001, employment and income impacts can be documented.

In 2008, the Perryman Group, a Texas-based economic consulting group, conducted an economic impact study of activity in the Barnett Shale on Fort Worth and the surrounding area. Their findings should be illustrative of potential impacts in Pennsylvania. At the time of the Perryman analysis, there were a total of 7,170 gas wells across the Barnett Shale region, with 541 alone within the Fort Worth city limits.

1. Overall Economic Impact

Overall, the Perryman Group report estimates that Barnett Shale accounts for $8.2 billion in annual output (8.1% of total output in the regional economy), and 83,823 jobs (8.9% of total jobs). This is a significant number, particularly since the Barnett Shale region predominantly is an urban area, which already had a large and extensive economy. Potential impacts in northern Pennsylvania could be much higher on a percentage basis since the local economy there is relatively smaller

2. Were the Jobs and Income Are

As with most economic activity, the impacts of natural gas affect more than just the specific firms directly involved in the industry. There are also important employment and income effects on local businesses who supply the industry (such as oil field service companies, restaurants and retailers, and hotels), and effects that result from employees spending their wages locally.

The Perryman report identifies three separate types of economic activities related to natural gas, including: (1) exploration, drilling and operations; (2) leasing and royalties that go to landowners; and (3) pipeline infrastructure. Of the three, exploration, drilling and operations accounts for the predominant share of economic activity (67 percent of gross product; 62 percent of personal income), while pipelines account for 22 percent of gross product (27 percent of personal income). Leasing and royalty income, which currently is of much interest in Pennsylvania, actually accounts for a very small share of the economic impact (only 11 percent of gross product, and 12 percent of personal income). Employment impacts are similar- exploration, drilling, and operations account for 58 percent of new permanent jobs, royalty and lease payments account for 14 percent, and pipeline infrastructure accounts for 28 percent.

3. Which Industries Benefit

The Perryman analysis uses standard economic modeling methods to estimate how the economic impacts from the Barnett Shale 'multiply' within a community, tracing the direct, indirect, and employee spending through the local economy (see Table 1, which is adapted directly from their report). Their analysis includes an industry by industry estimate for the gross product, permanent income, and permanent jobs impacts.

As expected, the industrial sector with the largest gain from the Barnett Shale is the crude petroleum and natural gas industry, accounting for about one fifth (21 percent) of personal income product increases (and 7 percent of new jobs). Retail trade accounts for about 16 percent of increased personal income (and 27 percent of the new jobs), while new construction accounts for 10 percent of increased personal income (and 9 percent of new jobs). Eating and drinking establishments similarly benefit (5 percent of personal income, and 15 percent of new employment).

For any individual industry, the difference between their impact on gross product and on employment partially reflects wages and salaries within that industry. Retail trade, and eating and drinking establishments, for example, together account for 21 percent of new personal income, but 42 percent of total new employment, reflecting that many such jobs are relatively low paying.

The Perryman analysis is specific to the local economy surrounding Fort Worth, so the properties and numbers cannot be applied directly to Pennsylvania. Yet the analysis does provide useful indications of the general impacts that could expected, plus things which Pennsylvania policy makers should consider. Extrapolating to Pennsylvania is particularly difficult because the oil and natural gas sector and supporting infrastructure is not as fully developed in some of the rural areas with Marcellus Shale, so much of the economic activity at least initially will have to be conducted by firms and employees located outside the region, which will lessen the economic impact. As the industry expands within Pennsylvania, more of these jobs should be going to local residents, either as new hires or as employees move into the region, either purchasing or renting homes.

4. Impacts on Local Governments and Taxpayers

The impacts of Marcellus Shale on Pennsylvania local governments and taxpayers will be significantly different than that estimated by the Perryman Group in Texas. Unlike in Texas, natural gas will provide relatively little new tax revenues to local jurisdictions in Pennsylvania since natural gas is not subject to local taxation in the Commonwealth. In contrast, in Texas the value of natural gas extracted in a year is subject to local property taxes, which means school districts, county governments, and municipal governments receive higher local tax revenues directly from the extraction of the natural gas. Neither lease or royalty income in Pennsylvania is subject to local income taxes, nor do Pennsylvania local jurisdictions benefit directly from higher local retail sales since they lack authority to levy a local sales tax. Under current law, natural gas will not significantly increase the local tax base, and thus local tax revenues.

The Perryman Group analysis does not consider increased costs borne by local governments and school districts, but indications are that these can be significant. The process of drilling, fracing, and maintaining natural gas wells can create significant heavy truck traffic on rural roads, many of which were not designed for carrying vehicles of this size. Beyond basic drilling equipment, the traffic will include trucks carrying significant amounts of water (a report from Denton, Texas, suggests that each drilling site could require 364 such water truck trips, which would be equivalent to 3,494,400 car trips (Denton County Oil and Gas Task Force, 2005)).

Tax collections by the state government will increase in Pennsylvania through the corporate income tax and sales tax, yet these collections will have little direct benefit to the local jurisdictions who will face higher service costs due to natural gas exploration. In other words, local jurisdictions with natural gas wells very likely will face higher demands for services and thus higher costs, and yet receive little new revenues to pay for those services. The result likely will be higher local taxes (paid for by everyone, not just those directly benefiting from lease or royalty revenues), or cuts in other services. Because Pennsylvania law limits municipalities' and counties' abilities to use land use planning tools to influence the location of natural gas drilling activities, local governments will have little ability to prevent or affect drilling in locations which will significantly affect local service costs and taxes.

It is important to note that school districts, and county and municipal governments who own land leased for natural gas extraction will receive windfalls from leasing and royalties, so they will receive some benefits. Yet the amount they receive won't relate directly to the overall costs they may experience across their jurisdiction. In addition, some may be tempted to use these windfalls for basic operations (keeping taxes low in the years the monies are received) rather than to use the monies for capital expenditures and other investments in their community's future. The natural gas money provides a great opportunity for local jurisdictions to improve infrastructure, create parks or other investments to be enjoyed by current and future generations, or otherwise increase local quality of life, spreading the benefits over many years.

5. What Will Affect the Local Economic Impacts?

From an economic standpoint, the Perryman analysis provides some indications of factors local policy makers should consider in Pennsylvania. The industrial sector analysis in Table 1 clearly indicates that many sectors in the economy will benefit from natural gas exploration and drilling, as businesses and employees spend money locally. There clearly are opportunities and benefits for the construction industry, retail trade, and others.

The size of these economic impacts, however, depend critically upon whether such businesses exist within the Pennsylvania communities affected by natural gas; the more spending that occurs outside the community, less economic benefit will accrue locally since those dollars will simply leave the community rather than re-circulating among local businesses. Similarly, to the extent that non-residents hold new jobs, the less benefit will remain in the community itself.

The two-fold economic development challenge is thus (1) finding ways to help local businesses and workers compete for the new business opportunities arising from natural gas; and (2) finding ways to encourage businesses, workers, and royalty owners to spend their new dollars locally rather than out of town. New business start-up and technical assistance should target identified business opportunities related to natural gas, and workforce development training should focus on the new specialized jobs which will be created (such as landmen who service the wells). General local business and community development programs focused on helping local businesses or downtowns be competitive similarly could help Pennsylvania communities better compete for the new spending resulting from the natural gas.

Sources:

"Drilling for Dollars: An Assessment of the Ongoing and Expanding Economic Impact of Activity in the Barnett Shale on Fort Worth and the Surrounding Area." The Perryman Group. Waco, Texas. March 2008. Available on-line, at: www.bseec.org/images/summaryreport.pdf

"Summary Report." Denton County Oil and Gas Task Force. 2005. http://www.co.denton.tx.us/

Table 1. The Current Annual Impact of All Major Sources of Stimulus Associated with the Barnett Shale on Business Activity in the Barnett Shale Region

Detailed Industrial Category

Source: Adapted from Perryman Group, 2008, Table 7

	Gross Product		Personal Income		Employment	
	Total	*Percent*	*Total*	*Percent*	*Total*	*Percent*
Agricultural Products & Services	56,888,599	1%	38,743,790	1%	541	1%
Forestry & Fishery Products	2,714,104	0%	1,006,924	0%	8	0%
Coal Mining	2,636,511	0%	2,777,813	0%	13	0%
Crude Petroleum & Natural Gas	2,201,107,991	27%	1,015,147,454	21%	5,625	7%
Miscellaneous Mining	4,111,049	0%	2,416,169	0%	20	0%
New Construction	601,020,851	7%	495,278,931	10%	7,886	9%
Maintenance & Repair Construction	438,101,459	5%	361,023,204	7%	5,535	7%
Food Products & Tobacco	59,126,567	1%	30,203,815	1%	474	1%
Textile Mill Products	219,477	0%	185,652	0%	3	0%
Apparel	38,594,402	0%	19,554,519	0%	477	1%
Paper & Allied Products	16,919,774	0%	7,649,219	0%	82	0%
Printing & Publishing	44,783,369	1%	29,230,712	1%	419	0%
Chemicals & Petroleum Refining	42,159,245	1%	19,795,329	0%	122	0%
Rubber and Leather Products	23,117,419	0%	13,514,195	0%	247	0%
Lumber Products & Furniture	9,780,570	0%	6,974,392	0%	89	0%
Stone, Clay, & Glass Products	38,110,138	0%	19,930,918	0%	287	0%
Primary Metal	19,509,451	0%	14,522,023	0%	243	0%
Fabricated Metal Products	113,957,330	1%	73,571,619	2%	1,345	2%
Machinery, Except Electrical	41,207,018	1%	29,438,996	1%	327	0%
Electric & Electronic Equipment	26,089,233	0%	15,596,295	0%	104	0%
Motor Vehicles & Equipment	7,200,605	0%	4,678,671	0%	45	0%
Transp Equip, Except Motor Vehicles	5,132,154	0%	3,352,116	0%	25	0%
Instruments & Related Products	2,472,722	0%	1,879,772	0%	14	0%
Miscellaneous Manufacturing	8,084,740	0%	5,576,339	0%	54	0%
Transportation	285,689,717	3%	188,945,917	4%	2,497	3%
Communication	125,864,102	2%	53,735,597	1%	400	0%
Electric, Gas, Water, Sanitary Serv	141,588,601	2%	61,785,346	1%	178	0%
Wholesale Trade	272,376,413	3%	157,054,268	3%	1,755	2%
Retail Trade	1,317,009,628	16%	787,530,330	16%	23,030	27%
Finance	127,983,892	2%	74,525,729	2%	615	1%
Insurance	89,310,082	1%	53,392,505	1%	576	1%
Real Estate	422,441,645	5%	68,064,005	1%	606	1%
Hotels, Lodging Places, Amusements	72,165,676	1%	47,342,655	1%	1,177	1%
Personal Services	205,575,691	3%	159,941,609	3%	2,836	3%
Business Services	349,613,818	4%	285,195,936	6%	3,635	4%
Eating & Drinking Places	460,215,268	6%	244,860,022	5%	12,318	15%
Health Services	324,897,998	4%	274,705,668	6%	4,890	6%
Miscellaneous Services	192,991,345	2%	167,306,704	3%	4,148	5%
Households	18,020,856	0%	17,638,957	0%	1,178	1%
Total	8,208,789,508		4,854,074,117		83,823	