The asymmetric nexus between air pollution and COVID-19: Evidence from a non-linear panel autoregressive distributed lag model

- Wen C.[a],
- Akram R.[b]
- Irfan M.[c, d, e]
- Iqbal W.[f],
- Dagar V.[g],
- Acevedo-Duqued Á.[h],
- Saydaliev H.B.[i, j]

Abstract
The emergence of a new coronavirus (COVID-19) has become a major global concern that has damaged human health and disturbing environmental quality. Some researchers have identified a positive relationship between air pollution (fine particulate matter $PM_{2.5}$) and COVID-19. Nonetheless, no inclusive investigation has comprehensively examined this relationship for a tropical climate such as India. This study aims to address this knowledge gap by investigating the nexus between air pollution and COVID-19 in the ten most affected Indian states using daily observations from 9th March to September 20, 2020. The study has used the newly developed Hidden Panel Cointegration test and Nonlinear Panel Autoregressive Distributed Lag (NPARDL) model for asymmetric analysis. Empirical results illustrate an asymmetric relationship between $PM_{2.5}$ and COVID-19 cases. More precisely, a 1% change in the positive shocks of $PM_{2.5}$ increases the COVID-19 cases by 0.439%. Besides, the estimates of individual states expose the heterogeneous effects of $PM_{2.5}$ on COVID-19. The asymmetric causality test of Hatemi-J's (2011) also suggests that the positive shocks on $PM_{2.5}$ Granger-cause positive shocks on COVID19 cases. Research findings indicate that air pollution is the root cause of this outbreak; thus, the government should recognize this channel and implement robust policy guidelines to control the spread of environmental pollution. © 2022