The Impact of the Fracking Boom on Arab Oil Producers

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Executive Summary

The use of hydraulic fracturing (or fracking) in conjunction with horizontal drilling and micro-seismic imaging has made it possible to extract crude oil from rock formations characterized by low permeability. Oil extracted by these techniques is commonly referred to as shale oil (or tight oil) to differentiate it from crude oil extracted by conventional drilling techniques. To date commercial shale oil production has been largely limited to the United States. This article quantifies the impact of the U.S. shale oil boom since November 2008 on global oil production, on U.S. imports of crude oil, on U.S. exports of refined products, and on Arab exports of crude oil.

I represent the U.S. shale oil boom as a sequence of exogenous shocks to world oil production. On the basis of a structural econometric model of the global market for crude oil, I construct an estimate of how the price of oil in global markets would have evolved in the absence of this boom. I show that the cumulative effect of the shale oil boom on the Brent price had been building gradually since 2011, reaching a peak in June 2014, before declining in late 2014. Whereas in mid-2014 the Brent price was lower by $10 than it would have been in the absence of the fracking boom, by mid-2015 this price differential had fallen to $5, reflecting unexpectedly slow or even negative growth in shale oil production. My analysis also demonstrates that a very similar price decline would have occurred between July 2014 and January 2015 even in the absence of increased U.S. shale oil production, suggesting that increased shale oil production was not the main cause of this price decline.

I use the difference between the actual and the counterfactual global price of crude oil to quantify the losses in Saudi oil revenue (and hence in Saudi national income) since late 2008 under the maintained assumption that Saudi oil production remained unchanged by the fracking boom. My analysis shows that the cumulative losses in Saudi oil revenue caused by fracking by August 2015 had reached 102 billion dollars. I relate this estimate to the substantial decline in Saudi net foreign assets between mid-2014 and August 2015. I show that the shale oil boom accounts for 27% (or 24 billion U.S. dollars) of this decline , with the remaining 66 billion dollars reflecting increased oil production by other oil producers, shifts in oil price expectations, and the weakening of the global economy. If the decline in Saudi net foreign assets were to continue at the rate experienced between January 2015 and January 2016, one would expect Saudi net foreign assets to be exhausted by early 2020. I make the case that this decline is unsustainable and discuss policy implications of my analysis for Arab oil producers in general and for Saudi Arabia in particular.

My analysis highlights the need for far-reaching reforms in Arab oil producing countries. A natural starting point for such reforms would be for policymakers to reduce or even phase out domestic subsidies on energy consumption. Clearly, however, such reforms will not be enough, given the magnitude and persistence of the oil revenue shortfall that has accumulated in recent years. One problem is that many Arab oil-producing countries lack an income tax base. Taxing incomes of domestic citizens working in the public sector would be the same effectively as lowering public wages and hence fiscal spending, leaving taxes on foreign workers' income as the only policy option for raising tax revenue. Thus, much of the fiscal adjustment will have to occur on the expenditure side. One

indication that this concern is taken seriously by policymakers in the Arab world is that Saudi Arabia in June 2016 unveiled a plan to more than triple its non-oil revenue by 2020, while reducing public spending. This plan includes the introduction of indirect taxes as well as reductions in subsidies for water and electricity and public wage cuts.

Keywords: Arab oil producers; Saudi Arabia; shale oil; tight oil; oil price; oil imports; oil exports; refined product exports; oil revenue; foreign exchange reserves; oil supply shock.

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