

Shale Oil and Biofuels: Implications for Oil Prices and the Political Instability of OPEC as a Cartel-of-Nations

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After the global recession of 2008/2009, oil prices recovered (Figure 1), biofuels reached the blend wall,¹ and U.S. crude oil production boomed. Since 2009, U.S. crude oil imports have declined by

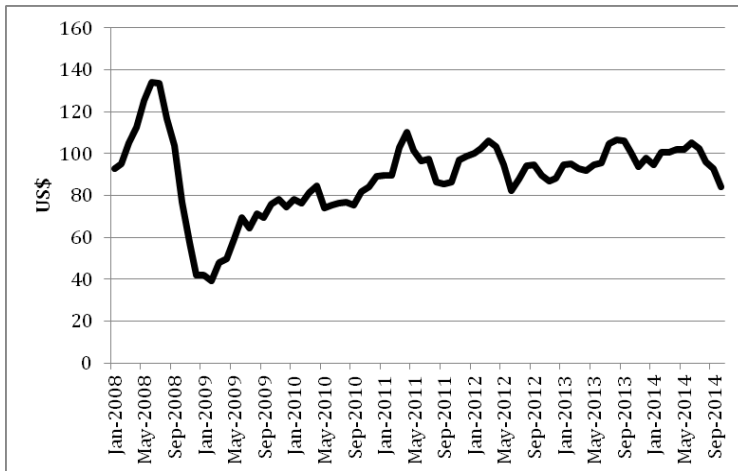


Figure 1. Cushing, Oklahoma, Oil Future Contract 1 Prices.

Source: U.S. Energy Information Administration data, retrieved from <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RCLC1&f=M>

17.69%² and the Organization of Petroleum Exporting Countries' (OPEC's) market share has shrunk significantly (Figure 2) even though we are in a period of high international oil prices. Recently, in response to the continuous erosion of its market share, Saudi Arabia increased its production, resulting in a sharp decline in the price of crude oil, with the West Texas Intermediate price falling to \$74.61 US per barrel on November 18, 2014.³

This chain of events may signify a change in the stable regime of oil pricing. Initially, OPEC operated as a cartel-of-

nations that supported high oil prices. That enabled the ruling party in OPEC countries to "bribe" the local population into compliance with this policy by providing cheap fuel, as well as subsidizing food and health services.

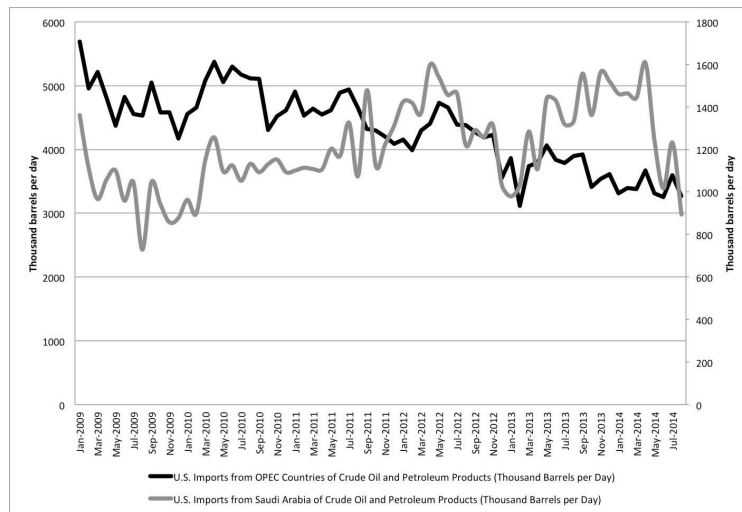


Figure 2. U.S. Imports of Crude Oil and Petroleum Products from OPEC.

Source: U.S. Energy Information Administration data, retrieved from http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbldp_m.htm

However, the introduction of shale oil and biofuels reduced U.S. dependence on imports of crude oil substantially, resulting in a significant decline in imports from OPEC countries (Figure 2). Recently, imports of crude oil from Saudi Arabia have declined from 1,607 barrels a day in April 2014 to 894 in August 2014, a 45% drop. What are the implications of such changes to the international oil markets?

The cartel-of-nations concept provides a useful framework for better understanding OPEC's response to expansion of the fuel supply within the U.S. and its implications for the international oil markets.

OPEC as a Cartel-of-Nations

OPEC was created as a permanent intergovernmental organization at the Baghdad Conference on September 10–14, 1960, by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela. Since its inception, OPEC countries have responded to changes in the international oil markets, sometimes successfully, but other times with less success. The importance of OPEC to international oil markets is a ques-

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See footnotes at end of text.

tion of significant interest and thus has resulted in a large body of literature (e.g., Smith, 2009).

OPEC is a cartel-of-nations, not firms, that aims to affect international oil prices. While a cartel-of-firms is a monopoly that maximizes industry profits, a cartel-of-nations model assumes that OPEC countries, as a group of countries, aim to maximize the benefits of oil production and export, as well as domestic consumption of oil. The implications are that market power in the international oil markets is a key determinant of OPEC countries' fuel pricing behavior. This cartel-of-nations framework is expanding the international trade literature on optimal export and import taxes (Bhagwati et al., 1998; Stern, 1989). This framework suggests that we should observe a wedge between the price of oil in exporting nations and its price in importing nations. It also predicts that the more inelastic the import demand curve, and thus the larger the country's market power in the international markets, the larger the wedge between the domestic and international price (which is consistent with the trade literature; see Bhagwati et al., 1998, and references therein). To this end, during the last two decades, OPEC countries have produced roughly 40% to 50% of the volume of trade in oil, and prices of fuel in OPEC countries have on average been much lower than in most of the world. In 2010, fuel prices at the pump in OPEC countries were an average of 39¢ U.S. per liter lower than in oil-importing countries (GIZ, 2011).

The cartel-of-nations model suggests that OPEC's response to the introduction of alternatives to its oil (e.g., shale oil) is fundamental to understanding the effect of the introduction of substitutes for conventional oil in the U.S. The cartel-of-nations model explains that expansion of the non-OPEC oil supply reduces global prices but by less than predicted by other theories (i.e., competitive model, standard cartel theory). For example, while using 2007 data and comparing competitive and standard cartel models to the cartel-of-nations model, Hochman et al. (2011) showed that the introduction of biofuels resulted in the competitive model overestimating the price effect by 9% to 26% and the cartel-of-firms model overestimating the price effect by 4% to 17%. Under the cartel-of-nations model, OPEC responds to the introduction of alternatives by increasing domestic consumption. However, maintaining this behavior depends on OPEC maintaining its market share in the international oil markets.

Implications of the Recent Changes in Global Oil Supply

OPEC needs money to finance its domestic fuel consumption subsidies. Individual OPEC countries need a sufficiently high international oil price; otherwise, these countries might run deficits. The U.S. Energy Information Administration Country Analysis Briefs in 2007 suggested that Saudi Arabia is heavily dependent on oil and petroleum-related industries. In 2005, oil export revenues were around 90% of total Saudi export earnings (EIA, 2007a). Dependence on oil-export revenues among OPEC countries, however, is not limited to Saudi Arabia. Oil and gas export revenues accounted for more than three-quarters of Venezuela's export revenues in 2005 (EIA, 2007b). In 2006, up to 98% of Algeria's exports (by value) came from oil and natural gas (EIA, 2008). The domestic fossil industry and the revenues it generates are, therefore, key to economic growth and development in OPEC countries.

Because OPEC countries depend heavily on oil-export revenues, they are vulnerable to increases in the oil supply and its alternatives in the rest of the world. To this end, the recent increase in global crude oil production has come at a time when expectations of growth in global oil consumption are decreasing, which has resulted in looser international oil markets (EIA, 2014). An increase in the supply of alternatives has resulted in a decline in the demand for oil exports from OPEC and thus less oil-export revenues to subsidize domestic fuel, food, and health services in OPEC countries. However, the introduction of alternatives has also resulted in a decline in OPEC market share in international oil markets and in OPEC countries facing a more elastic import demand curve. A more elastic import demand curve lowers OPEC's economic benefits from subsidizing domestic fuel consumption (recall that the cartel-of-nations model predicts that the optimal fuel subsidy is inversely related to the import demand elasticity; that is, maximizing economic benefit suggests that a more elastic import demand curve results in a lower fuel subsidy to the domestic fuel-consuming population).

The substantial reduction of oil-export revenues for OPEC countries, as well as the decline of their market share in international oil markets, has resulted in OPEC responding to the significant increase in supply with an increase of its own exports, an effort driven by OPEC countries' desire to preserve their market share.

A key factor that is likely contributing to the OPEC response is that the U.S. oil industry is also constrained and price drops may render production of shale oil economically infeasible. While some research has placed the breakeven price at above \$90 US, recent developments have suggested that declines in oil prices have different impacts on different regions/companies (see <http://online.wsj.com/articles/energy-boom-can-withstand-steeper-oil-price-drop-1414627471>). According to an article published

in Bloomberg on October 17, 2014,⁴ although some regions will feel the pinch at \$80 U.S., most will still be profitable. Furthermore, much of the Eagle Ford play would be profitable even at \$50 U.S.

Concluding Remarks

The outcome of the aforementioned changes will be determined in the international oil markets, and this may result in a paradigm shift. The outcome will be the product of the difference between the break-even price of OPEC budgetary needs and the breakeven price of production in the Bakken and Niobrara Basins in the U.S. Sluggish demand for oil only furthers the economic turmoil in the oil and gas industry.

OPEC's internal demand for oil-export revenues is fundamental to understanding OPEC's pricing behavior. International oil prices, as well as OPEC's share in these markets, are key to understanding the dynamics of the international oil markets and OPEC's role in these markets. The cartel-of-nations model is essential to a regime that subsidizes domestic fuel, as well as food and health services, and finances these expenses with oil export revenues, thus buying the local population's compliance with this policy and achieving political stability.

Footnotes

¹ The blend wall refers to the maximum amount of ethanol blenders are permitted to blend with petroleum-based fuel. Currently, it is set at 10% of the gasoline consumption.

² Retrieved from http://www.eia.gov/beta/petroleum/imports/browser/#/?chartindexed=1&v=l&vs=PET_IMPORTS.WORLD-US-ALL.A

³ Crude oil, light-sweet, Cushing, Oklahoma, contract 1 – Retrieved from http://www.eia.gov/dnav/pet/pet_pri_fut_s1_d.htm

⁴ Retrieved from <http://www.bloomberg.com/news/2014-10-17/oil-is-cheap-but-not-so-cheap-that-americans-won-t-profit-from-it.html>

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