



Unveiling the asymmetric impact of exports, oil prices, technological innovations, and income inequality on carbon emissions in India

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ARTICLE INFO

Keywords:

Exports
Oil prices
Technological innovation
India
Income distribution
NARDL

ABSTRACT

In the case of a developing country like India, foreign trade can play a vital role because it may help in generating employment opportunities by channelizing the finished goods and natural resources. However, the excessive production of tradable goods and imports of carbon-intense resources may have a harmful impact on biodiversity in the long run. The current situation of India appears to fall in the same category because India's exports of manufactured goods and imports of crude oil have witnessed a sharp rise. Besides, the country's carbon emissions have increased persistently, especially after liberal trade policy regime (i.e. after 1991). To validate this argument, in the present study, we examined the temporal impact of exports and oil prices on carbon emissions in India from 1980 to 2018. Technological innovation and income inequality are considered as the controlled variables. The empirical results calculated using the nonlinear autoregressive distributed lag (NARDL) approach reveal that the upward-tick in exports and technological innovation led to an increase in carbon emissions. On other hand, downside movements in exports, increased oil prices, and increased income inequality helped reduce the level of carbon emissions in the long run. The study confirmed a nonlinear association between carbon emissions and its considered determinants. By taking a cue from the computed results, we proposed an SDG-based policy framework, which may help policymakers achieve economic and environmental targets in the coming years.

1. Introduction

In the 1990s, due to the deteriorating terms of trade, the Indian government adopted a liberal trade policy regime (Trade Promotion Council of India, 2021). Besides, the Indian government made significant improvements in the delivery of financial services (Mohan, 2004). These policy measures unlocked new investment opportunities for foreign and domestic investors and strengthened the industrialization process in the country (Sharma et al., 2018). In the liberal policy environment, despite witnessing robust growth in exports and per capita income, the government is unable to navigate the growing level of pollution emissions (Lee et al., 2021) and income inequality (Rodgers, 2018). The latter might be the outcome of the flawed socio-economic policies of the country. In contrast, the former might have resulted

from the industrial sector's unsustainable production practices adopted in the preceding years. Here it can be argued that the increased demand for industrial products in domestic and international markets might have encouraged industries to produce at a large scale. This in turn, might have intensified the usage of carbon-intense energy solutions and subsequently gaseous emissions (Shahzad et al., 2021).

In this connection, the literature supports that the increased exports of a country may exacerbate environmental quality if the export-oriented industries count on the energy-intense production processes, and exports comprise manufactured goods that require more tangible inputs than technical skills (Ahmed et al., 2021). On other hand, if the export basket contains high-tech products then increased exports may improve export earnings and environmental quality because such kinds of products require minimal energy solutions (Anand et al., 2015;

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<https://doi.org/10.1016/j.resourpol.2021.102408>

Received 31 August 2021; Received in revised form 30 September 2021; Accepted 5 October 2021

Available online 9 October 2021

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