



The political economy of OPEC

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ABSTRACT

We develop a conceptual model that captures OPEC pricing behavior, and apply it to explain the large gap observed between domestic fuel prices in OPEC countries and prices in the rest of the world. We model OPEC as a cartel of nations, not firms, and assume that politicians use two instruments: production quotas and domestic fuel consumption subsidies. The cartel-of-nations model suggests that introduction of alternatives to petroleum products may lead OPEC to reduce exports and increase domestic fuel consumption. The empirical analysis suggests that when OPEC sets production quotas, it places similar weights on consumer and producer surplus. But when OPEC countries set domestic fuel subsidies, on average 6% more weight is given to consumer surplus with some of the OPEC countries pursuing very aggressive domestic cheap fuel policies.

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1. Introduction

There is growing interest in the behavior of fuel markets as countries and the global community are establishing climate-change and energy-security policies. But, to understand fuel markets (i.e., the downstream oil markets), we need to understand the unique institutional setup that characterizes the oil industry (i.e., the upstream oil markets). To this end, the Organization of the Petroleum Exporting Countries (OPEC) is not a textbook cartel. It is not run by a group of profit-maximizing firms but by politicians who pursue political, as well as economic, objectives.

In this paper we focus on the unique institutional setup characterizing the upstream oil industry, and model OPEC as a cartel-of-nations rather than firms. We assume that OPEC decisions enhance the well being of domestic fuel consumers and oil producers, and that aggregate production quota decisions are impacted by domestic fuel policies and vice versa. While OPEC sets production quotas, individual countries set domestic fuel policies. We also empirically quantify the weights given to consumers' and producers' interests, when setting production quotas as well as prices of fuel in OPEC countries. We conclude with policy implications.

Our model tries to capture two stylized facts about OPEC countries: OPEC has market power in international markets for crude oil, and consumers of gasoline and diesel in OPEC countries pay a significantly lower price at the pump compared to the rest of the world. Whereas, in 2010, average retail prices of super gasoline net of domestic policies in non-OPEC countries was about 0.66 US\$, they averaged only

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0.35 US\$ per liter in OPEC countries (GIZ secretariat, 2011).¹ If OPEC were one country, we could explain these stylized facts using the classical export tax model (Graaf, 1949–50; Johnson, 1953–54; among others), whereby an exporting country that has market power establishes policies that maximize its social welfare (see also Bhagwati et al., 1998 and references therein). The wedge between the domestic and the international price of oil, which is interpreted in the export tax model as a tax with the domestic price as a benchmark, can be interpreted as a subsidy with the international price as a benchmark, and which is more appropriate in the case of OPEC.

But OPEC is not one country but a group of countries. While collectively OPEC determines production quotas,² domestic fuel consumption subsidies are determined unilaterally (Gupta et al., 2002; Reiche, 2009; Ragab, 2010; among others). Furthermore, recent studies (Gawande and Krishna, 2003; Grossman and Helpman, 1994, 1995; Karp and Perloff, 2002) suggest that policy is established within a political economic context where different groups have different weights. Thus, we develop a political economic framework for both the OPEC-wide and the country-specific decisions. We call this framework the “production quota cum domestic fuel subsidies” (PQ-DFS) model. The PQ-DFS model results in a set of equations describing the OPEC pricing behavior. We use this set of equations to derive an empirical model, which is used to assess to what extent politicians in OPEC countries place extra weight on consumer welfare when setting fuel policies in pursuit of cheap oil policies,³ and if the political economy of subsidizing fuel consumption is different from that of the allocation of production quotas. We also use this framework to assess if the political economy guiding gasoline policies inside OPEC countries is different than that of diesel.

We show that the smaller the absolute value of the demand elasticity of imports from OPEC, the larger is the wedge. We also show that if the domestic consumption in OPEC countries is very small (as observed in the 1970s), then the PQ-DFS model results in outcomes similar to those derived under the standard cartel. However, the more weight is placed on domestic fuel consumption compared with oil production the larger the gap between the domestic prices in OPEC countries and prices in the rest of the world, and when similar weights are placed on domestic fuel consumption and on oil production the PQ-DFS model results in outcomes similar to those derived under the textbook optimal export tax model (e.g., as defined in Bhagwati et al., 1998).

Data availability dictated the empirical strategy. Taking from the literature estimated demand elasticities of fuel inside and outside of OPEC countries, we found that when OPEC allocates production quotas it places similar weights on consumer and producer welfare. But when setting domestic fuel subsidies inside OPEC countries, we found that although on average OPEC countries put 6% more weight on consumer surplus than producer surplus, the weight placed on consumer surplus varies significantly across OPEC countries and some countries pursue very aggressive cheap fuel policies (e.g., during the period 1993 to 2008, both Iran and Venezuela placed, on average, over 40% more weight on consumer surplus). Overall, the optimal export tax model offers a good approximation of OPEC's aggregate pricing behavior, but is less accurate when evaluating fuel consumption inside OPEC countries.

Using recent studies on demand elasticity of gasoline and diesel (i.e., Dahl, 2012), we analyzed both gasoline and diesel consumption in OPEC countries. We show that the weights placed on gasoline consumption in OPEC countries increased during the beginning of the 21st century, a period where crude oil prices increased from 12 to more than 140 US\$ and where oil revenues spiked. We also show that

the weights placed on gasoline consumption vary among OPEC countries, and that, on average, Persian Gulf states place the largest weights while African states place the lowest. Moreover, cheap oil policies and lower domestic fuel prices are more likely in OPEC countries with indicators of weak institutions and administrative capacity. The dynamics of the weights placed on diesel consumption, however, are different than those of gasoline. The extra weight placed on diesel consumption declined during the first decade of the 21st century. We hypothesize that the differences in growth of gasoline and diesel demands led to a spike in the price of diesel relative to gasoline. Our analysis suggests that failure to incorporate OPEC as a cartel-of-nations results in predictions that under-estimate global crude oil consumption.

Despite the enormous amount of research that followed the surge in oil prices during the 1970s and 1980s, OPEC's pricing behavior continues to be a source of puzzlement. Although the majority of the literature refers to OPEC as a profit-maximizing cartel, some argue that Saudi Arabia acts as the dominant producer (e.g., Alhaji and Huettner, 2000a, 2000b; Mabro, 1996), and yet others argue that cooperative behavior among OPEC countries limits growth of production capacity but is much less successful at controlling production (e.g., Smith, 2009). Other studies suggest that political forces increased oil prices, which remained high during the 1970s because of capacity constraints in OPEC countries (e.g., Ezzati, 1976). Some have also argued that OPEC is a revenue-maximizing entity (e.g., Teece, 1982) or that it is driven mostly by political motives (e.g., Moran, 1982). We contribute to this literature by building on work dating back to the 1950s (Graaf, 1949–50; Johnson, 1953–54; among others) and proposing an alternative framework that integrates most of these factors into a unified framework, namely, the PQ-DFS model, which enables us to evaluate the relative importance of the above-mentioned factors. In particular, our framework suggests that OPEC policies may aim to pacify the urban middle class by providing cheap fuels.

Section 2 presents the stylized facts that guide assumptions leading to the PQ-DFS model, which is described in Section 3. We present the game that models the OPEC countries' pricing decisions in Section 4, and derive the equilibrium and its implications in Section 5. We, then, quantify the distribution of power in determining overall production and domestic fuel consumption in OPEC countries (Section 6). We describe the data and its limitations (Section 6.1), followed by the empirical analysis (Section 6.2). The implications to international fuel markets and climate change policy are discussed in Section 7. Concluding remarks are supplied in Section 8.

2. OPEC pricing behavior in retrospect

We first overview OPEC's contribution to oil markets over time and the importance of oil for OPEC countries. We then turn to domestic-fuel consumption in OPEC countries and depict the gap between domestic and international fuel prices. Because of data limitations, we analyze both oil and fuel prices assuming simple rules of transition between the two.⁴ That is, we use the amount of crude oil produced and consumed to depict the various quantity trends but use crude oil, gasoline, and diesel prices to depict the various price trends.

Although only a few years ago many predicted OPEC dominance in international oil markets will grow over time (Fig. 1), recent developments suggest otherwise. A recent report suggests that global oil output capacity is likely to grow at a pace larger than any single decade increase

¹ Although the use of regular gasoline is more common, the data of Metschies et al. (2007) reports only super gasoline and diesel prices.

² See <http://www.opec.org/>.

³ These cheap oil policies are akin to cheap food policies, where governments subsidize domestic food consumption to achieve political stability and cheap labor (Lewis, 1955; Schultz, 1968; Johnson, 1975; among others).

⁴ We build on Bachmeier and Griffin (2003), who estimated an error-correction model with daily spot gasoline and crude-oil price data over the period 1985–1998 and found no evidence of asymmetry in the response of wholesale gasoline prices to changes in crude-oil prices. We also build on Fuss (1978) and Dasgupta (1970), whose work suggested that the putty-clay approach fits the energy sector well, and the several studies that assessed the impact of energy regulation using the putty-clay specifications (see survey by Khanna and Rao, 2009).

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