

DRIVERS OF ROYALTY RATES AND PRIMARY TERMS IN PRIVATE U.S. MINERAL LEASES

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Overview

Private ownership of mineral rights has been one of the key enablers of the shale boom in North America because landowners have a direct financial incentive to encourage drilling on their property. This feature makes the US market different than the rest of the world. Brown, Fitzgerald, and Weber (2015) and Brown et al. (2016) show that royalties are an important source of income for rural economies, and they also document substantial cross-sectional differences in mean royalty rates across states using data on leasing through 2011. Since shales differ widely across states along several dimensions, it is unclear whether landowners in states like Ohio are receiving lower royalty rates than places like Texas because of economic fundamentals like geology and cost or some other unexplained cross-state heterogeneity. If it is the latter, voters in these areas may wish to consider policies that increase their share of resource rents.

There are a number of economic explanations for variation in lease prices over time and space. In a previous working-paper, I construct a general equilibrium model of the market for depletable resource rights (Agerton 2016). The model makes several predictions about how price, productivity, competition, scarcity of unleased acres, and alternative uses for land impact lease prices. Previous research by Timmins and Vissing (Timmins and Vissing 2014; Vissing 2015, 2016) shows that landowner characteristics affect non-pecuniary terms in leases. In particular, leases signed by poorer or minority households tend to have fewer protections for the landowner. This could be seen as either a change in lease quality or a decrease in the price received by these landowners. Similarly, as I show using a simple model, lengthening a primary term without increasing the price of a lease (through the bonus or royalty) means that the landowner is receiving lower compensation.

Using proprietary geospatial data from Drillinginfo on mineral leases in Texas, I confirm that royalty rates and primary terms vary over time and space. To explore whether the economic theories above explain this variation, I pair leasing data with geospatial data on income, demographic characteristics, land use, drilling, and production. Since royalty rates tend to take a discrete number of values, not a continuum, I estimate a series of ordered discrete choice models to test the hypothesis that royalties increase and primary terms decrease when:

1. Landowners tend to be wealthier and whiter;
2. The economic opportunity cost for using land is higher;
3. Resources are more valuable (because of price or geology);
4. Leases are larger;
5. Unleased acreage is scarce; and
6. The lessor owns more land.

I also test whether firm, play, and state-specific effects are present.

Methods

Ordered discrete choice models

Geosprocessing

Results

Initial results for the Eagle Ford Shale suggest that the most important factor determining royalty rates may simply be the scarcity of leases, though population density and income also have some explanatory power. Additionally, individual firms tend to pay higher or lower royalty rates, which is consistent with firm-specific productivity discussed in Agerton (2016) and some anecdotes of companies like Chesapeake paying more than others. Surprisingly, median housing values are negatively correlated with royalty rates, and oil and gas prices have little effect. These results are preliminary, however, and may change as more plays and states are added.

Conclusions

The terms for private mineral leases in US shales vary substantially across states, plays, and time-periods. This paper tests several hypotheses based on previous empirical and theoretical research to see 1) what drives contract terms to change and 2) how much cross-state variation can be explained using economic factors. Without data on firms' costs or private information on the value of leases, it is not possible to definitively say whether landowners in states with abnormally low royalty rates are receiving lower fractions of resource rents. However, should this be the case, voters in these areas may wish to consider introducing or updating policies to increase landowners' share of oil and gas revenues.

References

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