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Environment for Development Research Brief

Impacts of COVID-19 on Tight Oil Supply

Evidence from a Price Responsive Model

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Key Points

- Drilling activities are very responsive to oil prices, while tight oil production is not very responsive.
- Tight oil production could decrease by 1.3-2.3 MMbbl/d (million barrels per day) during the pandemic induced recession.
- Tight oil is not the new Swing Producer.

The coronavirus pandemic is having substantial impacts on the oil and gas industry. Following the plummeting of oil prices in March 2020, the future supply of tight oil in the United States has become crucial for government policy. Tight oil is crude oil extracted from low permeability rocks, which accounted for more than 60% of the total crude oil production in the United States in 2019. Market prediction, however, is not well established. In this paper, I construct a model to quantify the price responsiveness of tight oil supply in the United States using well-level play-specific panel data (a play is a geological formation). I use the model to analyze the influence of the coronavirus pandemic on tight oil supply. Key findings of the research include the following.

The oil price elasticity of tight oil drilling (an economic measurement of sensitivity to price changes) increased from insignificant in 2000-2008 to 2.0 in 2010-2016, which is a high level of sensitivity. The oil price elasticity for tight oil production increased from insignificant to 0.5 in the same periods, which is a low level of sensitivity.

In a computer simulation, tight oil production decreases from 8.1 MMbbl/d in 2020Q1 to 6.3 MMbbl/d in 2021Q1 if oil price remains at 30 USD/bbl in 2020Q3-2021Q1 and then increases to 50 USD/bbl (Price model 1). It decreases to 6.8 MMbbl/d in 2020Q4 if the oil price remains above 40 USD/bbl (Price model 2), and to 5.8 MMbbl/d in 2021Q1 if oil price decreases to 25 USD/bbl (Price model 3). The production decline is 16-28% of the productivity in 2020Q1. Tight oil production is projected to increase again when oil prices recover.

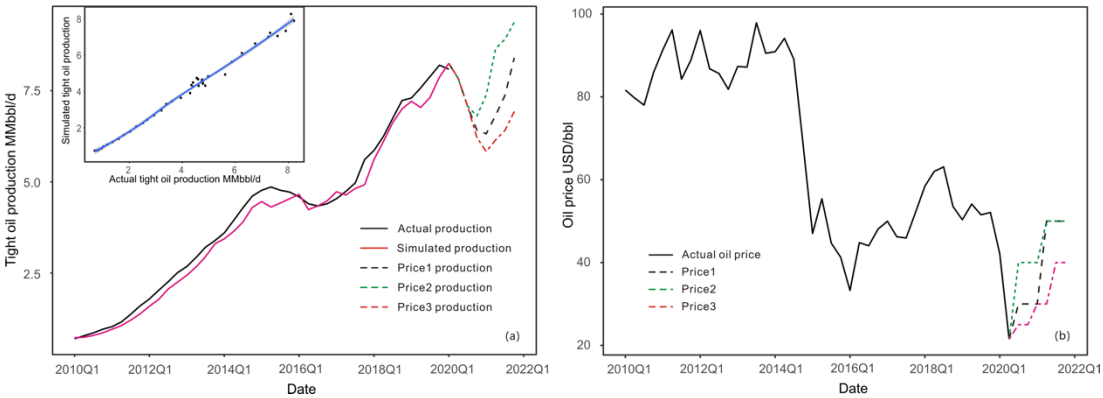

Fig. 1. (a) Simulated tight oil production in 2010Q1-2020Q1 and forecasted tight oil production under three price models in 2020Q2-2021Q4. The insert is the regression between simulated production and

actual production; **(b)** Real WTI spot oil price in 2010Q1-2020Q1 and three price models in 2020Q2-2021Q4

Tight oil does not satisfy the criterion of a "swing producer". Its cost is higher than conventional oil and no entity is trying to regulate tight oil production by force or through agreement. The Railroad Commission of Texas declined a proposal to cut production in response to the price decline during the pandemic in May 2020. Instead, it was OPEC that led the production control in 2016 and 2020. Therefore, the role of swing producer still belongs to conventional-oil producing countries rather than the high-cost tight oil.

This brief is based on: *Impacts of COVID-19 on Tight Oil Supply: Evidence from a Price Responsiveness Econometric Model*, EfD Discussion Paper 20-25, 2020, by Yan Chen, Chinese Academy of Sciences, Beijing, PRC.

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