



OPEC vs US shale oil: Analyzing the shift to a market-share strategy

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In 2014, global oil supply overtook demand and the oil price started to decline. In its November 2014 meeting, OPEC decided not to reduce supply and prices fell further. Many oil-market analysts interpreted this as the formal decision to squeeze higher-cost US shale oil production back out of the market. It also stood in contrast with OPEC's coordinated cut during the Global Financial Crisis and Saudi Arabia's role as a "swing producer" which seeks to accommodate changes in demand or production by other players. In its December 2015 meeting, OPEC reiterated its commitment to a "market-share" strategy. Many have opined on whether OPEC is taking a sensible perspective by driving competitors out of business or whether it is a misguided move tantamount to "hara-kiri".

Our goal in this paper is to understand the fundamental market factors that induced the shift in OPEC's strategy. We present a simple economic model of the oil market: OPEC has a degree of market power and competes against a set of non-OPEC producers who act as price-takers. OPEC has a choice between two strategies. The first strategy, which we call "accommodate", is to maximize profits via a "high" oil price, which allows higher-cost non-OPEC producers to remain profitable. The second strategy, referred to as "squeeze", is to drive up production, which drives down price and thereby induces high-cost producers, specifically US shale oil, to exit the market. We show that *either of these two strategies can be optimal* for OPEC depending on market demand and supply fundamentals.

Our theory shows that the market-share strategy becomes relatively more attractive for OPEC under these conditions: (i) slower global oil demand; (ii) greater US shale oil production; (iii) reduced cohesiveness within OPEC; and (iv) higher output in

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other non-OPEC countries. We show that a regime switch from accommodate to squeeze becomes optimal when US shale oil grows beyond a specific point. The model can rationalize OPEC's decision to raise output in the face of weaker demand, and explain a large drop in the oil price.

In the empirical part of the paper, we begin with a description of oil-market developments that highlight how the above comparative-statics are pertinent. We then give an account of OPEC's strategy shift and the market responses of non-OPEC players. We proceed to quantitatively calibrate the model to oil market data across a range of scenarios. First, we show how the model rationalizes the oil market in the period preceding the price collapse as a high-price accommodate scenario where OPEC *chooses* not to squeeze US shale oil despite already substantial market-share erosion and having sufficient spare capacity for a squeeze. Second, to illustrate selected comparative statics, we show how some parameter changes can prompt a rational decision by OPEC to squeeze US shale oil out of the market. Third, we show that the model generates squeeze equilibria when calibrated to forecasts of future data that yield higher OPEC output and lower prices.

Our model exposes the fallacy of interpreting a fall in OPEC's revenues or profit as evidence that a market-strategy is necessarily misguided. The simple point is that the relevant comparison is not how profits compare to an earlier period, but rather how they would compare to pursuing a different strategy today—for which profits could be even lower. By showing how a market-share strategy can be optimal for OPEC in a formal framework, we offer the model as a potential rational economic explanation for the 2014 switch in OPEC's strategy and the subsequent oil price crash. However, we do not wish to claim that it is the most likely of a range of possible economic or political motivators.

It remains to be seen whether the initial logic of the squeeze will play out and vindicate the OPEC strategy in the coming years. As of early 2016, the squeeze appears to have been less successful than OPEC might have calculated: a substantial decline in US shale output does not (yet) appear imminent, and the squeeze has perhaps provided more costly than anticipated given the continued decline in oil prices. One potential reason is that the costs of US shale have fallen more strongly than might have been anticipated. It is also possible that the attempted squeeze and the re-entry of Iran have made coordinated accommodation so problematic that OPEC reluctantly yet rationally persists with the squeeze. Our paper does not pretend to forecast the future of the industry but rather to provide a coherent economic framework to think about the key drivers of such regime switches, including the one that took place at the end of 2014.