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Survey the Effect of Types of Renewable and Non-renewable Energies Consumption on Economic Welfare in Iran

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Abstract

The role of energy for welfare and economic development of countries highlights importance of energy. So far, no major study was conducted on the effects of energy on economic welfare in Iran. Hence, this study surveys the effect of the consumption of renewable and non-renewable energy on economic welfare in Iran during the period 1981-2018. ARDL model and cointegration approach had used to determine the existence of short-term and long-term relationships among variables. Estimation results show adjustment speed of error correction model to long-term equilibrium is about 61%. The relationship between economic welfare and exogenous variables such per-capita GDP, labor force, Gini index and types of renewable and non-renewable energy sources (solar, wind, water, geothermal, oil, gas and gasoline) is straightforward in short and long terms. One percent incraseing in the exogenous variables of research leads to an increase of 0.85, 0.66, 0.45, 0.61, 0.56, 0.36, 0.31, 0.72, / 76, and 0.34 percent in the welfare of society. Despite the relative abundance and non-optimal use of non-renewable energy (oil and gas) in Iran, the positive effect of renewable energy on economic welfare indicates use of this type of energy along with non-renewable energy will increase economic welfare.

Keywords: Renewable and Non-renewable Energies, Economic Welfare, ARDL

1. INTRODUCTION

Regarding the growing economy and the complex role of energy in this field, energy decisions cannot be made easily. Because it is one of the main inputs of production, any decision in this field affects the economies of countries. As a result, energy, as one of the most important elements of production as well as one of the most important end products, plays a unique role in the country's economic growth and development. On the other hand, given the amount of energy consumption in developed countries, as well as the effects of energy abuse on air pollution and climate change, energy and fossil fuel consumption planning, as well as environmental quality maintenance, are critical for societal welfare[1]. Numerous studies by researchers around the world show that the growth rate of energy consumption in countries around the world depends largely on the level of economic growth [2]. In this regard, most countries in the world have put on the agenda policies and strategies to encourage economic institutions to develop and use renewable energy. Among these goals, to promote energy supply and demand in developing countries, replace clean energy sources, and increase energy efficiency have been many governments' focus. Therefore, coherent policy-making is necessary to reduce dependence on fossil fuel energy sources and the economic stability of the country[3].

Regarding the effect of renewable and non-renewable energy consumption on economic welfare, it can be said that some believe that the more renewable and non-renewable energy consumption increases in countries, the more economic welfare increases, and the experimental studies conducted in this regarding be referred to the studies of [4-6] which concluded the increase in economic prosperity is due to the consumption of various renewable and non-renewable energy sources in countries with these resources. While other studies were conducted by economists who believe; Consumption of renewable and non-renewable energy alone does not lead to increased economic prosperity, but also depends on other economic factors such as exchange rate fluctuations, inflation, as well as the poverty and population of each country and cannot be conclusively concluded in this regard. Including these studies are [7-10] cited.

Based on the mentioned advantages, this study intends, for the first time, by model ARDL and the co-integration method during the years1981 to 2018, the effect of types of renewable and non-renewable energies Consumption on economic welfare. Pay attention. Which tests the following hypotheses:1- The effect of using renewable energy on the economic welfare of society is significant, and positive.2-There is a statistically significant difference between the effect of using renewable energy and non-renewable energy on the economic welfare of society. Thus, the variables used in the economic welfare model are per

capita GDP, labor force, equitable distribution of income, and a variety of renewable and non-renewable energy sources (solar, wind, water, geothermal, oil, gas, and gasoline).
The organization of this part of research will be as follows: the first part is the introduction, the second part is the theoretical literature, the third part is the research background, the fourth part is the introduction of the research model and estimation method, the fifth part is the experimental findings and interpretation of the results and finally, in the final section, conclusions and discussion are Reviewed.

2. MATERIAL AND METHOD

This research, in terms of causal-analytical method and purpose, is practical and the method of data collection is documentary-library. All data of variables are annually tested and based on the whole country, during the years 1981 to 2018, and statistics and information on economic welfare, labor, GDP per capita, equitable distribution of income from the Statistics Center of Iran and various sources Renewable and non-renewable energies (solar, wind, water, geothermal, oil, gas, and gasoline) are extracted from the BP and the refining and distribution of petroleum products to identify and explain the long-run relationship among variables by ARDL method, it was also used.
Considering the importance of energy as one of the most important factors to increase economic wellbeing, in order to model the relationship between renewable and non-renewable energy on economic well-being in the present study, the model of [11,12] based on the equations 1 and 2 are used.

$$W_t = f(RE_t . GDP_t . LFO_t Din) \quad (1)$$

$$LnI_t = \alpha_0 + \alpha_1 LnRE_t + \alpha_2 LnGDP_t + \alpha_3 LnLFO_t + \alpha_4 LnDIN_t + U_t \quad (2)$$

Where W_t as a dependent variable (economic welfare index), RE_t types of renewable and non-renewable energy (solar, wind, water, geothermal, oil, gas, and gasoline). GDP_t per capita GDP, Prodaction LFO_t labor force DIN_t is the index of the equitable income distribution. According to [11] study, the dependent variable is considered an experimental model. Therefore, regarding the possibility of structural failure in renewable and non-renewable energies in 2011, two virtual variables DU90 and D90 entered The model is modeled that the variable DU90 from the year of failure onwards is the value of one and the rest of the years the zero of variable D90 for the years after failure, take the numbers 1 and 2, respectively [13].
Moreover, the econometric model used in the present study is defined as follows:

$$LnW_t = \alpha_0 + \alpha_1 LnRE_t + \alpha_2 LnGDP_t + \alpha_3 LnLFO_t + \alpha_4 LnDIN_t + \alpha_5 DU90 + \alpha_6 D90 + U_t \quad (3)$$

To achieve the goal of this study, according to [11, 14] the model ARDL is used. It is based on a dynamic approach and its general form is as follows:

$$W_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j Y_{t-j} + \sum_{i=0}^{q} \beta_i X_{t-i} + V_t \quad (4)$$

In this equation, the dependent variable W_t is a function of the surface values and with the interrupt is the explanatory variable and the values with the interval itself.

3. Results and Discussion

In this part of the research, the model is estimated to correlate the variables among GDP per capita, labor force, equitable distribution of income and types of renewable and non-renewable energy (solar, wind, water, geothermal, oil, gas, and gasoline) To determine the economic welfare index, before estimating the model, it is necessary to check the reliability of the variables. Since the data of the variables discussed in this research is in the form of an annual time series from 1981 to 2018.Therefore, it is necessary to first test the model variables in terms of statics and instabilities. Then, based on the model, using a self-regression model with distributive intervals, the relationship among the variables was examined to investigate the co-integration relationship. In the next step, considering the Berengi test, Dolado and Mr. Test, the existence of a long-term relationship was investigated. In the following, the vector error correction pattern (VECM) is estimated. Finally, the Granger causality test investigated the causal relationship between economic welfare index variables and renewable and non-renewable energies.

4. Conclusions

The main purpose of this study is the effect of consumption of renewable and non-renewable energies on the economic welfare in Iran during the period 1981-2018.To analyze the subject, the model ARDL and the co-integration method have been used to determine the existence of short-term and long-term relationships among the variables.
The results revealed that the error correction model has a relatively fast repair speed, and that it can correct 61 percent of the short-term imbalance error in each period to attain long-term equilibrium.It is estimated that the relationship between economic prosperity, per capita GDP, labor force, equitable distribution of income, and variuos renewable and non-renewable energy sources (solar, wind, water, geothermal, oil, gas, and gasoline It is incremental in both the short and long term. the results also show that

the variables of the labor force, GDP per capita, equitable distribution of income, and all types of renewable and non-renewable energy sources (solar, wind, water, geothermal, oil, gas and gasoline), increase economic prosperity in it becomes long-term, so that in the long-term use of one percent of the mentioned variables, economic welfare is 0.85, 0.66, 0.45, 0.61, 0.56, 0.36, 0.31, 0.72, 0.76 and 0.34 percent Increases, which means that renewable and non-renewable energy not only do not have a detrimental effect on economic well-being, but also lead to long-term economic growth.

This research is also in line with experimental studies such as[7, 8]; therefore, according to the results of the research, the policy recommendation is that if the country moves towards production and investment in renewable and non-renewable energy, using this type of energy's (sun, wind, water, geothermal, oil, gas, and gasoline) in terms of its abundance is easier and more efficient day by day. Moreover, not only will they not have a detrimental effect on economic well-being, but in all geographical areas, they will increase investment in the private sector as well as the labor force, and ultimately; they will bring economic growth in the future.

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