International Journal of Multidisciplinary Research and Growth Evaluation
ISSN: 2582-7138
Received: 24-06-2021; Accepted: 14-07-2021
www.allmultidisciplinaryjournal.com
Volume 2; Issue 4; July-August 2021; Page No. 457-459

The determinants of carbon dioxide emissions: A review of the literature

Mohamed Ibrahim Mugableh
[1-3] Associate Professor, Department of Finance & Banking Science, Irbid National University, Jordan
Corresponding Author: **Mohamed Ibrahim Mugableh**

Abstract
The current research paper reviews the determinants of carbon dioxide emissions in developed and emerging countries. These determinants are macro and micro economic variables. The results showed that the determinants of macro and micro economic variables are significantly influenced carbon dioxide emissions in developed and emerging countries.

Keywords: Carbon Dioxide Emissions, Gross Domestic Product, Energy Consumption

Introduction
Several studies have examined the causal relationships between two sets (i.e., EC and GDP) and (CO_2 emissions and GDP). However, the causal relationships between these sets provide researchers and policy makers the exact knowledge about the importance of EC on improving GDP. In addition, the importance of the EC is under heated debate, since the increases of EC induces the CO_2 emissions into the atmosphere. The current paper classifies the review of literature into two sections. The first section is dedicated to explain the causal relationships between EC and GDP by considering the neutrality and dependent hypotheses. The second section is motivated to explain the causal relationships between CO_2 emissions and GDP by considering the environmental Kuznets curve (EKC) hypothesis.

EC and GDP causal relationships
Nowadays, the literature includes two perspectives on the causal relationships between EC and GDP. The first perspective is the neutrality hypothesis, which states that a country might follow an energy conservation policy for reducing CO_2 emissions while preserving the stability of GDP. For example, Alam *et al*. (2011) [2] found no causal relationship between EC and GDP for India. Altinay and Karagol (2004) [6], Jobert and Karanfil (2007) [17], & Ozturk and Acaravci (2010) [41] found similar results for Turkey, while Zhang and Cheng (2009) [45] found them for China. Second, a country's GDP is highly dependent on EC, one of the main thrusts for achieving higher GDP. Alam *et al*. (2012) [1] found bidirectional long-run causality between electricity consumption (ELC) and GDP for Bangladesh. Apergis and Payne (2010) [7] established bidirectional causality between EC and GDP in 20 countries. Asafu-Adjaye (2000) [8] showed bidirectional causality between EC and GDP for Thailand and the Philippines; similar results were found by Belloumi (2009) [13] for Tunisia, Dagher and Yacoubian (2012) [14] for Lebanon, & Wang *et al*. (2011) [44] for China. Lean and Smith (2010) pointed to unidirectional Granger causality running from ELC to GDP in the long-run for five ASEAN countries. Menyah and Wolde-Rufael (2010) [23] established unidirectional causality running from EC to GDP for South Korea. However, Alam *et al*. (2012) [1] postulated that the neutrality hypothesis, namely, EC is neutral to GDP−is rejected as the reduction in energy reduces GDP growth; and therefore, conservation policies might impede the growth of economy.

CO_2 emissions and GDP causal relationships
The EKC hypothesis developed by Kuznets (1955) [19] tackled the relationship between GHGs emissions in general and GDP. The EKC hypothesis states that as GHGs emissions increase, the GDP also increases until it reaches a threshold point; then the emissions decline with an increase in GDP. The causality directions are mixed on the relationships between CO_2 emissions and GDP. For example, Alam *et al*. (2011) [2] found no causality relationship between CO_2 emissions and GDP in India. Al-mulali (2011) [4] demonstrated long-run and short-run bidirectional causality among oil consumption, CO_2 emissions, and GDP in the Middle East North African countries. Govindaraju and Tang (2013) [15] found a unidirectional causality running from GDP to CO_2 emissions in China. Hossain (2011) [16] did not find evidence of a long-run causal relationship between GDP and CO_2 emissions, but did find evidence of a unidirectional short-run causality relationship from GDP to CO_2 emissions in newly industrialized countries.

Kim, Lee, and Nam (2010) [17] established a nonlinear Granger causality between CO_2 emissions and GDP in Korea. However, Ozturk and Acaravci (2010) [41] showed that CO_2 emissions did not cause GDP in Turkey. Pao and Tsai (2011) found a bidirectional causality running among GDP, EC, and CO_2 emissions in Brazil. In addition, Pao, Yu, and Yang (2011) found bidirectional Granger causality among GDP, energy use, and CO_2 emissions in Russia.

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