Chapter 17
The Efficiency of Nations in the Struggle Against the COVID-19 Pandemic

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ABSTRACT

This chapter aims to investigate the efficiency of nations in their struggle against the COVID-19 analysing data from June and December 2020 with a novel three-stage methodology. In the first stage, 107 nations were clustered into highly competitive, competitive, and non-competitive countries using their Global Competitiveness Index scores (World Economic Forum) to evaluate comparable countries in the second stage with the Data Envelopment Analysis. In the third stage, the relationship between countries' efficiency and performance in 66 variables published in the United Nations Human Development Report was investigated along with the long-debated aspect of a nation's political governance regime using Tobit regression. The worst performing highly competitive nations were USA and UK, competitive nations were Chile and Peru, and non-competitive nations were Brazil and Mozambique. Air pollution, international inbound tourists, urban population significantly reduced while domestic credit and gross national income per capita significantly increased efficiency, but the political regime did not affect it.

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INTRODUCTION

The COVID-19 crisis has caused unprecedented suffering across the world. Millions have become infected, and hundreds of thousands have lost their lives. Nations mobilised their health workers and infrastructure to curb the spread of the disease and cure the infected. A global pandemic has severe worldwide impacts influencing economic and living conditions of nations. It reduces the Gross National Product (GNP), restricts the life expectancies, and even prevents the students from getting an adequate education. On the last day of 2019, Chinese officials warned the World Health Organization (WHO) of pneumonia cases with an unknown cause in Wuhan City, Hubei, China. The International Committee on Taxonomy of Viruses announced the name of the new virus as the Severe Acute Respiratory Syndrome CoronaVirus 2 (SARS-CoV-2). On 11 February 2020, the WHO announced "COVID-19" as the name of this disease and declared the outbreak of COVID-19 a global pandemic on 11 March 2020 (WHO, n.d.).

COVID-19 is currently one of the most significant healthcare problems worldwide. As of 18 December 2020, the total confirmed number of cases is 75,371,570, and the death toll is 1,670,455 (Worldometer, 2022). There are still 107,229 people in serious or critical condition. The countries have not been able to stop the growth of the pandemic within their boundaries. In fact, Huang et al. (2020) use a novel deep neural network framework to forecast the COVID-19 outbreak in Germany, Italy, and Spain and show that there is a disproportionate burden across countries, suggesting that important factors positively or negatively influence the countries' attempts to respond to this pandemic.

This research aims to identify the efficiency of nations against the COVID-19 pandemic and determine the factors that affect their efficiency. Nations are initially clustered based on the twelve competitiveness pillars of the Global Competitiveness Index published by the World Economic Forum (WEF) (Schwab, 2019). Then, a Data Envelopment Analysis (DEA) output-oriented model with assurance region (Zanakis et al., 2007) is run separately for each cluster, taking health-related variables as inputs and COVID-19 response outcomes as outputs. Finally, the relationship between nations' performance in 66 variables published in the Human Development Report of the United Nations (Conceição, 2019) and COVID-19 response efficiency is estimated using Tobit regression (Zeng et al., 2016) to inform policies developed for each nation.

In fact, a country's ability to rapidly detect and isolate infected persons and cure them immediately could end the outbreak. Therefore, the DEA establishes international comparisons on the efficiency of nations to reduce the number of COVID-19 victims and inform nations to prepare for a similar pandemic in the future. For this purpose, the authors collected the data of 107 nations in June and December 2020 and investigated variations among nations in curbing the pandemic through their resources using a novel three-stage methodology. The authors initially clustered nations into highly competitive, competitive, and non-competitive nations to allow each country to be evaluated in a group of comparable countries. The authors found that the USA was the worst performer in the highly competitive nations cluster based on the data until June 2020, whereas the UK was the worst performer based on the data until December 2020. Chile was the worst performer in the competitive nations cluster based on the data until June 2020 while Peru is the worst performer based on the data until December 2020. Brazil was the worst performer in the non-competitive nations cluster based on the data until June 2020 but based on the data until December 2020, Mozambique has the lowest efficiency scores. Air pollution, international inbound tourists, urban population significantly reduce efficiency scores whereas domestic credit and gross national income per capita significantly increase efficiency. On the other hand, the political governance regime of a country does not affect its efficiency.