Chapter 9
Environmental Taxes and Carbon Footprint:
A Panel Causality Analysis of Selected EU Countries

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ABSTRACT

This study examines the causal relationship between environmental taxes and carbon footprint in the context of climate change mitigation, using data from ten major EU economies (Austria, Belgium, France, Germany, Ireland, Italy, Netherlands, Poland, Spain, Sweden) over 1994–2022. Employing panel causality analysis, the study first applies tests for cross-sectional dependence, slope heterogeneity, and panel unit roots. The Dumitrescu and Hurlin test results indicate a significant causality from environmental taxes to per capita carbon emissions in at least one country. The findings suggest that well-designed environmental taxes can play a critical role in reducing emissions. The study highlights the importance of revenue allocation and policy coherence and recommends future research on the effect of such taxes on ecological footprint components for more comprehensive sustainability assessment.

INTRODUCTION

Global warming is defined as the increase in the temperature of the earth's surface as a result of the greenhouse effect of gases released into the atmosphere by humans (Çokgezen, 2007:101). Today, countries face serious environmental challenges that threaten their sustainable development goals. The most prominent of these

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is climate change. The problem of global warming and climate change concerns different societies and countries in spatial terms and in terms of time; it confronts present and future generations and has an intergenerational character (Doğan & Tüzer, 2011:158-159). Problems such as climate change, loss of biodiversity, and air and water pollution complicate the sustainable use of natural resources and put pressure on socioeconomic systems. The increase in these problems on a global scale has brought along the efforts of countries to strengthen their environmental management capacity. In recent years, with the rise in environmental awareness, governments have turned to sustainable policy instruments; practices such as adopting environmentally friendly technologies, developing green financing mechanisms, and tightening environmental regulations have come to the fore. As Karmaker et al. (2021) emphasize, the willingness and capacity to deal with environmental challenges has increased significantly, especially in developing countries. This shows that environmental problems are local and common issues that require global cooperation, and solutions are developed through multi-stakeholder approaches.

To mitigate the effects of greenhouse gas emissions, national economies have turned to practices such as environmental taxes, carbon capture and storage, carbon pricing, and carbon trading. Although these practices are seen as a potential option to prevent environmental degradation, the most widely used one is the environmental tax (Kılıç & Altıparmak, 2020). Environmental taxes, one of the most important economic instruments that can have a direct impact on preventing environmental pollution, aim to direct individuals and businesses towards more environmentally friendly choices by costing environmentally damaging activities. Environmental taxes ensure the integration of environmental costs into the economic system in line with the polluter pays principle (OECD, 2011; Tietenberg & Lewis, 2016). In this way, it is aimed to prevent environmental degradation and encourage environmentally friendly production and consumption behaviors. Many countries, especially industrialized states, widely apply environmental taxes to reduce carbon emissions, limit the consumption of natural resources, and support sustainable development policies. Carbon taxes, taxes on energy consumption, waste management taxes, and vehicle emission taxes are some of the prominent examples. By reflecting the actual cost of polluting activities, these taxes both correct the market mechanism and contribute to reducing environmental damage (Ekins, 2000). Moreover, environmental taxes are gaining importance as a regulatory element and a new public financing instrument. As the need to generate additional resources for public budgets increases in the fight against global emissions growth, environmental taxes have the potential to meet this need. Revenues can be used to finance environmental projects, renewable energy investments, or social support mechanisms, thus creating a holistic structure that serves both environmental and economic sustainability (OECD, 2011; IMF, 2019).