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The shift in US oil demand and its impact on OPEC's market share

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Abstract

Tremendous political pressure is being exerted on the US government by different political parties to diversify its sources of foreign oil supplies by switching from the reliance on OPEC's oil to that originating from non-OPEC nations. Without a doubt, such a shift would adversely impact the market share of some OPEC members, particularly Saudi Arabia, Venezuela and Nigeria. These countries should therefore consider seriously the negative impact of this scenario and consequently formulate individual or joint production policies aiming at protecting their oil market share. To help OPEC achieve this objective, there is a need to estimate the demand function of US oil imports. This paper proffers an estimate of such a function, taking into account, among other variables, the impact of US Strategic Petroleum Reserve (SPR). © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Oil supplies; OPEC; Demand function; Strategic Petroleum Reserve (SR)

1. Introduction

The United States consumes about one third of the World total oil production every year. This makes the US a significant customer for OPEC and other major oil producers. The considerable US role as an importer is expected to continue for the next two decades of the new millennium.

The US has increased its crude oil imports by 40% during the period 1988–1998. While the US has increased its imports by 25% from the Arab Gulf states during the same period, its oil imports went up by 122% from the countries of the southern region of the Atlantic Ocean such as Venezuela, Nigeria, Angola and

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Colombia. This indicates that the US has just shifted its oil supplies within OPEC members.

Although the US government will continue to reduce its dependence on foreign oil, its imports from non-OPEC countries will increase. Hence, it is of paramount importance for OPEC nations to estimate the US long-run oil demand function. The estimation of such a function would help OPEC countries, particularly Saudi Arabia, Venezuela and Nigeria in formulating their production policies and making sound decisions regarding their respective productive capacity. The purpose of this short paper is to proffer an estimation of the US long-run oil demand function. The rest of the paper is made up of two sections. Section 2 discusses the econometric procedure, data, empirical results and implications for OPEC, and Section 3 concludes the paper.

2. Econometric methodology and results

The performance of any economy is measured in terms of the growth rate of its gross domestic product (GDP). In general, the US GDP appears to play a major role as a long-term determinant of its demand for crude oil, including foreign oil. In other words, GDP can be used together with oil price to form a long-run relationship to estimate the quantity of oil demand. Furthermore, the deterioration of crude oil prices in 1998 was attributed in part to the accumulated stocks of crude oil reserve throughout the world, and the subsequent price improvement in 1999 was due in part to the decline of these stocks. This linkage of oil prices to the size of oil inventory gives credence to the important role being played by the US Strategic Petroleum Reserve (SR). Since its inception in 1977, the US government has resorted to SR to exert downward pressure on US oil demand and prices. Therefore, the change in SR will be used as an exogenous variable to determine the change in US oil imports.

In this paper, we used the annual data for the period 1974–1998 to determine the US demand for crude oil imports. These data were extracted from different sources including several issues of the US Economic Report of the President, Annual Energy Review, Statistical Abstract of the US and *Oil and Gas Journal*.

The variables included in the data are defined as follows:

$Z =$ the natural logarithm of the real price per barrel (bbl) of imported crude oil. This price was measured by the US Energy Information Administration in 1992 dollars.

$Y =$ the natural logarithm of the US real GDP. This GDP was measured in 1992 dollars.

$X =$ the natural logarithm of the US crude oil imports measured for every year as a daily average of imported barrels.

SR = The US annual strategic petroleum reserve, where every value of this reserve is reported at the end of the year. Furthermore, since this reserve