Unconventional Gas Development and Local Public Finance: Evidence from the Barnett Shale

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Oil and natural gas production is experiencing a renaissance in the US with the increased development from shale formations over the past several years. Drilling has created jobs and generated public revenues for local and state governments (Weber, 2012; Pless, 2012; Raimi and Newell, 2014).

This study evaluates the medium to long-term effects of shale gas development on zip code level housing values over the 1997 to 2013 period in Texas’ Barnett Shale. As demonstrated in Figure 1, the Barnett Shale formation splits the Dallas-Fort Worth metropolitan area in half, with all of the drilling occurring on the western side and none occurring on the eastern side. In examining the evolution of housing values, we connect the natural resource economics literature on the effects of extractive industries to the public economics literature on local public finances and property values – in Texas the oil and gas development provide property tax revenue for local schools and governments.

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Evolution of Shale Gas Development in the Barnett

Figure 2 demonstrates how development evolved over the last decade. The number of well permits, represented as the blue columns, submitted in key Barnett Shale counties jumped in 2001 and then increased every year until 2008 when it peaked. By 2012 more than 16,000 wells had been drilled in the Barnett Shale (Railroad Commission of Texas, 2014). The red line in Figure 2 represents the difference in housing values, as measured by the Zillow Housing Value Index (ZHVI), between zip codes in the shale and those nearby but outside of the shale. Initially,
Shale zip codes had an average housing value index similar to nonshale zip codes. As drilling increased the housing values increased in shale zip codes relative to nonshale zip codes. In 2010 and afterwards, nonshale zip codes regained value relative to shale zip codes as drilling activity slowed. Still, by 2013 shale zip codes had an average Zillow Home Value Index of $14,000 – higher than nonshale zip codes.

**Shale Development’s Effect on the Tax Base**

The greater appreciation of housing in shale zip codes in part reflects the tax treatment of oil and gas rights and its implications for local public finances in the region. In Texas the value of oil and gas rights enter the property tax base as mineral property once drilling begins. As oil and gas rights gained value (as leasing activity expanded) and were assessed for tax purposes as
mineral property, they expanded the value of the real property on which taxes for local
governments and schools are assessed.

In Figure 3 we graph the difference in tax revenues in the shale and nonshale areas for
each year. For our entire study area, oil and gas rights accounted for the largest increase in
property tax base. For the property tax base in 1998, shale school districts had about $4,000 more
(per student) in oil and gas rights than did the nonshale districts; by 2009 this had increased to
$90,000 per student. The next largest increase in the tax base came from commercial property,
which increased by about $60,000 per student. Commercial property includes infrastructure
related to gas development such as pipelines and compressor stations as well as equipment like
drilling rigs.²

² A complete description of property categories for tax purposes in Texas is available at
Linking the Increase in Property Values to the Increase in the Tax Base

The peak in the difference in housing values across shale and nonshale zip codes roughly corresponds to the peak in the difference in the nonresidential property tax base. Figure 4 shows the average difference in the natural log of ZHVI values for shale and nonshale zip codes and the average difference in the nonresidential property tax base. The two series track very closely. The difference in the nonresidential property tax base leveled off in 2009 and 2010 and declined noticeably in 2011. The difference in the (natural log of) ZHVI values also declined in favor of nonshale zip codes in 2011 and continued to decline in 2012 and 2013. With a decline in drilling and continued low natural gas prices, the property tax base advantage of shale zip codes would
have decreased further in 2012 and 2013, in line with the decline in housing values in shale zip codes relative to nonshale zip codes.

Figure 4. Housing Appreciation and the Nonresidential Tax Base, 1998-2011

Should We Expect Similar Findings Elsewhere?

Shale gas development provides the potential for net benefits to local governments and school through tax revenue windfalls. The improvements in local public finances and the spending of revenues, however, depend on tax policies, which vary across states. For example, Pennsylvania or Oklahoma exclude oil and gas rights from property taxes but collect other revenues at the state level, and schools and local governments there may receive far less revenues from the oil and gas industry than in Texas. Revenue transfers from the state may still provide sufficient funding to cover the cost of the public services used by the industry but perhaps not enough to improve local schools and public amenities beyond their pre-drilling
levels. This suggests that the effect of shale gas development on public finances and therefore housing values may vary across states with different tax and revenue distribution policies.

References