

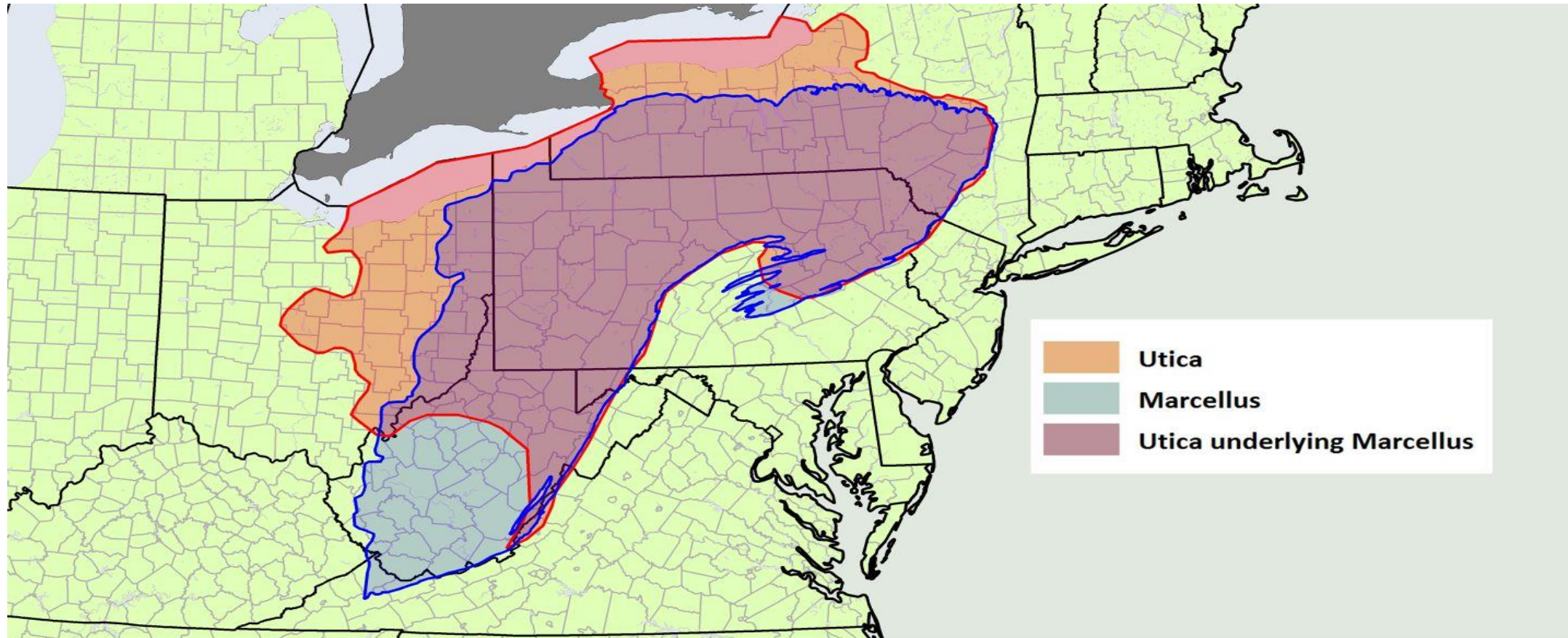


Understanding and Interpreting the Employment Impacts of Shale Drilling

*Shale Symposium: What Communities Need to Know
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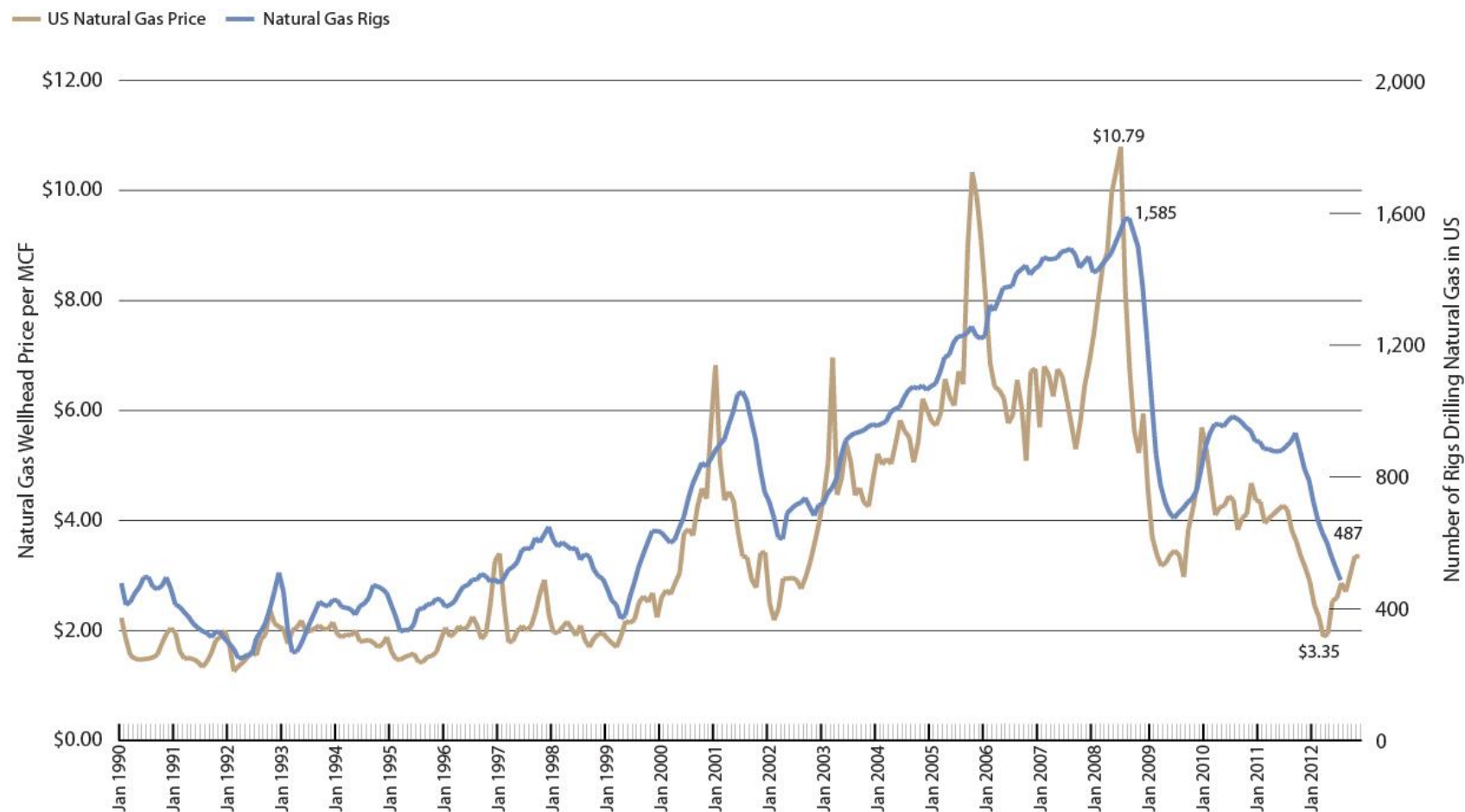
The Geography of the Marcellus and Utica Shale



The Utica underlies the Marcellus in many areas, coming closer to the surface in eastern Ohio. (Source for Marcellus and Utica outlines: Energy Information Administration.)

Drilling Expands and Contracts with Gas Prices

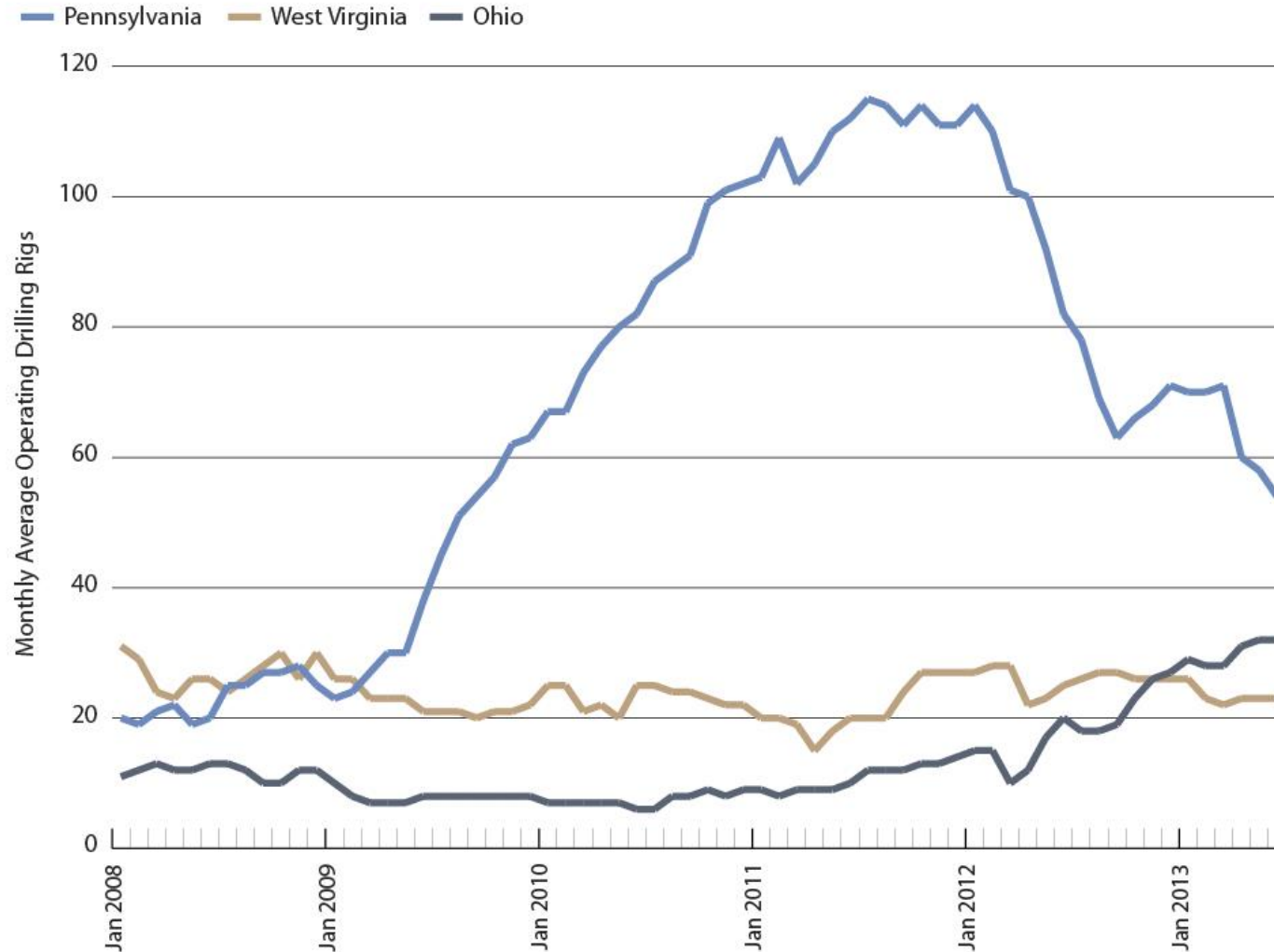
Figure 1. Drilling for Natural Gas Fluctuates with Natural Gas Prices



Source. Multi-State Shale Collaborative based on U.S. Energy Information Administration

Shift to Wet Gas Moved Drilling from PA to OH

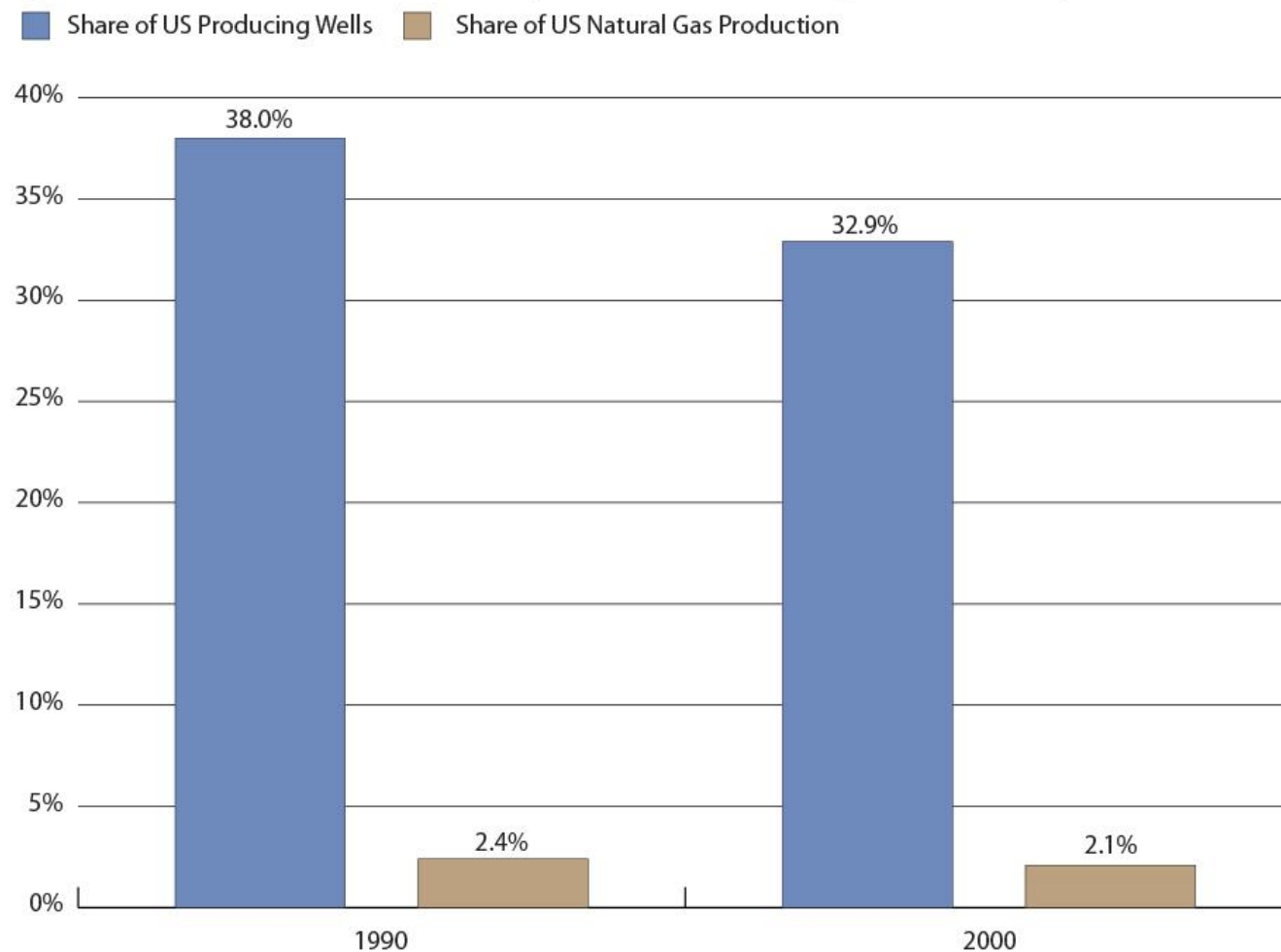
Figure 3. A Shift in Drilling from Pennsylvania to Ohio



Source. Multi-State Shale Collaborative based on Baker Hughes North American Rig Count

Natural Gas: Not an Infant Industry

Figure 4. Prior to Shale, Ohio, Pennsylvania, and West Virginia Had Many Low-Producing Wells



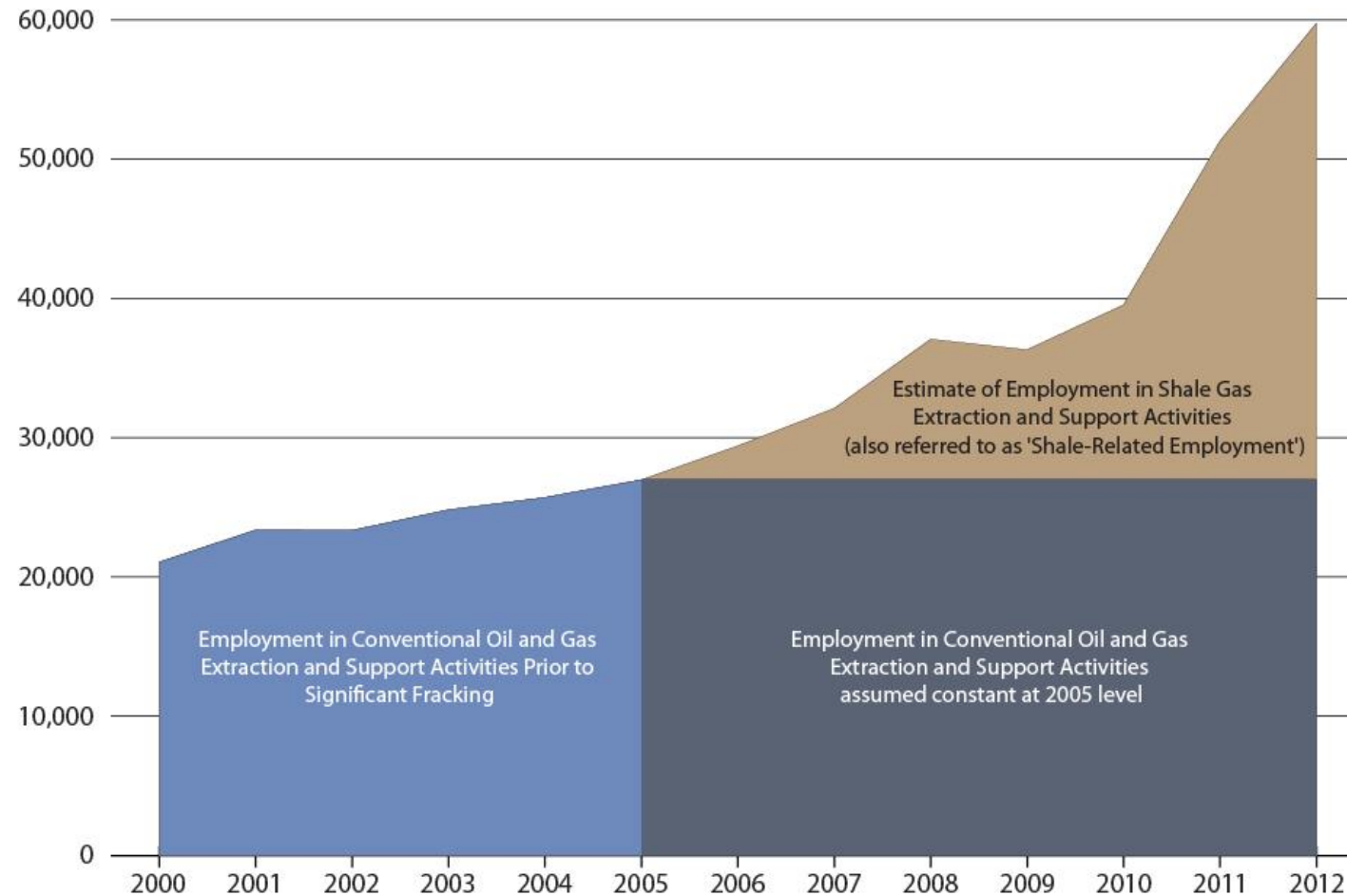
Source. Multi-State Shale Collaborative based on U.S. Energy Information Administration

Methodology: Measuring Shale-Related Jobs

- Identify industries with shale company or “support” jobs; these also include oil, conventional gas, and mining jobs
- Identify industries (sometimes broader ones) for which data exist across six states
- Count growth in these industries’ jobs since 2005 as “shale-related”
- Conservative in two ways
 - Attributes ALL growth to shale, none to coal or conventional oil and gas
 - Already includes some supply chain jobs (e.g., pipeline construction)
- Consensus methodology: our method is the same as PA Dept. of Labor & Industry and PA Independent Fiscal Office

Counting Shale Jobs: Our Method in a Picture

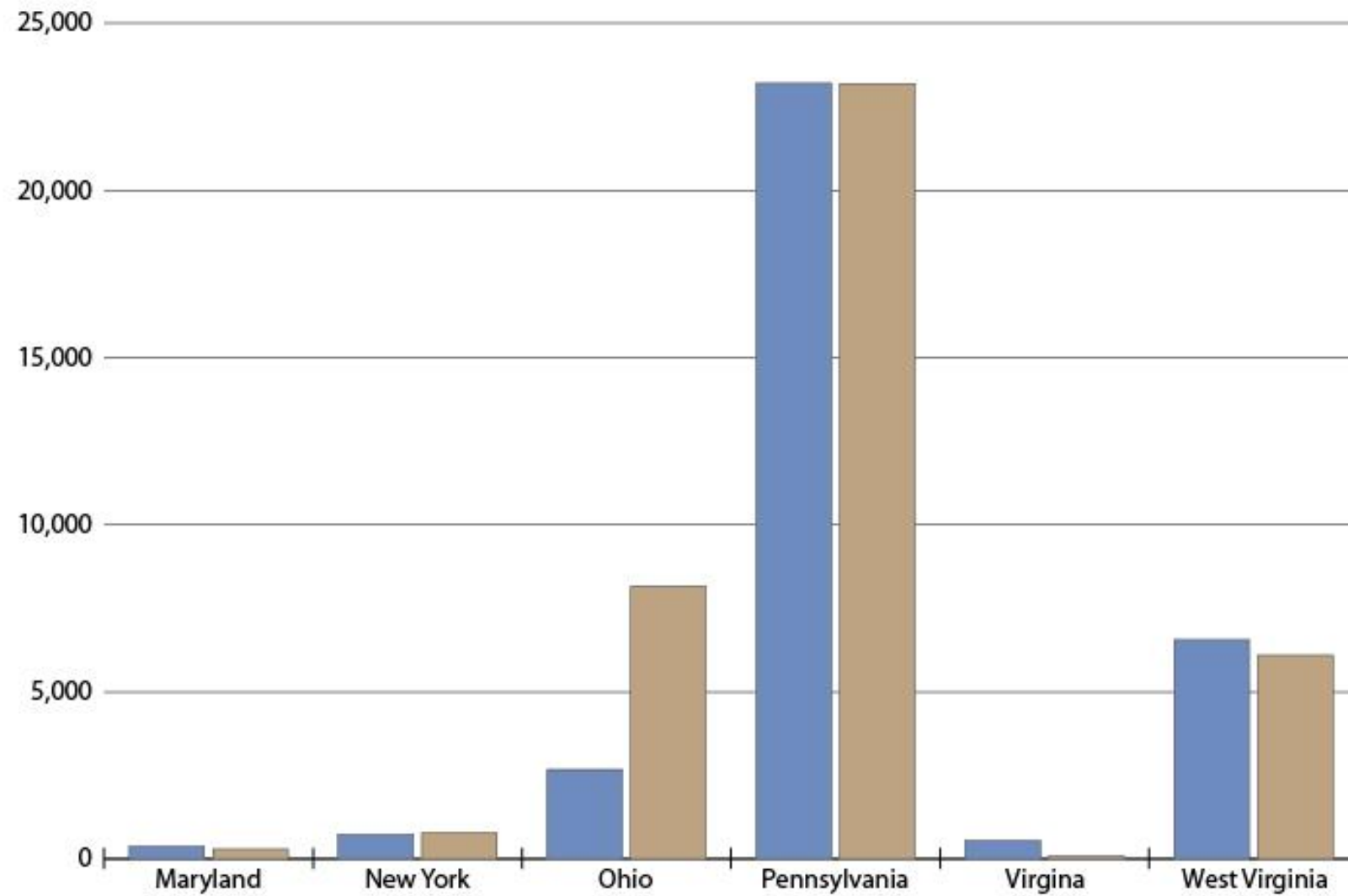
Figure 8. Estimating Shale-Related Employment



Source: Multi-State Shale Collaborative based on QCEW data.

Total Shale-Related Employment

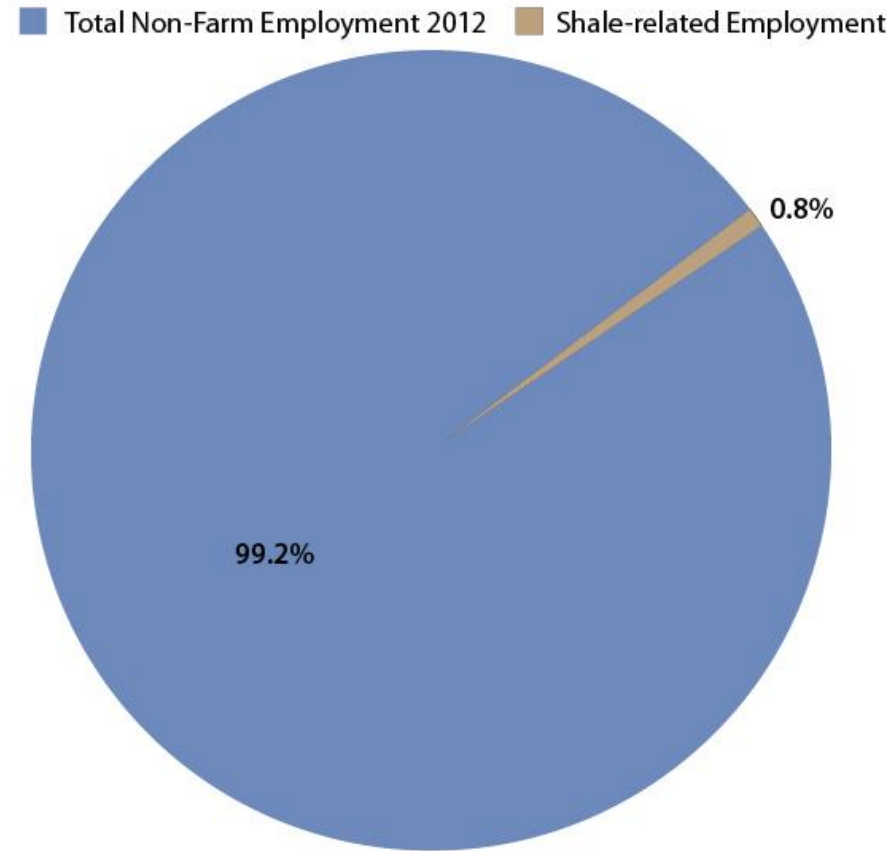
■ 2005-Q2 to 2012-Q2 ■ 2005-Q2 to 2014-Q2



Source. Mult-State Shale Collaborative based on QCEW data.

Shale Jobs Less Than 1% of WV Jobs

Figure 10. Shale-related Employment as a Share of Total Covered Employment in West Virginia

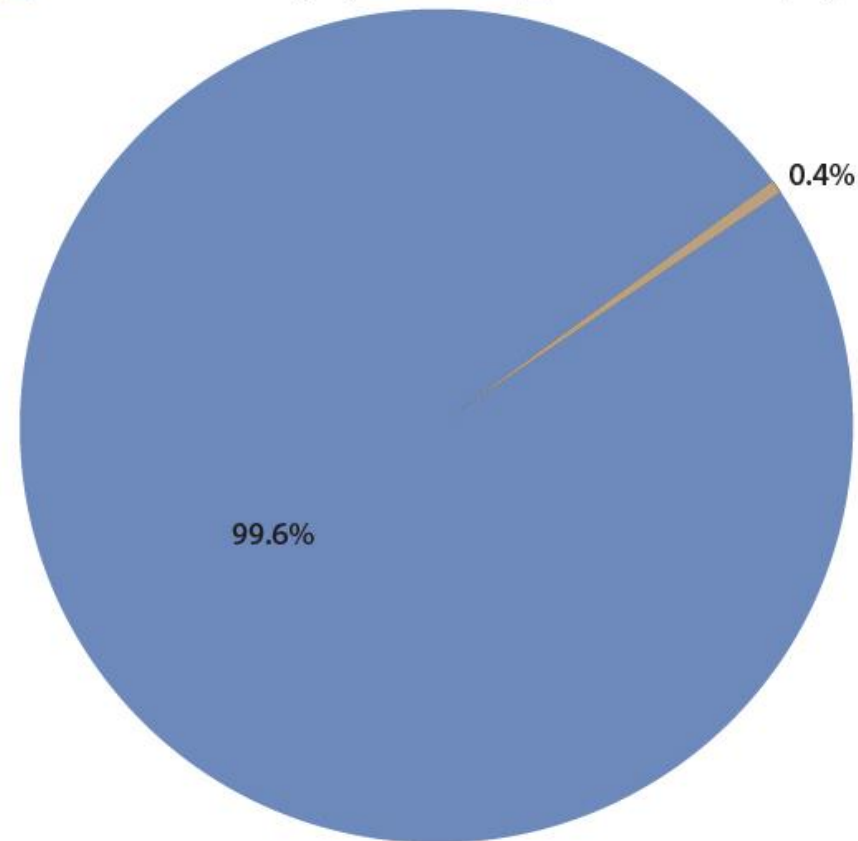


Source. Multi-State Shale Collaborative based on QCEW data

Shale Jobs Less Than Half a % of PA Jobs

Figure 9. Shale-related Employment as a Share of Total Covered Employment in Pennsylvania

■ Total Non-Farm Employment 2012 ■ Shale-related Employment

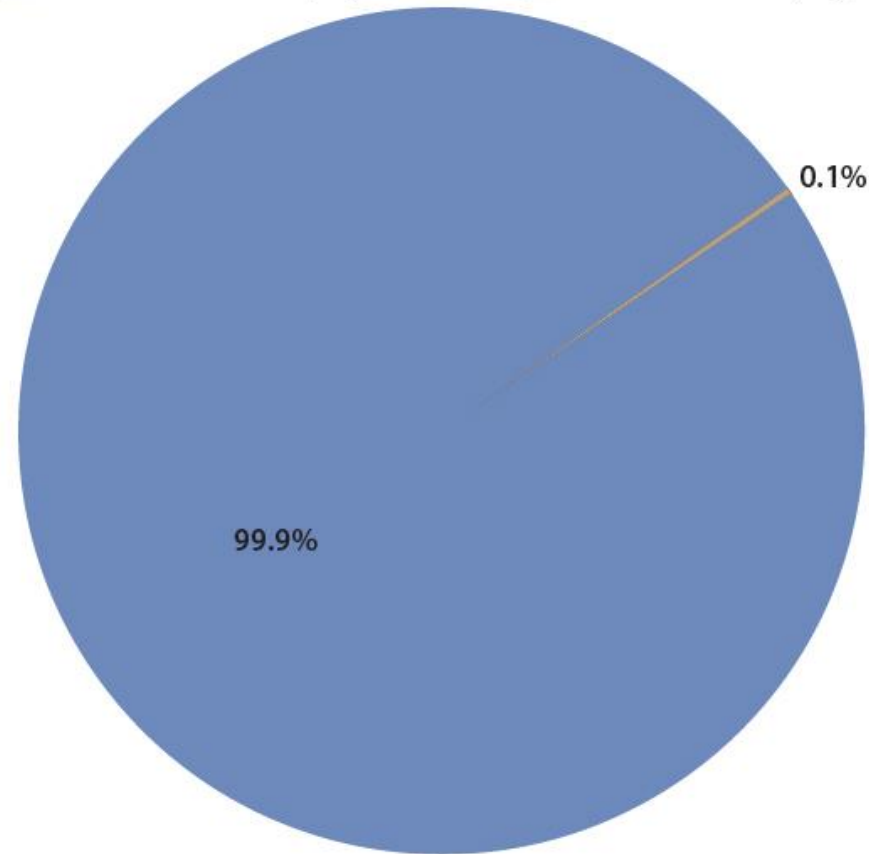


Source. Multi-State Shale Collaborative based on QCEW data

Shale Jobs One Tenth of 1% of Ohio Jobs

Figure 11. Shale-related Employment as a Share of Total Covered Employment in Ohio

■ Total Non-Farm Employment 2012 ■ Shale-related Employment

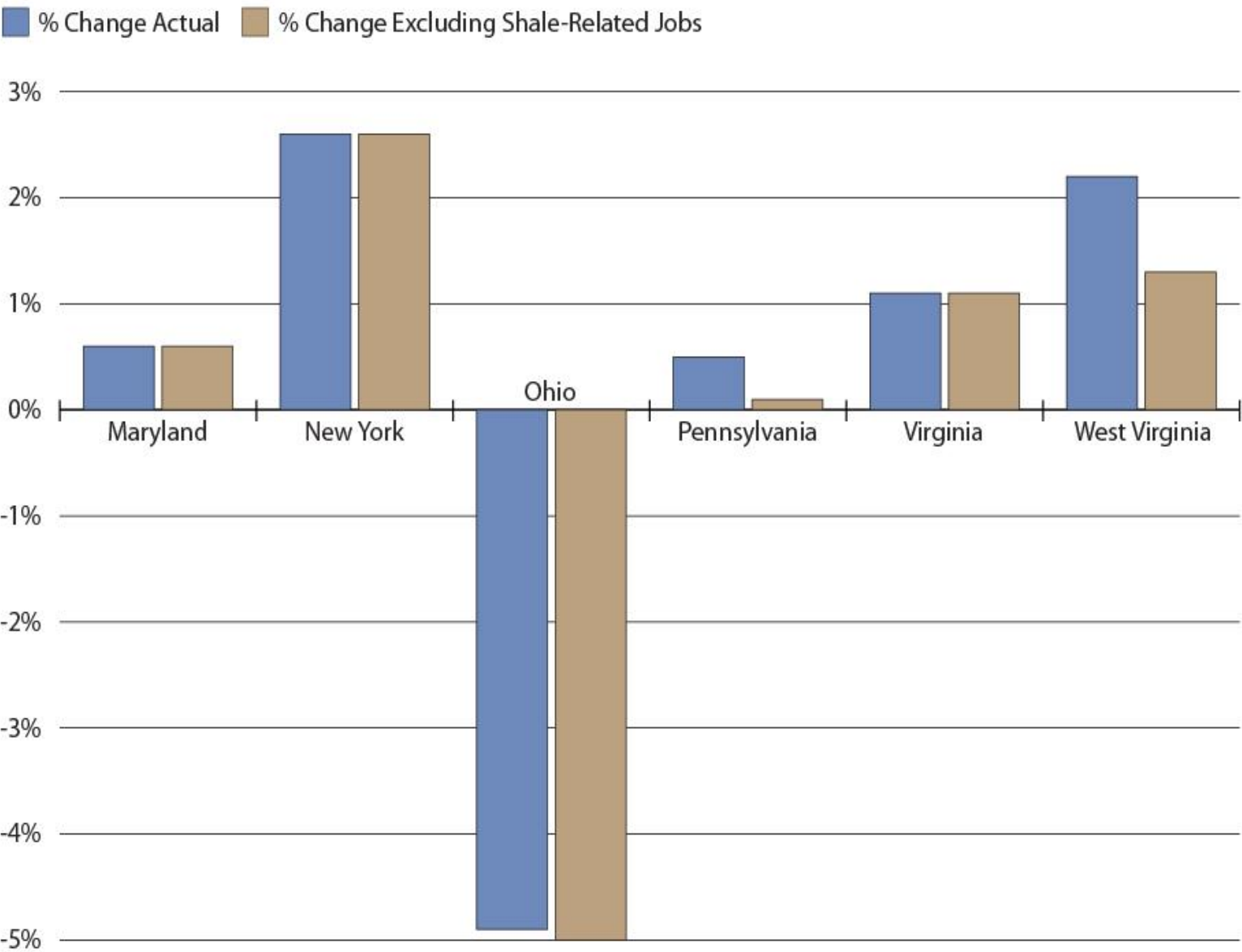


Source. Multi-State Shale Collaborative based on QCEW data

Shale Jobs in Context

- Education and health care employ 4.5 million people in the six states – not 33,000
- Education and health care account for one in six jobs are in education and health care versus one in 794 for shale-related jobs
- In Pennsylvania, # times as many jobs have been lost in the public sector since 2010 as shale-related jobs have been created since 2005

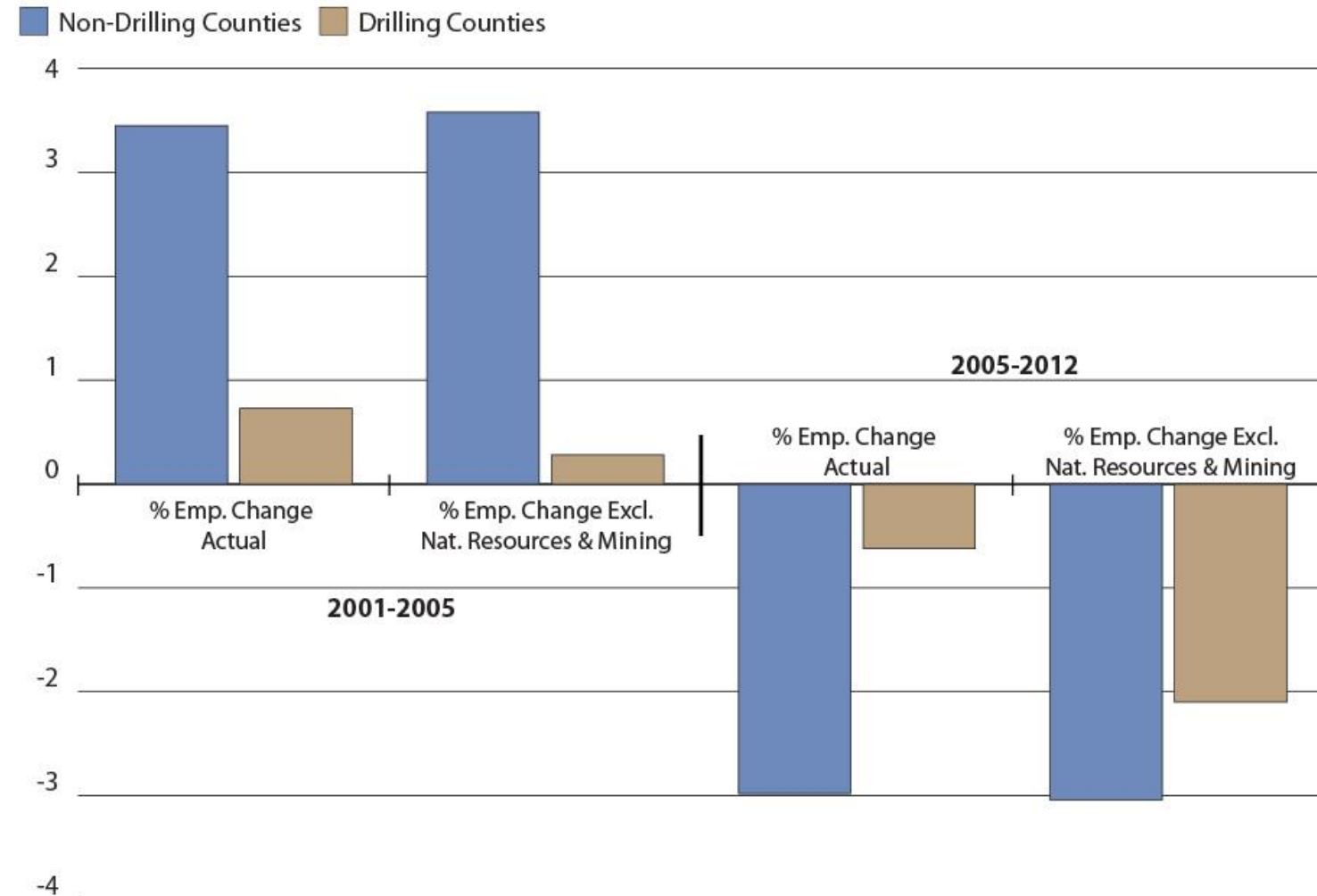
Figure 12. Growth in Shale Jobs Makes Little Difference to State Job Growth, 2005-12



Source: Multi-State Shale Collaborative based on QCEW data.

Drilling Counties Cushioned Slightly From Recession

Figure 14. Employment Growth in Drilling and Non-Drilling Counties Before and After Drilling Take-Off



Source. Multi-State Shale Collaborative based on QCEW data.

Statistical Research Also Shows No Relationship Between Wells and Total County Job Growth

- Academic study in PA through 2009 by Weinstein and Partridge
- We update to 2011/2012, expand to 3&6 states, and use two sources of data...
- ...with same result: no statistically significant relationship found between number of wells and employment growth
- Number of wells is related to higher income growth:
 - Weinstein & Partridge suggest some royalty income stays local
 - Not clear how many people benefit

Total Jobs Impact of Drilling

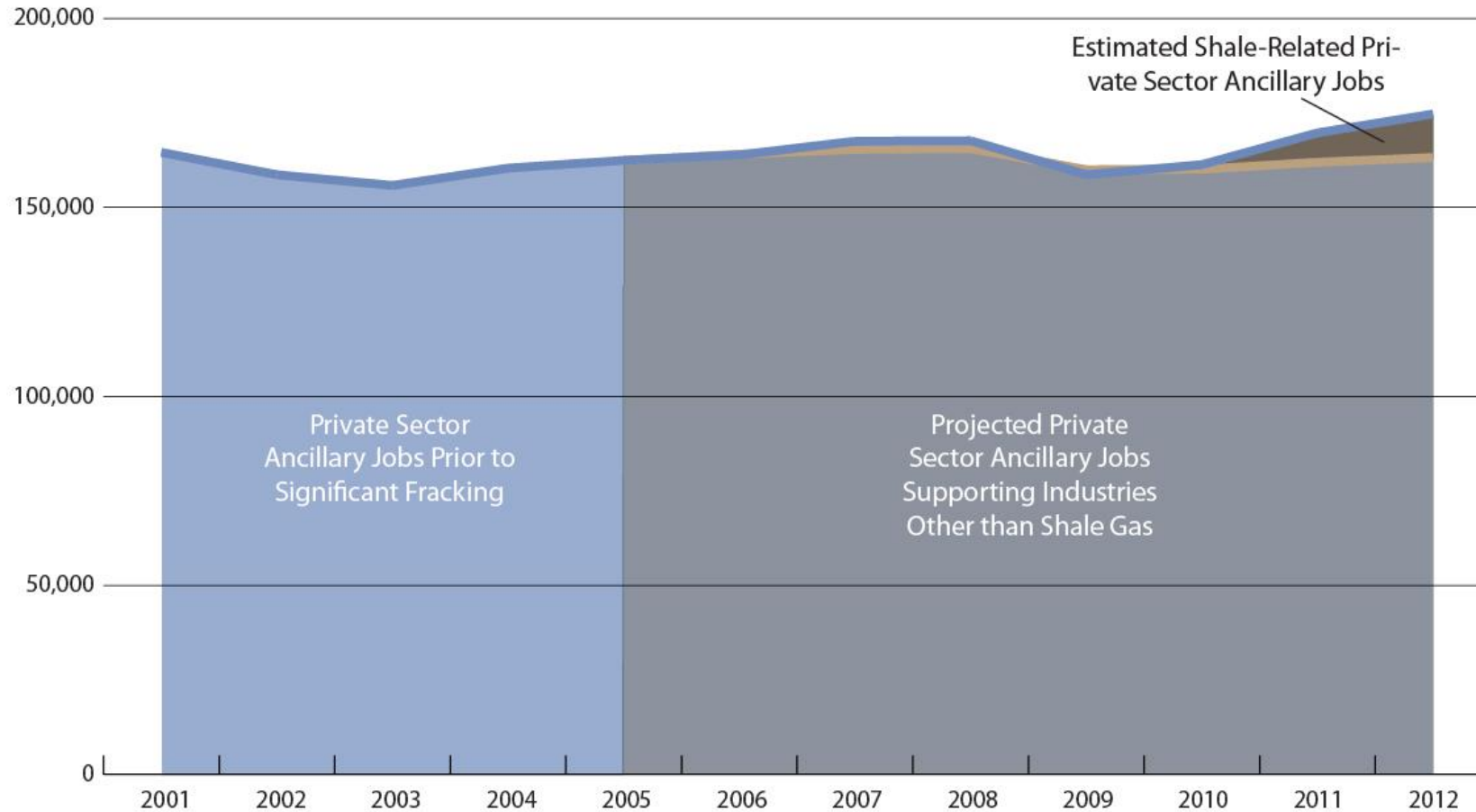
- Total jobs impact includes jobs at drillers AND suppliers AND consumer industries where drilling industry & supplier owners, workers, and lease holders shop
- Independent academic studies estimate total jobs impact to be about twice shale-related jobs
- Industry-funded studies estimate (or “project”) jobs at twice to seven times the independent academic studies – using flawed assumptions
- Result: impression created of hundreds of thousands of jobs when the reality is tens of thousands

Sewing More Confusion on Total Jobs

- Count every UPS driver – and all the 200,000 workers in 30 “ancillary” industries with some shale supplier jobs – as “shale supported”
 - But wait, these industries had almost as many jobs before fracking
 - So 95-99% of these jobs are unrelated to shale
- Count “new hires” – there are lots of those
 - But 29 of 30 new hires replace someone who left – they are not new jobs
 - “Yes but new hires is a nice big number”

Ancillary Jobs Are Unrelated to Shale: in a Picture

Figure 15. Very Little Change in Ancillary Employment

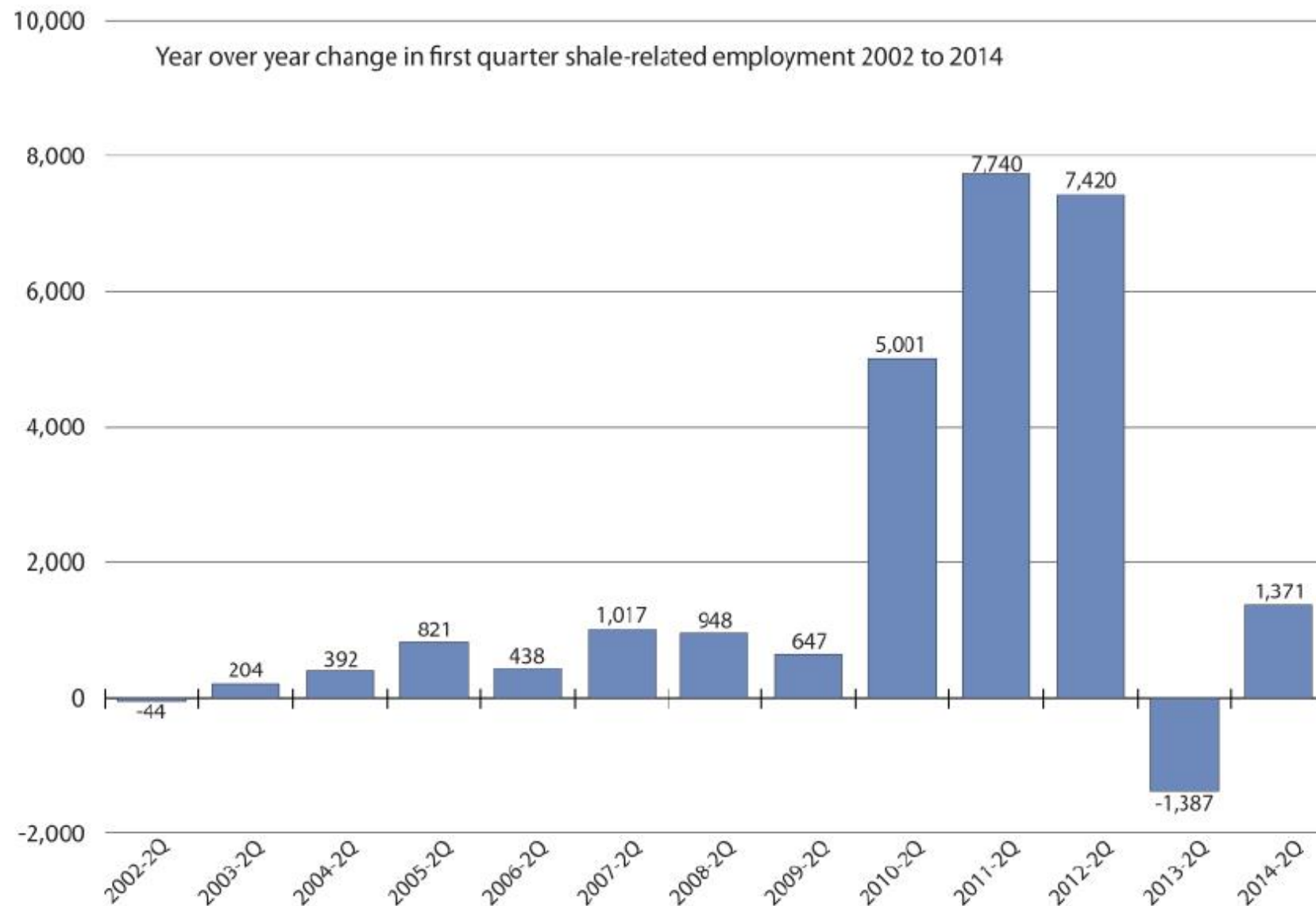


Note. Projected Ancillary employment is calculated in 2006-2012 as 2.926% of total covered employment in each year. The data presented here as for private sector employers.

Source. Multi-State Shale Research Collaborative based on Quarterly Census of Employment and Wages data.

From Boom to Bustlet?

Shale-Related Employment Peaked in 2012



Note. Shale related employment is defined here as employment in Oil and Gas Extraction (211), Support Activities for Mining (213), and Oil & Gas Pipeline & Related Structures Construction (237120) in MD, NY, OH, PA, VA and WV.

Source. Multi-State Shale Collaborative based on QCEW data