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The Relationships between Carbon Dioxide (CO2) Emissions, Energy Consumption and GDP for Israel: 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 CO2 emissions and energy use in affecting the economic output, this paper is an effort to fulfill 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 (using disaggregated energy sources: crude oil, coal, natural gas, electricity), carbon dioxide (CO2) emissions and gross domestic product (GDP) for Israel using time series analysis from the year 1980-2010. To investigate the relationships between the variables, this paper employs the Phillips–Perron (PP) test for stationarity, Johansen maximum likelihood method for cointegration and a Vector Error Correction Model (VECM) for both short- and long-run causality among the research variables for the sample. The long-run equilibrium in the VECM suggests significant positive impacts of coal and natural gas consumptions on GDP in Israel. In the short run, GDP positively affects coal consumption. While there exists a positive unidirectional causality running from coal consumption to consumption of petroleum products and the direct combustion of crude oil, there exists a negative unidirectional causality running from natural gas consumption to consumption of petroleum products and the direct combustion of crude oil in the short run. Overall, the results support arguments that there are relationships among environmental quality, energy use and economic output but the associations can to be differed by the sources of energy in the case of Israel over of period 1980-2010.

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