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Study of mediated consumption effect of Renewable Energy on Economic Growth of OECD countries

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Abstract

The present study aims to investigate on the impact of the renewable energy intermediate consumption on the economic growth of OECD countries. The data are from the energy balance sheet of all OECD countries during 1990-2012. The time series linear pattern has been used to have estimation. With studying Johansen Cointegration Test and ARDL model, it can be concluded that increasing the renewable energy consumption leads to economic growth increase in these countries. In other word that increasing the renewable energy consumption, the efficiency of the energies is increasing and leads to a high economic growth. Also, a development in technology can be resulted in a higher economic growth of those countries.

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1. Introduction

Energy is one of the valuable resources in the world. Considering the increase of the world population, energy consumption also increases and the usual energy sources cannot be enough (Fotros, 2012). Human always has been tried to produce and save energy during the history. Nowadays, energy, as a factor of production, has a great impact on development of different countries and the main role on the development of contemporary civilization. The needs to consumption of energy, to achieve to development also some other issues such as the consumption of fossil energies

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and the environment, have caused specific attention to the renewable energies. The correlation between the energy and economic growth should be considered.

In this study, linear model has been used to determine the correlation between renewable energy intermediate consumption and the economic growth of OECD countries.

There have been many studies has been conducted to review the correlation between energy consumption and economic growth during the time and especially recently. Considering the results of these studies for particular countries, using different methods, it can be seen that there are various results about the production and consumption of the energy. (Stern D. , 1993) and (Lee, The impact of energy consumption on economic growth: evidence from linear and nonlinear models in Taiwan, 2007) investigated on it and found the relationship between energy consumption and Growth Domestic Product (GDP). Also, according to (Abosedra, 1989) an increase in GDP in the US will resulted in an increase of energy consumption. However, the findings of (Akarca, 1980), (Yu E. C., 1985), (Yu E. H., 1984) and (Cheng, 1995) show that there is no relationship between GDP and energy consumption. On the other hand, (Vachon, 2006) and (Huang, 2007) found that there is a positive correlation between the amount earning and improvement of renewable energies. They found that the more earning means the more potential tendency to protect the environment by using the renewable energies. While, (Marques, 2010) have shown that there is no positive correlation between GDP and the development of renewable energy consumption but the amount of renewable energy consumption depends on the quality of the consumption. In general, considering the last study, GDP has a negative impact on the share of renewable energies of the whole energy, except for the countries with the low level of renewable energies in which there is a positive correlation between the economic growth and the level of renewable energies. The technology of fossil energy production has had a great improvement in the countries with the high level of GDP. The change from fossil energy technology to the technology based on renewable energy is an expensive and time consuming process as they consume a lot of fossil energy (because the more production needs the more energy to product). Thus, considering the improvement of fossil energy and subsequently the cost of fossil energy production has reduced. There is also a trend in countries with high earning toward fossil energies rather than the renewable energies.

The main purpose of the present study is to examine the effects of the renewable energy (solar, biomass, heat, water) intermediate on OECD countries' economic growth. In this study we are going to find out whether consume of renewable energies has any effect on the economic growth of OECD countries. The innovations which distinguish this study is the point that the linear time series method, due to the use of OECD countries balance sheet data, has been used while the panel pattern is usually used to review the energy consumption in OECD countries. Also most of the literatures have considered the total energy consumption but this study only has investigated on the renewable energy consumption on the economic growth.

2. Background research

First, there will be a review on the studies which have been done before, and then, we will have a review on the differences between the present study and the previous ones. In many studies the correlation between the source of energy and economic growth has been considered. Some of them have focused on a particular country such as, (Lee, The impact of energy consumption on economic growth: evidence from linear and nonlinear models in Taiwan, 2007) and (Wolde-Rufael, 2009) while some others chose a group of countries to investigate on such as, (Fuinhas, 2012) and (Akinlo, 2008). More focus of these studies is on the analysis of the existing correlation in both long term and short term.

(Apergis N. P., 2010) have investigated the causality correlation of renewable energy consumption and the economic growth of 20 OECD countries by panel vector error correction model. The result shows that there is a bipolar causality correlation both long term and short term between renewable energy consumption and economic growth in these countries.The result of studies on 19 developing and developed countries by (Apergis N. P.-R., 2010), using panel vector error correction model shows that there is a mutual causality correlation between the economic growth and renewable energy consumption.

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