

## **COVID-19 OUTBREAK AND MITIGATION BY MOVEMENT RESTRICTIONS: A MATHEMATICAL ASSESSMENT OF ECONOMIC IMPACT ON NIGERIAN HOUSEHOLDS**

ABAYOMI AYOTUNDE AYOADE\* & OLUWASEYI ALIU

### *ABSTRACT*

As COVID-19 continues to spread across the globe, governments all over the world have been finding ways of mitigating the pandemic. Various measures including lockdown and social distancing have been enacted to curb the spread of the virus. While the epidemiological trends of the disease have received considerable attention, the economic impacts of the outbreak on the households have been largely understudied. A compartmental model was developed and an epidemiological modelling approach was adopted to examine the economic impact of lockdown and social distancing on Nigerian households. The basic epidemiological features of the model were examined before the model was studied analytically and numerically. Both the analytical and numerical results showed that the economies of every household in Nigeria apart from the rich was badly affected by the mitigation measures of COVID-19 when there was an impediment to the payment of salaries and distribution of palliatives.

*Keywords:* COVID-19; households; lockdown; social distancing

### *ABSTRAK*

Disebabkan COVID-19 masih merebak di serata dunia, kerajaan di seluruh dunia telah cuba mencari jalan bagi mengurangkan pandemik ini. Pelbagai langkah telah diambil termasuk sekatan pergerakan dan penjarakan sosial untuk mengawal penyebaran virus ini. Meskipun trend epidemiologi wabak ini telah menerima perhatian, impak ekonomi disebabkan oleh wabak ini kepada isi rumah masih kurang dikaji. Model kompartmen telah dibangunkan dan pendekatan pemodelan epidemiologi telah diterapkan untuk meneliti impak ekonomi kesan daripada sekatan pergerakan dan penjarakan sosial kepada isi rumah di Nigeria. Ciri-ciri asas epidemiologi model tersebut telah diteliti sebelum dikaji secara analitik dan berangka. Kedua-dua hasil analitik dan berangka menunjukkan ekonomi setiap isi rumah di Nigeria, selain daripada yang kaya, sangat terkesan dengan langkah-langkah mitigasi COVID-19 apabila terdapatnya halangan kepada pembayaran gaji dan pengedaran paliatif.

*Kata kunci:* COVID-19; isi rumah; sekatan pergerakan; penjarakan sosial

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*Department of Mathematics  
Faculty of Science  
University of Lagos  
Akoka, Yaba, Lagos,  
Lagos State, NIGERIA  
E-mail: ayoayoade@unilag.edu.ng\**

*Department of Fundamental and Applied Sciences  
Universiti Teknologi PETRONAS  
Perak, MALAYSIA  
Prototype Engineering Development Institute (PEDI)  
Ilesa, NIGERIA  
E-mail: oluwaseyialiu@gmail.com*

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<sup>\*</sup>Corresponding author