

Chapter 7

The Role of Technological Development on Renewable Energy Usage: An Econometric Analysis for G7 Countries

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ABSTRACT

The aim of this study is to determine the relationship between technological development and renewable energy use. Within this framework, G7 countries were included in the scope of the review. Data for the countries in question between 1990 and 2015 were used. In order to determine the relationship between these two variables, Pedroni panel cointegration analysis was utilized. As a result, it has been determined that technological development is very effective in the use of renewable energy. Therefore, countries need to improve themselves technologically in order to increase the use of renewable energy. It is very important to have technological infrastructure in renewable energy investments. Hence, technological investments should have the priority in order to increase the use of renewable energy. With the help of this issue, it can be more possible to be successful in this kind of investment.

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INTRODUCTION

The use of renewable energy has become very popular, especially in recent years. There are many different reasons for this. Firstly, countries that do not have energy resources attach importance to the use of renewable energy. In this way, they aim to reduce their dependence on foreign countries on energy. In addition, renewable energy is considered an environmentally friendly energy type. With the use of this energy, it becomes possible to attract the attention of environmentally sensitive investors. When these issues are considered, it is important to identify the factors that increase the use of renewable energy (Yu et al., 2019).

It is possible to talk about many different factors affecting the use of renewable energy. For example, economic factors can play a crucial role in the use of renewable energy. As can be seen here, a country can give importance to the use of renewable energy when it develops economically. In other words, a country with unemployment problems and high inflation problems will not be able to put it on its primary agenda on renewable energy use. The reason for this is that this country needs to solve these first mentioned problems (Dinçer et al., 2019d,e). Therefore, if a country attaches importance to the use of renewable energy, it should first increase its economic performance.

Political factors are another factor that can affect the use of renewable energy. In the absence of political stability in a country, investors will not want to invest in that country. This is similar for renewable energy investments. In making investment decisions, investors not only look at the economic situation in that country, but also take into account the political stability in that country (Adefarati and Bansal, 2019; Mirzaei et al., 2019). On the other hand, state support is very important in renewable energy investments. If the government provides incentives such as tax cuts to renewable energy investors, it will be easier to increase the renewable energy investments in the country (Pukšec et al., 2019; Hodges et al., 2019).

On the other hand, technological developments play an important role in increasing the use of renewable energy. Renewable energy investments are investments that require technological infrastructure. In addition, technological developments are an important factor in reducing costs in renewable energy production. Since renewable energy investments are also very costly investments, technological developments are very important. In addition, the cost-benefit analysis of renewable energy projects needs to be carried out in detail (Chen et al., 2019).

In this study, it will be tried to determine whether technological development has an effect on renewable energy use. In this context, G7 countries were included in the scope of the review. On the other hand, the relationship between these two variables are defined by Pedroni panel cointegration analysis. Thanks to the data to be obtained, it will be possible to make policy proposals for G7 countries. Therefore, it can be said that the main motivation of this study is to identify the way of improving renewable energy usage. In addition, Pedroni panel cointegration analysis is firstly considered in this study to see the relationship between these two variables.

This study consists of 5 different parts. In the first part of the study, the concept of renewable energy, its importance and the factors affecting this energy usage will be discussed. In the second part of the study, the types of renewable energy sources will be given. The literature review on the subject will be shared in the third part of the study. In the fourth part of the study, analysis results for G7 countries are given. In the last part of the study, the strategies developed for the results and suggestions for the future studies are mentioned.

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