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Analyzing the impact of export diversification and technological innovation on renewable energy consumption: Evidences from BRICS nations

Rajesh Sharma [a, b, *], Muhammad Shahbaz [c, d], Pradeep Kautish [e], Xuan Vinh Vo [f]

[a] School of Business, Mody University of Science and Technology, India
[b] Symbiosis Centre for Management Studies | SCMS Nagpur, India
[c] School of Management and Economics, Beijing Institute of Technology, China
[d] Institute of Business Research, University of Economics Ho Chi Minh City, Viet Nam
[e] Department of Marketing, Institute of Management, Nirma University, Ahmedabad, Gujarat, India
[f] Institute of Business Research and CFVG, University of Economics Ho Chi Minh City, Viet Nam

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ABSTRACT

Due to the rapid industrial growth in the BRICS nations, export earnings and energy demand witnessed an upturn in the preceding years. Therefore, by considering export diversification, extensive export margin, and intensive export margin as the determinants of renewable energy, the present study intended to explore whether total, horizontal, and vertical growth in exports stimulated the demand for renewable energy in the BRICS nations for the period of 1990–2018. In doing so, technological innovation, income inequality, and capital formation are carried as controlled variables. The elasticity coefficients revealed that export diversification, traditional exports, technological innovation, and capitalization contributed to escalating the usage of cleaner energy solutions, whereas the exports of new products and income inequality had a negative impact on the demand for renewable energy. The computed results signify the need for advanced and renewable energy-based production processes and just distribution of income in the society so that at industrial and household levels, cleaner, energy-efficient, and environment-friendly procedures can be followed. For securing the constructive contribution of various stakeholders, the study proposed a multipronged policy framework, which may help to culminate a synergy between economic and environmental channels.

1. Introduction

Owing to industrialization, financialization, demographic and natural resources dividends, liberal trade policies, and political and economic tie-ups, the BRICS (Brazil, Russian Federation, India, China, and South Africa) nations have registered their presence in international trade. It can figure out from their trade bills as imports and exports have witnessed an upward trend, especially in the preceding two decades [1]. To be specific, in 2014, the import bills of the BRICS nations reached to $635 billion (US), which in 2005 accounted for $286.2 billion (US) [2]. During the same period, exports from BRICS nations increased at an annual rate of 15.9%, whereas the average growth in exports across the world was reported as 8.8% per annum [3]. A closer examination of exports suggests that not only traditional products but also new and high technology products are now part of their export baskets. This is evident from the fact that high technology export-bills reached to $775.14 billion (US) in 2015, which accounted for merely $272 (US) in 2005 [2]. Besides the increase in international trade, multidimensional growth in internal markets enabled these nations to register consistently high GDP growth. As a result, per capita income of Brazil, Russia, India, China, and South Africa surged to $11079.71 (US), $11729.08 (US), $2100.80 (US), $7752.55 (US), $7433.61 (US), respectively in 2018 [4]. In these nations, the average per capita income increased by two times from 1990 to 2018. However, during this period, per capita income in China and India

* Corresponding author. School of Business, Mody University of Science and Technology, India.
E-mail addresses: professor.rajeshsharma@gmail.com (R. Sharma), muhdshahbaz77@gmail.com (M. Shahbaz), pradeep.kautish@gmail.com (P. Kautish), vxvinh@yahoo.com (X.V. Vo).

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