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Editorial: Financial and trade globalization, greener technologies and energy transition

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Editorial on the Research Topic

Financial and trade globalization, greener technologies and energy transition

The Research Topic “*Financial and Trade Globalization, Greener Technologies and Energy Transition*” has received 44 articles, exploring different aspects of how a complex and globalized economy, both from a commercial and financial point of view, is vital to support technological development and environmental regulation. These studies cover mainly emerging countries, which generally lack access to high technology and have significant financial constraints. Green technology and environmental regulation are fundamental to the energy transition toward a more sustainable economy with fewer greenhouse gas emissions.

Environmental issues are among the most hazardous issues the world faces in modern society. The paradigm shift and structural changes from emissions-intensive sources to services and information can reduce overall environmental externalities. In developed and emerging countries, technological progress such as medium and high technologies, greener technologies, and enforcement of environmental regulations have significantly reduced energy-related greenhouse gas emissions.

In this sense, this Research Topic has corroborated debating the importance of energy transition, financial and trade globalization, modern technologies, and environmental-related technologies for sustainable development. The energy transition is relevant to achieving better environmental development standards by reducing the use of limited natural resources. However, several countries lack access to advanced technologies and trade globalization and face significant financial constraints. Financial Globalization refers to overall cross-border financial flows and access to international capital markets, while Trade Globalization presents the share of all products used for exports and imports. They remove cross-border restrictions, enhance technology transfers, and attract more industrial investments.

Furthermore, technology access and Research and Development can contribute to green technologies and cleaner energy sources. With higher complexity, industries might become more environmentally friendly, develop technology and knowledge, and produce more efficiently with less pollution, further satisfying sustainable development goals. For this reason, this Research Topic has the mission of advancing knowledge in the fields of financial development and trade globalization to enhance better standards of sustainable

development, energy transition, and similar perspectives (i.e., renewable energy resources and alternative strategies to diversify the energy matrix), and modern technologies and other relevant aspects, such as export quality, economic diversification, economic complexity, innovation, and other dimensions that reveal the importance of economic structure to sustainable development.

The Research Topic selected articles using several quantitative methods and statistical analysis. It demonstrates the different strategies to answer research problems correlated with the Research Topic under analysis. For example, several articles applied econometric models through time series and cross-section analyses. It enables the comparison of different regions, countries, municipalities, or companies worldwide. In contrast, three articles presented alternative methodological strategies. First, [Almodfer et al.](#) proposed a new method to determine the parameters for the proton exchange membrane fuel cell (PEMFC). Furthermore, two articles used the literature review technique to answer research questions. [Rodriguez-Rojas et al.](#) proposed a new Taxonomy for sustainable finance, and [Zhang et al.](#) analyzed the literature on the green economy and its main challenges influenced by globalization.

Other studies analyzed a single region using time series or cross-section techniques. These articles studied municipalities, countries, or companies, especially in developing regions such as Brazil, Uruguay, Turkey, Poland, Pakistan, Romania, and Nigeria. Noteworthy, China was the most analyzed country among the published articles. In this sense, 18 articles are taking China under analysis, corresponding to 40.9% of the total articles in this Research Topic. The predominance of studies on China is consistent with the increasing role that China has played in the global economy, especially in Research Topic related to the energy transition.

Several articles analyzed the possibilities and effects of energy transition in China. [Han et al.](#) studied a stochastic production function model, and external and internal energy transition possibilities in Chinese provinces. [Hou and Song](#) created a translog production function using clean energy, fossil energy, and other factors as model inputs. The authors analyzed paths for energy substitution in China. In addition, [Liu et al.](#) empirically studied how the energy transition plays a crucial role in promoting the balanced development of China's economic growth.

Another relevant approach for studies in China was related to the effects of regulation and environmental taxes. For example, [Ren et al.](#) studied how environmental regulation contributes to the innovation of green products taking into account voluntary agreements in Chinese municipalities. In turn, [Xu and Chen](#) examined how the presence and regional heterogeneity of environmental taxes impacted the level of emissions of three different types of pollutants in Chinese provinces.

Other studies analyzed the effect of the quality of institutions in China. For example, [Amin et al.](#) investigated the effect of “financial development,” “institutional quality,” “foreign direct investment,” “trade openness,” “urbanization,” and “renewable energy consumption” on Chinese CO₂ emissions. [Sun](#) studied 30 Chinese provinces to explore the impact of financial development and foreign trade on carbon emissions. [Zhang and Ren](#) constructed a green full-factor productivity (GFFP) indicator for the administrative regions in the Changjiang Economic Area (CEA). They revealed the influence of foreign direct investment (FDI) and industrial structure optimization (ISO) on this measure.

Furthermore, four articles analyzed Chinese companies. [Zhang and Cheng](#), for example, investigated the effect of the Environmental Protection Law (EPL) on companies' cash holdings, especially the most polluting ones. [Yu et al.](#) evaluated the effect of the heterogeneity of financialization on the level of innovation of Chinese companies in terms of the energy transition. [Li et al.](#) studied how inclusive digital finance could help alleviate the financing constraints of Chinese Small and Medium Enterprises (SMEs). [Jiang et al.](#) evaluated companies listed on Shanghai A shares by exploring the impact of green financial development on the green technology innovation of these companies. [Tian](#) verified the impact of the executive capital incentive and the employee stock ownership plan on the performance of Chinese companies. [Tian](#) also examined the economic consequences of this implementation under environmental uncertainty.

Interestingly, two studies also analyzed companies but did not define the geographical area. [Li and Zhao](#) analyzed companies listed on the Growth Enterprise Market from 2009 to 2017. They employed the Poisson regression method to empirically test the impact of venture capital investment timing and venture capital rounds on business innovation performance. [Wang and Zhang](#) used the survey method to analyze several companies. The authors explored the influence of command-and-control environmental regulation (CCER) and market-based environmental regulation (MBER) on green supply chain management and the regulatory effect of environmental dynamism.

Five other articles investigated the Chinese economy related to other subjects. For example, [Xu et al.](#) investigated the effect of foreign trade on the energy efficiency of Chinese provinces. [Xie et al.](#) explored the role of commercial insurance in preventing and mitigating household financial risks and improving social security. [Pan et al.](#) used the VAR model to evaluate bidirectional FDI data from the Chinese Economic Zone of the Yangtze River. [Yao and Shao](#) established the Stackelberg game model under three conditions of carbon trading and analyzed the emission reduction strategies of real estate developers and building materials manufacturers. [Fan et al.](#) correlated partner countries' green logistics performance index with the level of exports from China.

Similar themes were studied in other emerging countries (i.e., Brazil, India, Russia, and South Africa), which, together with China, are part of the BRICS group. [Xu et al.](#) evaluated the impact of variables such as financial globalization, urbanization, economic growth, and the use of renewable energy on the level of environmental degradation. Uruguay was analyzed by [Abraham Ayobamiji et al.](#) using time series data to investigate how the country's carbon emissions are impacted by the level of commercial globalization, income from natural resources, economic growth, and financial development.

[Simionescu et al.](#) studied Romania to assess how governance and institutional quality affected the pollution level. Poland, another country in Eastern Europe, was studied by [Malgorzata et al.](#) The authors analyzed the energy sector, exploring companies listed on the Warsaw Stock Exchange that declares the use of ESG practices. The authors verified the relationship between the Index of Fundamental Power (FPI) and the value of the companies. [Habesoglu et al.](#) investigated Turkey to verify how government fiscal policy, which was greatly impacted by oil prices, influences environmental degradation. The authors found that government spending positively influences environmental degradation.

The Research Topic also presents two studies analyzing Pakistan. [Xuezhou et al.](#) investigated the relationship between the growth of Pakistani companies and their risk of insolvency, and the level of leverage of these companies moderated these variables. [Li et al.](#) studied the short-term and long-term causal relationships between sustainable development in Pakistan and variables of financial liberalization, health spending, and defense spending.

Despite several studies analyzing developing regions, only one article analyzed an African region. [Yu et al.](#) studied the Nigerian economy to answer how financial development, economic growth, and stock market performance impact environmental pollution. Note that more studies are required to investigate economic development in the African continent, which future Research Topic must consider.

It is noteworthy that some articles analyzed groups of countries. These articles predominantly take into account emerging economies. [Ke et al.](#), for example, examined the relationship between information and telecommunications technologies (ICTs), foreign direct investment, globalization, and CO₂ emissions from 77 developing countries. [Sebastian et al.](#) explored the effect of renewable energy and agriculture on the CO₂ emissions of 94 countries. In the same way, some articles addressed specific geographic regions (i.e., South Asia and Latin America). [Muhammad et al.](#) studied the relationship between trade liberalization, CO₂ emissions, energy consumption, and economic growth in Southeast Asian and Latin American countries. [Guo](#) analyzed the repercussions of the fiscal burden on energy transition through net GDP rate in eight nations, including the South Asia region, to unlock the opportunities for economic recovery.

There were also works on groups and associations of emerging countries (BRICS, MINT, ASEAN, G20). [Li et al.](#) investigated the effect of green investment, economic growth, technological innovation, use of non-renewable energy, and globalization on CO₂ emissions from MINT countries (Mexico, Indonesia, Nigeria, and Turkey). [Majeed et al.](#) analyzed the relationship between financial globalization and renewable energy consumption in the BRICS countries (Brazil, Russia, China, and South Africa). [Du et al.](#) analyzed the influence of oil price volatility, energy efficiency, and financial stability on sustainable energy production in the Association of Southeast Asian Nations (ASEAN) countries. Finally, [Shao and Wang](#) use data from G20 countries to investigate the relationship between energy price risk and energy efficiency for the energy transition to recommend the implication for the period of the COVID-19 crisis. [Zhao and Qamruzzaman](#) studied the Belt and Road Countries (BRI) countries, which, despite not referring only to emerging countries, are all closely linked to Chinese policies. In this work, the authors explored the relationship between urbanization, remittances, and globalization in energy consumption in BRI nations.

Although the importance for emerging countries is more prominent, the economic and environmental performance of developed countries can also be impacted by globalization and economic complexity. [Simionescu et al.](#), for example, found a

relationship between economic growth and the use of clean energy (renewable and nuclear) in three countries of the European Union. [Noja Gratiela et al.](#), in turn, examined the role of energy innovations, digital technological transformation, and environmental performance in improving the sustainable economic development of European Union (EU) countries. Finally, the work by [Beata et al.](#) analyzes the relationship between renewable energy and CO₂ emissions in the countries most dependent on natural resources.

In sum, the 44 articles of this Research Topic present several contributions to trade globalization, financial Research Topic, energy transition, technological advancements, sustainable production, innovation, and economic complexity research areas. Using several research methods and solving several research questions, these studies were able to provide relevant and straightforward policy recommendations for authorities in developed and developing nations. Noteworthy, these studies did not close the opportunities to explore this research area, but they advanced the knowledge on “*Financial and Trade Globalization, Greener Technologies and Energy Transition.*”

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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