

Shale Energy Development:

Community Economic Impacts and Policy Issues

Energy Infrastructure Workshop
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Program Objectives

- Define the Resource Curse
- Economic Overview of Shale Energy Development In Ohio
- National Overview - Economics of Modern Energy Boomtowns
- Economic Policy Issues
- Economic Policy & Recommendations
- Additional Resources



“The “resource curse” is the term coined for the seemingly counterintuitive occurrence of slow long-term economic growth in regions rich in natural resources.”

Source: Making Shale Development Work for Ohio, Michael Farren, Amanda L. Weinstein, and Mark D. Partridge (June, 2012)



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Reasons for a Possible Natural Resource Curse to Develop

- boom-bust cycle is not attractive to businesses outside of the energy sector wanting to invest in such locations due to the heightened risk and volatility.
- “Dutch Disease” natural resource sector can crowd out other economic activities because land and labor costs are bid up during boom periods.
- High wages in the resources sector for less-skilled workers reduces the incentives for further education and training
- Natural resource regions are not associated with entrepreneurship and small business development.
- The employment which does occur in booms largely is in the extraction sectors, and in non-tradable sectors like construction, services, and the retail sector.



Economic Overview of Shale Energy Development In Ohio



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Ohio Department of Job & Family Services

Core Shale Industries

(Change in Employment for Ohio)

NAICS	Description	Ohio Net Job Change Q4 2011-13
211111	Crude Petroleum and Natural Gas Extraction	-1,127
211112	Natural Gas Liquid Extraction	319
213111	Drilling oil and gas wells	572
213112	Support Activities for Oil and Gas Operations	1,467
237120	Oil and Gas Pipeline and Related Structures Construction	3,451
486210	Pipeline Transportation of Natural Gas	4
Total Jobs		4,686



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Source: ODJFS

EDA Teams & Partnership



Location Quotient – (Jobs in an Industry)

- Definition: Over 1.0 means that the region has a higher concentration of employment in a particular industry than the national average
- A LQ of 6.72 or 2.58 means the region is HIGHLY specialized. For instance if you have an LQ of 6.72 in the Glass and Ceramics cluster, that means that the number of firms is over 600% more concentrated than the national economy.

Eastgate Top 5 by Location Quotient

Cluster Description	2009 LQ	2012 LQ	% Change
Primary Metal Manufacturing	9.34	7.49	-20%
Transportation Equipment Manufacturing	1.57	2.78	77%
Fabricated Metal Product Manufacturing	2.04	2.3	13%
Glass & Ceramics	2.28	1.62	-29%
Electrical equipment, Appliance & Component Manufacturing	1.64	1.53	-7%

For purposes of cluster analysis, we are concentrating on the export industries clusters that begin with the core and include the secondary, tertiary (or ancillary) sectors. That is a true cluster.



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Source: StatsAmerica

NEFCO Top 5 by Location Quotient

Cluster Description	2009 LQ	2012 LQ	% Change
Primary Metal Manufacturing	3.23	3.75	16%
Fabricated Metal Product Manufacturing	3.57	3.57	0%
Chemicals & Chemical Based Products	1.93	2.11	9%
Machinery Manufacturing	1.6	1.63	2%
Glass & Ceramics	1.38	1.45	5%

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Source: StatsAmerica

Shift Share Analysis – (Job Growth)

- The national share explains how much of the regional industry's growth is explained by the overall health of the national economy
- The industrial mix effect represents the share of regional industry growth explained by the growth of the industry/ cluster/occupation at the national level
- The regional share is growth due to regional, not national or sector trends



Eastgate Top 5 by Regional Share

Cluster Description	National Share	Industry Mix	Regional Shift	Total Change
Transportation Equipment Manufacturing	262	-224	1,937	1,976
Fabricated Metals	311	-422	548	437
Energy (Fossil & Renewable)	423	-376	-59	-12
Mining	8	4	-29	-17
Electrical Equipment	74	-155	-10	-92



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NEFCO Top 5 by Regional Share

Cluster Description	National Share	Industry Mix	Regional Shift	Total Change
Chemicals & Chemical Based	1,217	-1,915	810	112
Mining	26	14	-90	-50
Energy (Fossil & Renewable)	1,470	-1,306	-244	-80
Glass & Ceramics	112	-300	60	-128
Fabricated Metals	1,397	-1,894	210	-286



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Observations

- The cluster changes that are occurring in the broad region are primarily in the core and ancillary industries related to the shale development but also manufacturing in general, with steel product and machinery manufacturing strong and trending up.
- Workforce development will emerge as a key need for this region. As companies are working to meet the challenge, local workforce will be a key component for long term success.



National Overview

Economics of Modern Energy Boomtowns



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Economics of Modern Energy Boomtowns: Do Oil and Gas Shocks Differ from Shocks in the Rest of the Economy

By Alexandra Tsvetkova and Mark D. Partridge

This paper contributes to the literature by presenting what we believe is the most detailed account of the effects of energy sector on local employment in the U.S. We separately consider the following variables:

- Metro vs. Non-Metro
- Time Difference (1, 3, 6, & 10 year time periods)
- Instrumental variable approach (quantify the resource)
- Industry Mix (DiffEnVar vs. DiffDSchock)
- The1985 mining share variable



Effects of Energy Sector Expansion on Employment (non-metro counties)

- After the year 2000 when the most energy expansion took place, each 10 new jobs directly created by the energy sector were indirectly associated with:
 - 3 additional jobs after one year
 - 2 additional jobs after three years
 - 20 additional jobs after six years



Effects of Energy Sector Expansion on Employment (non-metro counties)

In absolute numbers as a result of energy sector expansion, the study indicates that for a non-metro county with median employment between the 2001 and 2013 (energy boom):

- Overall - 6.5 new net jobs per year were created, which is 0.1% of the annual job growth.
- In areas with the largest energy sector growth, about 26 new net jobs were created per year, adding about 0.3% to the annual job growth.



Effects of Energy Sector Expansion on Employment (non-metro counties)

Energy Shocks vs. Equal Size Shocks

- Comparing the job creation effects of energy shocks to equal-sized shocks in the rest of economy, growth elsewhere in the economy generally had larger net positive spillovers, possibly because the energy sector imports many of their key inputs such as drilling equipment from elsewhere.



Effects of Energy Sector Expansion on Employment (metro counties)

Results indicate that the effects of energy sector expansion on metropolitan employment are less pronounced compared to nonmetropolitan counties.

- After one year, estimates show crowding out of jobs in the rest of the economy (especially manufacturing) as energy sector expands.
- Employment in transportation and warehousing together with wholesale trade increase after one year.



Effects of Energy Sector Expansion on Employment (metro counties)

Between 2001 and 2013 energy sector expansion created:

- 8 new net jobs per year in a county with median employment (0.1% of annual employment growth)
- 34 new net jobs in median county in the top 20% of energy sector expansion (also 0.1% of annual employment growth).
- However - 10 new energy jobs are associated with three lost jobs in other industries on average.



Effects of energy sector expansion on self-employment

- After 1 year, the study indicates that expanding oil and gas extraction leads to new paid jobs in both metro and non-metro counties, while self-employment is not affected.
- After 3 years, paid jobs are still being created in the counties with oil and gas growing sector, while metropolitan areas lose self-employed entrepreneurs at a higher rate than the companies create new jobs.
- After 6 years, non-metro counties enjoy modest increase in self-employment and larger increase in paid employment on average. **In metropolitan counties energy sector expansion does not statistically affect self-employment.**



Summary of Preliminary Findings

Overall, results from the study indicate that there is a positive effect of energy sector expansion on other sectors of employment after one year, peaks at six years, and declines afterwards.



Economic Policy Issues



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Economic Policy Issues – Taxation

- In the past, energy producing states, especially those with low population and large deposits of resources, have typically set the highest extraction tax rates.
- Historically, policymakers in those states felt that production was inelastic with respect to tax rates. (therefore, higher tax rates caused little lost production).
- However, today's policymakers feel they must compete for today's unconventional drilling activity by maintaining a pro-industry business climate.



Economic Policy Issues - Use of Revenues

- Convert the tax and non-tax revenues from resource extraction to financial assets that serve that purpose.
- Balance between current state and local expenditures associated with government operations, mitigating of extraction costs (e.g., education and infrastructure) and planning for the future (Headwaters Economics (2008)).
- Planning takes two forms:
 1. diversification of a state's economy
 2. developing permanent funds as compensation to future generations for the loss of the resource.



Economic Policy Issues - Equity

- If few communities opt to allow drilling activity, it is possible that those with the least capability to plan will by default end up with much of this activity?
- For example, to what extent is it fair for communities (or states) to have the benefit of natural gas if they are unwilling to also bear the negative consequences of such activity?



Economic Policy & Recommendations



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Do No Harm in the Long Run

1. Use financial proceeds from the activity, to fund long run investments that will strengthen the community so it can better adapt when the drilling ends.
2. Do not make long run financial commitments (particularly for infrastructure) that may burden the community long term.
3. Strive to maintain a diversified economy (rather than allowing the gas development to crowd out other economic activity).
4. Protect important environmental and community assets and amenities so they are not harmed during the boom activity.



Ensure the Hidden Costs of Resource Extraction are Adequately Compensated

- The industry should pay the full costs of negative externalities such as pollution and congestion.
- This can be accomplished by setting taxes, fees, and regulations such that marginal costs equal marginal benefits.
- Allowing an industry, to avoid paying for its external costs is not pro-business, and shifts those costs onto other sectors of the local economy and local residents.



Leverage the Additional Wealth and Economic Activity Into Permanent Advantages

- Communities need to take advantage of the short-term agglomeration and wealth benefits during the boom so that the local area is better positioned for the bust.
- Waiting to diversify until the bust sets in is too late. Who wants to start new businesses in declining regions?



Strengthen Capacity of Local Governments to Understand and Manage this Activity

- Development is occurring in small rural communities, many of which lack the financial and human resources to adequately prepare and manage the challenges.
- States should consider strengthening regional cooperation and collaboration in the impacted areas.
- Create shared positions that work across several local governments, spending a day or two weekly in each of their assigned jurisdictions. Positions focus solely on the unconventional oil and gas activity, allowing the individuals to specialize, without having to juggle other municipal responsibilities.



Invest Strategically in Workforce Development

- A critical factor affecting how much of the local economic impact of unconventional oil and gas development remains within a community is the extent to which local residents are able to successfully compete for the jobs.
- Heavy reliance on a transitory, non-local workforce means much of the wage income being generated by the activity quickly leaves the community.
- Targeted workforce training, focused on skills required during the drilling activity, such as welding, Commercial Drivers Licenses, diesel repair, and other skills, can help increase the share of employment going to residents.



“But Global Data also flagged the competitive advantage that U.S. companies will receive from the **lower cost provided by shale gas**. And this opportunity is attracting investment from some of the industry’s bigger names. Just last week the International Energy Agency said some **30 million European jobs** are at risk as manufacturers of petrochemicals, plastics and fertilizers are relocating to the U.S.”

Source: *Shale Reshapes Petrochemicals Business*.
The Wall Street Journal. Ben Winkley (July, 2014)



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