

The Role of Energy Efficiency in the Improvement of the Environment in Selected Oil Exporting Countries (Method of panel data)

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Received: 05/07/2015

Accept: 14/09/2016

Extended Abstract

Introduction

Issues related to environment are one of the most important issues the communities are facing with in the recent decades. On the other hand, the resource scarcity and the necessity of development for Iran and other similar countries makes the issue of efficiency as a solution of the environmental crisis important. In this study, the effects of the variables energy intensity (as one of the most common indicators of efficiency), population, affluence (GDP per capita), and the energy use are examined on the carbon dioxide emission with the method of panel data for the period of 1996- 2010.

Nowadays due to the expansion of human economic activities, the environment has been destroyed dramatically at the local and international level, thus, considering carbon emission and its issues have become one of the most challenging issues during the recent decades (Deluna, 2008). Also, the existence of the bilateral relation between growth and the environmental development is one of the more important and complex problems which has always captured different points of view (Dincer, 1999). Different countries are willing to achieve the balanced growth rate which requires special attention to the destructive consequences emerging as a result of the subsequent of energy consumption. The lack of attention to this matter can bring irreparable problems to the countries (Sadeghi & Sadat, 2004).

Too aggregation of the greenhouse gasses in atmosphere is one of the most important reasons of rapid changes in climate. Changes in climate, in turn, leads to an increase in world temperature, rising of the sea level, irregular weather

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condition, outbreak of floods, and other damages on earth. Solving these environmental problems with different subsequences is usually difficult. For example, to save the coastal areas replacing millions of population to other places is required (Delona, 2008). On the basis of the governmental climate change organization report only up to 2020, there is an opportunity to reverse the increasing trend of emission and its results.

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Theoretical Framework

One of the most popular methods which is usually used for the environmental issues is the equation of Environmental Impact, Population, Affluence, and Technology (EIPAT). This Model considers the effects of important variables can improve the environmental conditions as the technical innovation and improvement in technology is considered at this method. On the basis of this methodology, three major elements have more impact on the environment. These variables are population, affluence, and technology. Any changes in the abovementioned variables affect the condition of the environment. The relation between the technical innovation and environment is apparent in this model. Meanwhile, in spite of Erlich and Holdern, (1971), population factor is at the core of this model, on the other hand population growth causes an increase in the consumption which, in turn, can affect the income. At the same time technology is implicitly considered at this framework. Technology improvement may get fixed or even decrease per energy consumption due to the increase in efficiency.

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Methodology

On the basis of the theoretical framework the main important variables which are selected in this study are, population, energy intensity which are the proxy of energy efficiency, affluence, energy consumption, and the foreign direct investment for the period of 1996-2010. Energy intensity is modified as a portion of energy consumption to GDP. The data is collected from the nine member countries which are Algeria, Angola, Indonesia, Iran, Oman, Kuwait, Saudi Arabia, and United Arab Emirates. The data base is collected from the World Bank data base. Also, the data from population (urban population), affluence (per capita Income), foreign direct investment, and energy consumption are collected from the World Bank data base. Due to the different data base used in the current work, the methodology is a logarithmic model. This study examines the relationship between the efficiency of energy and the economic growth among the selected OPEC member countries.

Results & Discussion

Results show that the population is a more important factor in carbon dioxide emission. Subsequent to population growth, are the demand increase in farm lands, energy resources, water requirements, and so on. All these lead to a destruction of environmental issues (Perman, et al,2003). The results also show that a huge percent of emission is related to the increase in the population rate. Meanwhile, the energy efficiency shows a significant effect on the environmental issues. It means while the energy density increases, the emission also rises and vice versa. Hence, the improvement in energy efficiency will affect the quality of environment. Also, there is a significant positive relation between per capita income and the dioxide carbon emission (Asgharpour, et al,2013).

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Energy efficiency also has a meaningful positive effect on the environmental indices. It means that by the increase of energy intensity, dioxide emission will also increase, and vice versa. The findings confirm the obtained results of Delona, 2008, Ditters, 1998, and Rose. One of the most important factors in the rise of energy intensity, is the low quality and the price of the productions compared to the similar productions in other countries. The main reason for this, is because of the old manufacturing structure in the developing countries along with the cultural and social factors.

Key Words: Carbon dioxide emission, Affluence, GDP, Energy intensity, Energy efficiency, IPAT Equation.

JEL Classifications: N 7, P 18, Q 51.

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