Spatial Panel Data Modelling of COVID-19 Spreading at District Level in Sarawak, Malaysia

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Abstract The COVID-19 outbreak was well-controlled in the state of Sarawak, Malaysia in year 2020. A surge in positive cases started in January 2021 and affected all districts including the rural areas which have relatively limited health facilities. Hence, we investigated the spatial patterns of COVID-19 spreading at district level for the first 16 epidemiological weeks of 2021 by spatial autocorrelation analysis and spatial panel regression model. The results show that there exists weak positive spatial autocorrelation of COVID-19 confirmed cases. Having said that, the spatial cluster of high values in both weekly rate of confirmed cases and its spatial lag emerged in the center part of Sarawak in the seventh epidemiological week. Six other districts were identified as high potential for spill overing the disease to its neighbouring districts. Among the six spatial panel regression models constructed, the spatial autoregressive model which includes the spatial lag of COVID-19 confirmed cases, apart from the other two independent variables (recovered and death), is a better-fitting model. This implies that the COVID-19 spreading in the neighbouring districts has a significant effect on the rate of confirmed cases in a particular district of Sarawak.

Keywords COVID-19 · Spatial panel regression model · Spatial autocorrelation · Sarawak

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