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CO2 EMISSIONS, ENERGY CONSUMPTION AND OUTPUT: A COINTEGRATION ANALYSIS FOR IRAN

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The role of energy in the economic development process and economic growth particularly of developing countries is well known and documented in the literature. Countries use energy for production of goods and raise level their social welfare. So, energy use has the positive impact on development process, but it's has adverse effect too. Thus that energy use, lead to Greenhouse gas (GHG) emissions such as hydrocarbons (HCs), sulfur dioxide (SO2) and carbon dioxide (CO2), that they are especially CO2 cause of global warning [3]. One possible rational for this position is the presumption that economic development is closely related to energy consumption since higher output is expected when more energy is consumed, so output lead to GHG emissions. Such relationship between economic growth, energy use and GHG emissions occur only in earlier stage economic development. In fact, as a country develops, its energy use and so GHG emissions increases, but after reaching a specific level of economic progress, GHG emissions begins to decrease. In specific level of economic development process, the energy uses in the efficient form [11]. This tenet calls for a careful analysis of the relationship between economic growth, energy use and GHG emissions. This link is obviously very complex and depends on many different factors such as the size of the economy, the sectoral structure including composition of the energy demand, vintage of the technology, environmental quality demand and level (and quality) of environmental protection expenditures, [15].

Over the past two decades, the relationships between economic growth and CO2 emission, as well as economic growth and energy consumption, have been intensively analyzed. The first nexus is closely related to testing the validity of the so-called environmental Kuznets curve (EKC) hypothesis. A recent and emerging line of literature seems to incorporate both nexuses into multivariate framework. This approach facilitates the examination of the dynamic relationships between economic growth, energy consumption and CO2 emission altogether, [8].

This paper reviews the dynamic causal relationships between CO2 emission, energy consumption, and output for Iran using an integrated framework for the period 1972-2007. The vector error-correction model (ECM) and auto regressive distributed lags (ARDL) modeling techniques have employed for the empirical analysis. The empirical analysis is included two stages. In the first stage, it examines how the variables are related in the long-run. The second stage, it examines the dynamic causal relationships between the variables. The empirical results provide evidence for the existence of a robust long-run relationship between these variables. So that, CO2 emission and energy use are positively related to output in the long-run. The results also indicate that the elasticity of CO2 emission with respect to energy consumption in the long- run is less than it's elasticity in short-run. This result is reverse for elasticity of CO2 emissions with respect to income. The results also point to a unidirectional causality running from energy consumption to CO2 emission. According the empirical results, suggest that Iran should design new environmental policies to reduce CO2 emission.

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