

OPEC, Saudi Arabia, and the Shale Revolution: Insights from Equilibrium Modelling and Oil Politics

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Overview

The 2014-2016 drop in crude oil prices has been researched extensively by oil market analysts. Although results have given evidence for a variety of possible motivations, including decreased demand and geopolitical circumstances, the *shale oil revolution* is widely considered to be the main driver of price developments. Since 2012, crude oil production capacities in the US have nearly doubled due to the rapid growth of its shale oil industry.

Why OPEC did not respond to the expanding shale production and falling prices with production cuts remains an open question. Other researchers' results in these regards fall into three main categories: (1) OPEC tried to defend its market share by flooding the market in an attempt to drive out shale producers; (2) the shale oil revolution nullified OPEC's market power, leaving its members no choice but to accept low prices; and (3) OPEC was uncertain about the potential of shale oil and needed to test its performance under low prices.

However, most discussion of OPEC's intentions are purely qualitative, with little or no quantitative evidence. This paper aims to bridge this gap with insights from computational equilibrium modelling. Specifically, I construct a model of the global crude oil market from 2011Q4 through 2015Q4 and compute market outcomes numerically under different competition setups for each quarter. The model does not aim to provide a comprehensive picture of the crude oil market, but rather an understanding of whether prices pre- and post-drop can be explained within one common framework of business-as-usual competition. Subsequently, I embed the results in an extended discussion about the nature of shale oil, a changed oil market, and OPEC politics; especially the different strategic and economic factors that might influence Saudi Arabian oil politics.

Methods

Computational partial equilibrium modelling; Qualitative discussion

Results

Although the model performs reasonably well in explaining pre-2014 prices, all setups fail to capture low prices, which fall even beyond perfect competition outcomes. This result is robust with respect to large variations in cost parameters. Coordination to high prices would require extraordinary high unilateral cuts for Saudi Arabia, which are neither politically feasible nor incentive compatible.

Conclusions

In the context of actual events and the deferred decision to cut production in 2016, I conclude that initial OPEC policy aimed at defending market shares against shale oil and at evaluating the elasticity of shale supply. The latter turned out to be more robust and viable than expected, despite fiscal pressure from the burden of low prices on oil-dependent OPEC economies. Further developments, such as increasing pressure from climate change policies, might have strengthened incentives to flood the market, along with national politics. Saudi-Arabian-led efforts to negotiate a deal, ultimately reached in December 2016, should not (necessarily) be interpreted as the abandoning of previous strategies or as an OPEC defeat, even though the shale revolution may have permanently altered the market structure, with prices unlikely to return to pre-2014 values.

References

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