



# Iranian-Oil-Free Zone and international oil prices



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## ARTICLE INFO

### Article history:

Received 7 April 2014

Received in revised form 17 July 2014

Accepted 2 August 2014

Available online 13 August 2014

### JEL classification:

E37

Q32

Q34

Q38

Q43

### Keywords:

Oil price

VAR model

Sanction

Iran

## ABSTRACT

One of the main elements of economic sanctions against Iran due to its nuclear and military programs is crude oil exportation restrictions in addition to investment in Iranian energy related projects. Senders of such sanction are interested in understanding the impacts of such embargos on international oil prices. We apply unrestricted vector autoregressive (VAR) model, using impulse response functions (IRF) and variance decomposition analysis (VDA) tools with annual data from 1965 to 2012 to analyze the dynamic response of international oil prices to Iranian oil export sanction. Controlling for the supply of non-Iranian oil, the world GDP per capita, and post-Islamic revolution exogenous dummy variables, we show that international oil prices respond negatively and statistically significant to increasing shock in absolute negative changes of the Iranian oil exports – our proxy of Iran oil sanctions – following the first 2 years after shock. The main reason is the positive response of the non-Iranian oil supply to negative shocks in Iranian oil exports, filling the missing supply of Iranian oil in international markets.

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*‘If there is a further boost in the sanctions, we will hold our oil for ourselves and we will not export it. We have prepared a plan for this, to run the country without oil revenues. If the US adds to the sanctions, we would cut our exports to the world’.*<sup>1</sup>

(Rostam Qasemi, Iran's former Minister of Petroleum, *Platts*, 23 October 2012).<sup>2</sup>

## 1. Introduction

In 2011 Mr. Gerech, a former CIA officer, who is a senior fellow at the Foundation for Defense of Democracies and Mr. Dubowitz who is executive director of the foundation raise this question: “If we buy oil from despotic states, are we somehow complicit in their crimes?”

They suggest an Iranian-Oil-Free Zone in order to control ambiguous military and nuclear program of the Iranian state (Gerech and Dubowitz, 2011). Also recently eighty-three U.S. Senators wrote President Obama regarding their serious concerns on ongoing negotiations with Iran and necessity of planning for further radical oil sanction if the negotiations fail: “We must signal unequivocally to Iran that rejecting negotiations and continuing its nuclear weapon program will lead to much more dramatic sanctions, including further limitations on Iran's exports of crude oil and petroleum products”.<sup>3</sup>

We are interested in analyzing the dynamic interconnections between Iranian oil supply and global oil prices. How costly will be Iranian Oil Free Zone for global economy? Does Iranian oil supply matter for oil prices? We deviate from existing studies<sup>4</sup> in which the authors examine different political economy effects and consequences of sanctions for Iran. We add to the literature by investigating the external consequences of Iran oil sanctions for oil prices.

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<sup>1</sup> <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/Oil/8842808>.

<sup>2</sup> Also see <http://www.bbc.com/news/world-middle-east-16348633>.

<sup>3</sup> <http://www.foreign.senate.gov/press/chair/release/eighty-three-senators-outline-core-principles-of-a-final-agreement-with-iran-in-letter-to-president-obama>.

<sup>4</sup> See the recent studies of Farzanegan (2011, 2014), Dizaji and van Bergeijk (2013) Dizaji and Farzanegan (2014), Farzanegan (2013), and Naghavi and Pignataro (2013). See Appendix A for a summary of main findings of these studies.

According to the U.S. Treasury, as a result of oil sanction, Iranian crude exports have fallen to about 1 million barrels of oil per day in 2012 from the approximately 2.4 million barrels of 2011.<sup>5</sup> This supply shock raises the following question: *How do oil prices respond to Iranian oil production and export negative shocks?*

Rostam Qasemi, former Petroleum Minister under Ahmadinejad government, once explained his predications of world oil prices following Iran sanctions:

*“There is no doubt that the price of oil will increase drastically and the international markets will have to pay a heavy price... One can't give accurate predictions, but sanctions on Iran's oil will drive up the price of oil to at least 200 dollar”.*<sup>6</sup>

The main hope of Western countries for the successful implementation of an oil embargo against Iran is the extra production capacity of Saudi Arabia. Saudi Arabia produces, on average, approximately 10 million bbl/d while its maximum production capacity amounts to approximately 12 million bbl/d. It seems that in the case of maximum production, Saudi Arabia may be able to cover the shortage of Iranian oil exports in the markets. Can this possibility reduce the sensitivity of oil prices in the case of negative shocks in the Iranian oil supply?

Using the VAR models and impulse response analysis and controlling for non-Iranian oil supply and world economic growth in addition to the post-1979 exogenous shocks, we show that Iranian oil sanctions through negative changes of Iran oil exports has no inflationary effects on the real international oil prices during first 2 years after shock. By contrast, the response of oil prices is negative and statistically significant. This result may appear surprising but considering the positive and significant response of non-Iranian oil supply to negative shocks in Iranian oil exports help to solve the puzzle. Iranian government has already realized this possible response of non-Iranian oil suppliers. Iran's OPEC former Governor (in 2012) Mohammad-Ali Khatibi warned against any crude boosts by the Persian Gulf states to offset the missing Iranian oil exports due to international sanctions:

*“If our southern neighbors collaborate with the adventurous states by substituting their oil for Iran's oil,” Tehran will consider such a “green light” to the West as an unfriendly gesture.*<sup>7</sup>

The rest of the paper is organized as follows. Section 2 reviews the theoretical and empirical literature. Section 3 presents our data, methodology, and results. Section 3.4 concludes the paper.

## 2. Review of the theoretical and empirical literature

The theoretical framework of our empirical analysis is explained in the related literature on market power of the different members of Organization of the Petroleum Exporting Countries (OPEC). There are several studies on the behavior of OPEC in the oil market. *Dominant firm behavior* and *cartel behavior* are examples of such models. In our study, we analyze the response of global oil prices to the shocks in negative changes of Iranian oil exports, controlling for the non-Iranian oil supply.<sup>8</sup> For this purpose, the related literature is divided into two categories: the first part discusses dominant firm behavior within the OPEC,

while the second part looks at some studies exploring the OPEC from the perspective of one-part cartel behavior.

### 2.1. Dominant firm model

In this model markets consist of a dominant producer, which has control over the price, and many small firms. Two branches in the literature have discussed this model. One branch considers Saudi Arabia's role as a dominant producer within the OPEC, while the other branch defines a core group of countries as dominant producers.

#### 2.1.1. Saudi Arabia as the dominant firm

Consistent with the dominant firm model, Erickson (1980) analyzes the oil market claiming that Saudi Arabia is the dominant producer which determines the price. Iran, as one of the large producers in OPEC, behaves competitively. In fact, production quantity cannot fluctuate as much for the other large producers as it can for Saudi Arabia. Plaut (1981) notes that “Saudi Arabia, OPEC's price leader and largest producer, is the moderating force that reflects that country's unique economic role in OPEC.” Later on, Griffin and Teece (1982) also suggests that Saudi Arabia plays a dominant role, describing it as the “balance wheel” in the market. Maximizing its wealth over time, Saudi Arabia chooses the price path by giving consideration to fringe reaction. Griffin and Nielson (1994) investigate strategies adopted by the OPEC members for the period from 1983 to 1990. According to their empirical results, in the period from 1983 to 1985 Saudi Arabia behaved like a swing producer. That is, Saudi Arabia adjusted its production according to other member's output level. In a tit-for-tat strategy framework involving Saudi Arabia and other OPEC members, they add a nonlinear punishment for cheaters. They find that Saudi Arabia adopts this strategy and, in the case of excessive cheating, stops acting as a swing producer. In his book, Adelman (1995) states that “The Saudis have acted as what they are: the leading firm in the world oil market”. Alhajji and Huettner (2000a) explore different economic characteristics for a cartel and try to check the existence of those characteristics in some commodity cartels. They find that none of the specified characteristics were adopted by OPEC. Their study also introduces a model to calculate the elasticity of demand for OPEC's oil. Results show that this elasticity is less than 1 between 1973 and 1994 for OPEC as a whole, while it is greater than 1 for Saudi Arabia. This contradicts both profit maximizing and revenue maximizing conditions in a cartel. In contrast to stable elasticity of demand for OPEC as a whole, elasticity fluctuates a lot for Saudi Arabia which supports the notion of its swing role. In the authors' opinion, OPEC is not a cartel. In their assessment, Saudi Arabia is the dominant player in OPEC, while OPEC membership carries some advantages for other countries. Regular diplomatic relations with other members, sharing the cost of energy market researches, and hearing the voice of small members through OPEC are some of these advantages. They conclude that “OPEC is composed of Saudi Arabia, dominant world producer, plus several distinct sub-groups”.

Alhajji and Huettner (2000b) analyze different multi-equation models such as dominant firm model, the Cournot model and the competitive model to investigate whether OPEC as whole or different sub-groups of a cartel exercises any market power on the crude oil market. Statistical results of their model indicate that, compared to the case where Saudi Arabia is considered the dominant producer, all other models are rejected for the period 1973 to 1994.

To investigate the dynamic implications of OPEC behavior, Spilimbergo (2001) tests the null hypothesis of competitive behavior versus the alternative of collusive behavior for the period 1983 to 1991. In his study, collusive behavior is modeled as a market sharing agreement (that is, each OPEC member gets a fixed fraction of total revenue). Empirical results reject the alternative (market sharing cartel) at a very high confidence level. However, Saudi Arabia as a swing producer in OPEC represents an exception to that finding.

<sup>5</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=11011>.

<sup>6</sup> <http://finance.ninems.com.au/newsbusiness/8397140/oil-could-hit-200-a-barrel-under-new-sanctions-iran>.

<sup>7</sup> See [http://www.china.org.cn/world/2012-01/18/content\\_24433201.htm](http://www.china.org.cn/world/2012-01/18/content_24433201.htm).

<sup>8</sup> Sanction senders to Iran are hoping for cooperation of the Saudi Arabia (as a major oil export within the OPEC) to offset the shortage of Iranian oil and stabilizing the oil market. Therefore, in our literature review we also examine the function of the Saudi Arabia (which is controlled for in empirical analysis under non-Iranian oil supply). For more details on the aims of other main non-Iranian oil suppliers in OPEC to offset shortage of Iranian oil exports see <http://dailycaller.com/2011/12/28/official-gulf-states-ready-to-offset-iran-oil/>.

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