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Nonlinear Multivariable Analysis of CO2 Emissions in China

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Abstract : This paper addressed the impacts of energy consumption, economic growth, financial development, and population size on environmental degradation using grey relational analysis (GRA) for China, where foreign direct investment (FDI) inflows is the proxy variable for financial development. The more recent historical data during the period 2004–2011 are used, because the use of very old data for data analysis may not be suitable for rapidly developing countries. The results of the GRA indicate that the linkage effects of energy consumption–emissions and GDP–emissions are ranked first and second, respectively. These reveal that energy consumption and economic growth are strongly correlated with emissions. Higher economic growth requires more energy consumption and increasing environmental pollution. Likewise, more efficient energy use needs a higher level of economic development. Therefore, policies to improve energy efficiency and create a low-carbon economy can reduce emissions without hurting economic growth. The finding of FDI–emissions linkage is ranked third. This indicates that China do not apply weak environmental regulations to attract inward FDI. Furthermore, China’s government in attracting inward FDI should strengthen environmental policy. The finding of population–emissions linkage effect is ranked fourth, implying that population size does not directly affect CO₂ emissions, even though China has the world’s largest population, and Chinese people are very economical use of energy-related products. Overall, the energy conservation, improving efficiency, managing demand, and financial development, which aim at curtailing waste of energy, reducing both energy consumption and emissions, and without loss of the country’s competitiveness, can be adopted for developing economies. The GRA is one of the best way to use a lower data to build a dynamic analysis model.

Keywords : China, CO_2 emissions, foreign direct investment, grey relational analysis
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