

The impact of globalization and financial development on energy consumption: Implications for Iran's regional cooperation with neighboring countries

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Article Info	Abstract
<p>Original Article</p> <p>Main Object: Economics Scope: Iran</p> <p>Received: 20 January 2025 Revised: 10 February 2025 Accepted: 13 February 2025 Published online: 05 March 2025</p> <p>Keywords: emerging economies, energy consumption, financial development, globalization.</p>	<p>Globalization has led to the expansion of economic activities around the world and has important effects on the energy consumption of countries. Meanwhile, the impact of globalization on energy consumption can be positive or negative. Financial development is also known as a key factor in economic growth and can significantly affect energy consumption. This study examines the relationship between financial development, globalization and energy consumption and provides implications for Iran's regional cooperation with neighboring countries. The purpose of this research is to analyze the effect of globalization and financial development on energy consumption, focusing on emerging economies and countries in the region from 1980 to 2021 using three panel data methods including Generalized Least Square, FMOLS, and DOLS. Also, investigating how to use the capacities of globalization to promote Iran's energy cooperation with neighboring countries is another goal of this study. The results show that financial development increases the access to credits and leads to the growth of economic activities and thus increases energy consumption. Globalization also causes an increase in energy consumption in the initial stages, but after crossing a certain threshold, energy consumption decreases. These findings indicate the existence of a hump-shaped relationship between globalization and energy consumption. In addition, foreign investment, regional trade and urbanization play a significant role in increasing energy demand. As a result, with the development of regional cooperation and the transfer of energy-efficient technologies through trade and investment connections, Iran can move towards sustainable development and green industries while reducing energy consumption. It is suggested that the policy makers, by taking advantage of the capacity of globalization and financial development, create a suitable platform for investment in the field of energy and expand regional cooperation in order to reduce dependence on fossil energy.</p>

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Extended Abstract

Introduction

Globalization, as an encompassing process, has increased economic competition among countries and connected national economies through the development of trade and investment. This trend has impacted energy consumption and can lead to economic growth or reduced energy consumption through technology transfer. Iran, as an emerging economy with extensive energy capacities, is striving to strengthen its position; however, securing sufficient energy for economic growth remains a fundamental challenge. Expanding regional cooperation with neighboring countries can assist in managing energy resources and fostering economic convergence in energy projects. Additionally, globalization and financial development provide an opportunity for Iran to enhance its energy infrastructure and shift towards renewable energies through foreign investment and technology exchange.

Aims

This research examines the impact of globalization and financial development on energy consumption in the N11 countries and offers suggestions for regional cooperation.

Methods

In this study, the stationarity of the variables was first examined using the CADF test, followed by the analysis of the long-term relationship among the model's variables using the Kao cointegration method. Finally, the impact of globalization and financial development on energy consumption for 11 countries during the period 1980-2021 was evaluated using the panel generalized least squares method. The results of this research were validated using three methods: FMOLS, DOLS, and EGLS, which also include the nonlinear impact of globalization on energy consumption, considered one of the innovative aspects of this study.

Results

The findings indicate the absence of multicollinearity in the data and the presence of cross-sectional dependence among the variables. The cross-sectional unit root test shows that only the logarithm of energy consumption is non-stationary, which becomes stationary after one differencing. Additionally, the Kao cointegration test confirmed the existence of a long-term equilibrium relationship among the variables. The results of the model estimation demonstrate that the logarithm of financial development, per capita income, globalization, and urbanization have a positive and significant impact on energy consumption. Facilitating access to credit and loans increases investor confidence and energy demand, while rising income and economic activities also elevate demand. Globalization has a nonlinear effect on

energy consumption; at lower levels, it fosters economic growth and increases energy consumption, but with advances in technology and a shift towards sustainable development, energy consumption may decrease. Urbanization also raises energy demand due to migration to urban areas and the search for better opportunities. The model's R-squared value is 99%, indicating a high explanatory power of the examined variables on changes in energy consumption. Moreover, the results from FMOLS and DOLS methods confirm the above findings, indicating that the obtained results are statistically robust. Therefore, the research results suggest that regional cooperation could optimize energy consumption and achieve sustainable development goals in Iran. Given Iran's rich energy resources, the development of shared infrastructure with neighboring countries could reduce energy waste and improve efficiency. Additionally, joint investments in power plant projects, especially in renewable energy, can enable the distribution of clean energy and reduce costs. Furthermore, scientific and technological cooperation can enhance energy efficiency and strengthen energy security. However, challenges such as geopolitical issues and sanctions exist, necessitating management and international collaboration.

Conclusion

This study examines the impact of globalization and financial development on energy consumption in the N-11 countries from 1980 to 2021, demonstrating that these factors play a significant role in changes in energy consumption. Financial development, through increased investment and access to credit, leads to higher energy consumption, while the effects of globalization on energy consumption are nonlinear, initially increasing consumption but later reducing it due to new technologies. Iran's regional cooperation with neighboring countries, particularly in joint energy projects and technology exchange, can have a significant effect on optimizing energy consumption and enhancing energy security. Implementing these approaches, such as establishing gas pipelines and investing in renewable energy, can lead to reduced energy costs and improved efficiency. Despite challenges such as sanctions and fluctuations in energy prices, leveraging globalization and strengthening economic interactions can contribute to improved energy security and sustainable development in the region.

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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