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What motivates membership in non-renewable resource cartels? The case of OPEC[☆]

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Abstract

In this paper, we analyze the question of membership in a non-renewable resource cartel, with specific application to OPEC. One would expect the benefits of cartel membership to be positively related to the size of remaining reserves, while domestic petroleum consumption should be negatively related to membership if countries care about consumer interests. Our econometric analysis indicates that larger reserves and lower consumption are positively associated with OPEC membership. On the other hand, membership does not appear to be systematically related to

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countries' religious makeup. Our regressions correctly predict membership for the vast majority of oil-producing countries.

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1. Introduction

The Organization of Petroleum Exporting Countries (OPEC) has been a major factor in the world oil market since the early 1970s. While the cartel appeared relatively ineffective from the late 1980s through much of the 1990s,[1] recent events have again put OPEC in the spotlight. Production cutbacks by large oil producers helped increase oil prices from the US$ 10 per barrel range in early 1999 to over US$ 30 per barrel in 2000. Prices in early 2005 climbed over US$ 50 per barrel with virtually no spare production outside of OPEC to meet rising demand. OPEC continues to have regular meetings to discuss production quotas and pricing strategies. Further, its member countries own 69.3% of the world's proven reserves as of the beginning of 2005 (Oil and Gas Journal), approximately the same as the 69.8% figure they owned at the beginning of 1973. In light of long-term trends towards increasing world demand and limits on production capacity outside of OPEC, it is likely that the cartel will remain an important force in international oil markets.

Hnyilicza and Pindyck (1976) and Pindyck (1978) argue that there are substantial gains to cartelization available to members of OPEC, potentially in the neighborhood of 50–100% of non-cooperative profit flows. In light of this observation, why does OPEC include less than one-fourth of all oil producing countries? In fact, a group of non-member countries were invited to attend OPEC meetings beginning in the late 1980s. These countries, referred to as "shadow OPEC," were involved in discussion of production and pricing with OPEC member states. In March 1998, two members of shadow OPEC, Mexico and Norway, announced that they would limit their production at the same time that OPEC was doing so. Griffin and Xiong (1997) also find gains to cartelization. However, they also argue that member states have substantial incentives to defect. A cartel is a classic example of a prisoner's dilemma: all members are better off when all cooperate but each member does better by defecting. Given this incentive, why do countries remain in OPEC or adhere even partially to their quotas? Indeed, Ecuador dropped its membership in OPEC in 1992, the first such defection since the group was formed in 1960. More recently, Gabon also left the cartel. Since Ecuador and Gabon exited from the cartel without retribution, why don't other OPEC members follow suit? The basic question these observations raise is: which producers have an incentive to join the cartel, or remain in it, and which producers do not?

In this paper, we analyze the question of membership in a non-renewable resource cartel, focusing specifically on OPEC. In Section 2, we discuss examples of non-renewable resource cartels and the relevant literature on collusion in repeated and dynamic games. We use this

[1] See, for example, Adelman (1986), Griffin and Vielhaber (1994), and Jones (1990). On the other hand, Griffin and Xiong (1997) argue that world oil prices are higher than those predicted for a non-cooperative oligopoly.