The Relationships between Carbon Dioxide (CO2) Emissions, Energy Consumption and GDP per capita for Oman: Time Series Analysis, 1980–2010

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Abstract : The relationships between environmental quality, energy use and economic output have created growing attention over the past decades among researchers and policy makers. Focusing on the empirical aspects of the role of CO_2 emissions and energy use in affecting the economic output, this paper is an effort to fulfil the gap in a comprehensive case study at a country level using modern econometric techniques. To achieve the goal, this country-specific study examines the short-run and long-run relationships among energy consumption, carbon dioxide (CO_2) emissions and gross domestic product (GDP) for Oman using time series analysis from the year 1980-2010. To investigate the relationships between the variables, this paper employs the Augmented Dickey Fuller (ADF) test for stationary, Johansen maximum likelihood method for co-integration and a Vector Error Correction Model (VECM) for both short- and long-run causality among the research variables for the sample. All the variables in this study show very strong significant effects on GDP in the country for the long term. The long-run equilibrium in the VECM suggests positive long-run causalities from CO_2 emissions to GDP. Conversely, negative impacts of energy consumption on GDP are found to be significant in Oman during the period. In the short run, there exist negative unidirectional causalities among GDP, CO_2 emissions and energy consumption running from GDP to CO_2 emissions and from energy consumption to CO_2 emissions. Overall, the results support arguments that there are relationships among environmental quality, energy use and economic output in Oman over of period 1980-2010.

Keywords : CO2 emissions, energy consumption, GDP, Oman, time series analysis
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