Chapter 11
A Panel Asymmetric Causality Between Health and Climate Change:
Empirical Evidence From EU Regions

Reyhan Cafri
Iskenderun Technical University, Turkey

Pınar Kaya Samut
Atılım University, Turkey

ABSTRACT

As climate change threatens human life and health by causing severe storms, floods, temperature fluctuations and droughts, it is predicted that in the coming decades, most of the global population will be impacted and the lives of millions will be at risk. In this context, the article investigates the existence of a symmetric and asymmetric causality between climate change and health between 1990 and 2015 for European countries, including EU, EFTA member and EU candidate states. In the first stage of the analysis, health scores are estimated by cluster and discriminant analyses; in the second stage, the relationships among these scores and climate variables are examined. The country-specific findings are obtained for the health effects of climate change variables according to factors such as geographical structure and seasonal characteristics. According to the results, while the health effects of changes in temperature and greenhouse emissions differ from country to country, the reduction in precipitation for nearly half of the countries is found to have a negative effect on health.

INTRODUCTION

The adverse effects of the increasing world population and, consequently, increased human activity, in the environment have together caused global climate change, which has great ramifications for present and future generations. According to National Aeronautics and Space Administration (NASA) (2014), climate change is defined as the change in the normal temperature in a given period of time, or in the

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amount of rain in a year. With the industrial revolution, increase in the greenhouse gases in the atmosphere and rising air pollution caused the world's average temperature to increase and rainfall patterns to change. Subsequently, an increasing trade volume through globalization continues to force countries to increase production, causing environmental pollution. As a result, this has become a factor included in all literature which addresses accelerating climate change (Idso & Idso, 2001; Vitousek, Mooney, Lubchenco, & Melillo, 1997; Zachos & Dickens, 2008). Due to damages as a result of global climate change, studies on the social and economic effects of this subject have started to draw attention. The fact that climate change threatens both present and future generations has raised a number of concerns. For this reason, this issue has been intensively discussed in national and international platforms. The concepts of growth and development, being previously among the main targets of economies, have been replaced by sustainable growth and development, and intensive studies have been initiated to improve the adaptation and resistance of a sustainable environment to climate change (Swart, Robinson, & Cohen, 2003; Soubbotina, 2004).

The concept of sustainability was introduced by the United Nations Environment and Development Commission's "Common Future" report published in 1987. According to this report, humanity has the capability of sustaining development by ensuring its daily needs, without jeopardizing the ability to respond to the future generations' needs (Brundtland, 1987). Besides this, sustainability is defined as ensuring the continuity of the diversity and productivity of biological systems according to the science of ecology. Climate change and disaster risk for sustainable improvement of life for future generations among sustainable development goals have been considered as one of the areas to be focused on mainly within the scope of strategic planning.

Climate change has environmental and socio-economic problems as well as direct and indirect effects on human life. These effects are caused by hot/cold air waves, air pollution, and allergens. On the other hand, the indirect effects of climate change, as a result of changes in the ecosystem, cause vectors to multiply or change in the habitat, resulting in infectious diseases such as malaria, tuberculosis, and AIDS. In addition, diseases such as dysentery, cholera, and typhoid are diseases that are indirectly caused by climate change. Besides, natural disasters such as rising water levels as a result of melting glaciers and hurricanes cause injuries and deaths. Moreover, these natural disasters can cause loss of production and hunger by deepening poverty due to economic loss. It is also stated that extreme weather affects people physically and weakens their psychological health (McMichael, 2013; Patz, Campbell-Lendrum, Holloway, & Foley, 2005; WHO, 2012).

While the impact of climate change on health is felt globally, different countries are experiencing these effects at different levels. According to the estimates of the World Health Organization, climate change is expected to negatively affect the lives and health of billions of people over the next decades. It is stated that climate change affects the most basic health needs such as clean air, safe water, sufficient food and adequate shelter. According to researches carried out by the World Health Organization, it is stated that exposure to air pollution causes heart and respiratory diseases, and also exposure to polluted air during pregnancy negatively affects infants' health (The European Economic Area (EAA), 2015). As a result of droughts caused by the increase in air temperatures and the decrease in rainfall, water, and food shortages are bound to occur. According to the studies on the effects of droughts, nutritional insufficiency, increased risk of infectious diseases, acute and chronic diseases that are increasing after inadequate and unclean water consumption are the main health problems caused by drought. Climate change is thought to affect food production especially in cereals. So, reducing the productivity of agriculture increases the risk of starvation and malnutrition, leading to infant and child deaths (McMichael & Haines, 1997).