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All time cheaters versus cheaters in distress: An examination of cheating and oil prices in OPEC

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Abstract

This paper investigates the OPEC quota share system and whether there is any pattern to ''cheating''. Using threshold cointegration methods, we examine each OPEC member's cheating behavior in periods of rising and falling real oil prices. Most OPEC members behave differently in response to rising oil prices than falling oil prices. For shocks of typical historical size, most members overproduce their quotas regardless of the direction of the real oil prices in the medium to long run. However, in response to large real oil price shocks, most members conform to a ''public finance argument'' whereby they underproduce their quotas in response to rising oil prices and overproduce in response to falling real oil prices. In an extended model with cheating by Saudi Arabia and other OPEC members, we find no statistically significant relationship between Saudi Arabian cheating and other cheating. The impulse response functions reveal that for typical shocks, neither Saudi Arabia nor other OPEC members absorb cheating by the other party. However, when there is a large incidence of cheating by other OPEC members, Saudi Arabia responds in kind: this forceful response is in line with a tit-for-tat strategy when there is ''too much'' cheating.
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1. Introduction

The recent surge in crude oil prices necessitates a close examination of the world oil market and the behavior of the players therein. Undoubtedly, OPEC is one such player and one of its

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principal strategies is the quota share system. Inaugurated in 1982, the quota share system stipulates that each member country produce a certain level of crude oil. Since it is not explicitly clear how quotas within OPEC are assigned, some papers have attempted to explain and evaluate the quota allocation process (e.g., Bakhtiari, 1992; Gault et al., 1999). There is agreement that production capacity is a major factor in the assignment of the quotas and the quotas are adjusted from time to time to coincide with the changes in market fundamentals (Dahmani and Al-Osaimy, 2001).

Although all OPEC countries agreed initially to the quota share system, they all have shown a clear tendency to deviate from their quota shares. A *casual* examination of quotas and actual production reveal that (i) cheating is a permanent phenomenon, (ii) some countries cheat more than others and (iii) the intensity of cheating varies over time. Even though numerous papers have examined OPEC behavior (e.g., Griffin, 1985; Jones, 1990; Dahl and Yucel, 1991; Gulen, 1996; Kohl, 2002), limited attention has been paid to the empirical examination of the quota share system and its effectiveness within OPEC. One recent exception is Kaufmann et al. (2004) who found that OPEC capacity utilization, quotas, cheating and OECD stocks of crude oil ''Granger cause'' real oil prices but real oil prices do not Granger cause OECD capacity utilization, OECD production quotas, or cheating.

Rotemberg and Saloner (1986) argued that growing demand is a motive for oligopoly members to behave in a competitive way. When demand is relatively high the firm that lowers its price slightly gets to capture a large market until the others are able to change their prices. Others argue that the bias in allocating the quotas is an important reason behind the cheating behavior. Griffin and Xiong (1997) argue that the allocation is biased toward small producers and emphasize discount rates as a determinant of the volume of cheating. Countries that disregard the future for present gains cheat more than other countries.

According to Adelman (1986), discount rates figure prominently in oil production decisions. Lower oil prices translate into lower revenues for OPEC members, and in order to compensate for the loss of revenue, they increase production. By increasing their production, they are implicitly discounting the future more.

There is a good reason to expect fluctuations in oil price to influence cheating. Since most oil exporting countries rely heavily on oil revenues for public finance, in wake of lower oil prices one would expect a country to exceed its quota to compensate for falling oil revenues. If cheating takes place to compensate for lower revenues under falling prices, one would expect cheating to decrease when prices are rising. Is the cheating behavior within OPEC different when oil price are rising than when the prices are falling? Does cheating significantly alter real oil prices? Do some members particularly, Saudi Arabia, adjust their production to ''absorb'' some overproduction of the quotas by others? Does Saudi Arabia enforce the rules, and if so, does the underlying behavior conform to a tit-for-tat strategy?

This paper provides direct evidence on these questions and the behavior of cheating within OPEC using threshold cointegration methods with asymmetric adjustment. Specifically, we use threshold and momentum models of cointegration developed by Enders and Granger (1998) and Enders and Siklos (2001). These methods are suitable for testing whether cheating behavior within OPEC exhibits different patterns in response to rising and falling oil prices, as statistical properties of these methods are well established.[2] Moreover, threshold cointegration methods

[2] In this paper, we use ''cheating'' to describe overproduction of the assigned quota without any negative value judgment.

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