OPEC's Pursuit of Market Stability

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Motivations underlying the research

Maintaining stability in the world oil market is a prominent component of OPEC's self-stated mission. OPEC's modus operandi is to tap spare production capacity to offset shocks to demand and supply. The attempt to stabilize the world oil market is not a small or easy task, disruptions to demand and supply are both large and frequent. Indeed, it is entirely possible that, despite best efforts, the attempt might fail.

We therefore examine the extent to which OPEC has succeeded in this mission. We assess how effective has been OPEC's management of its spare capacity to reduce the volatility of the price of oil. We also estimate the value of OPEC's spare capacity buffer to the global economy and investigate how the benefits of OPEC's effort to reduce price volatility have been distributed geographically.

Research performed

Using annual data starting in 1971, we provide a novel decomposition of shifts in global oil demand and non-OPEC supply that forms the backdrop for OPEC's attempts to stabilize the market. From this decomposition we derive an estimate of the call on OPEC's oil that would have assured the oil price remained constant throughout time, and we compare this inferred call to OPEC's historical production. The following factors can, however, complicate the analysis: (i) the level around which OPEC has attempted to stabilize the price has most likely varied throughout time; (ii) OPEC may not have been able to accurately anticipate or respond to each of the shifts.

Using more detailed monthly data available only since 2001, we turn to Pierru, Smith and Zamrik's (*Energy Journal*, 2018) analytical approach that incorporates these complicating factors. We extend their analysis by including the tumultuous years 2015-2019 and updating the counterfactual exercise (assuming there had been no attempt to stabilize the price of oil) that measures the success of OPEC's attempt to offset perceived shocks to demand and supply.

By elaborating on Pierru et al.'s analytics, we derive the formula giving the value of OPEC's spare capacity buffer to the global economy. Using parameters estimated with our data, we calculate the value of the buffer as the expected increment to global GDP that is generated by OPEC's attempt to counter supply shortfalls. We also provide estimates of the buffer value for some of the world's large economies.

Main conclusions

Our decomposition of shifts in global demand and non-OPEC supply provides a fresh perspective on the debate over the relative importance of demand versus supply factors as determinants of previous price movements. When factoring in OPEC's production, the analysis provides support to the hypothesis that, to a certain extent, OPEC has adjusted its production in response to changes in the call on its oil. It therefore suggests long-term market stabilization efforts by OPEC during the past fifty years.

Our counterfactual analysis based on monthly data indicates that OPEC in general, and Saudi Arabia in particular, has succeeded to a limited but important degree in its attempt to employ spare capacity to offset shocks and stabilize the price of oil. Although the size of each monthly offset may have

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been subject to significant error (of estimation as well as execution), the magnitude of those errors has nevertheless been contained within the bounds necessary for stabilization to succeed.

We conclude that from September 2001 to October 2014 OPEC's management of spare capacity decreased price volatility substantially, by at least 25% relative to what it otherwise would have been. During OPEC's market share campaign (November 2014–December 2016) the use of spare capacity did not reduce price volatility, but this was a purposeful departure from previous attempts to stabilize the market. Finally, our counterfactual analysis shows that during the agreement between the OPEC+ nations (2017–2019) the management of OPEC's spare capacity reduced monthly oil price volatility considerably, from 19.3% to 7%.

The value of OPEC's spare capacity buffer to the global economy increases with the magnitude and persistence of the shocks to offset, and the GDP losses incurred when there are production shortfalls. However, the value is diminished by the error that OPEC makes when estimating the size of the shocks to offset and executing production decisions. We find that OPEC's attempt to stabilize the oil price produces an expected annual increment to global GDP equivalent to some $175 billion in 2015 prices, around 0.2% of the world's GDP. For the USA, China and the European Union, the annual value of OPEC's buffer amounts to $39.4 billion, $30.9 billion and $59.4 billion, respectively. These results conform to the intuition that the value of OPEC's spare capacity would be highest for economies that are oil-intensive and that import a large share of their total oil consumption.

Shale oil has a limited impact on the elasticity of the demand for OPEC's oil since it comprises only a small fraction of non-OPEC supply. Therefore, the development of shale oil has not significantly reduced the value of OPEC's buffer. Our results show that OPEC's spare capacity, as an institutional mechanism, plays a critical role in the well-functioning of the oil market, for the benefit of the global economy.