The role of healthcare supply chain management in the wake of COVID-19 pandemic: hot off the press

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The role of healthcare supply chain management in the wake of COVID-19 pandemic: hot off the press

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Abstract

Purpose – *The study aims to examine the role of health-care supply chain management during the COVID-19 pandemic in a cross-section of 42 selected sub-Saharan African (SSA) countries.*

Design/methodology/approach – *The study used cross-sectional robust least square regression for parameter estimates.*

Findings – *The results confirmed the N-shaped relationship between the health-care logistics performance index (HLPI) and COVID-19 cases. It implies that initially HLPI increases along with an increase in COVID-19 cases. Later down, it decreases COVID-19 cases by providing continued access to medical devices and personal protective equipment. Again, it increases due to resuming economic activities across countries.*

Practical implications – *The continuing health-care supply chain is crucial to minimize COVID-19 cases. The international support from the developed world in providing health-care equipment, debt resettlement and resolving regional conflicts is deemed desirable to escape the SSA countries from the COVID-19 pandemic.*

Originality/value – *The importance of the health-care supply chain during the COVID-19 pandemic is evident in the forecasting estimates, which shows that from August 2021 to April 2022, increasing the health-care supply chain at their third-degree level would reduce coronavirus registered cases. The results conclude that SSA countries required more efforts to contain coronavirus cases by thrice increasing their health-care logistics supply chain.*

Keywords *Health-care supply chain, COVID-19 pandemic, Logistics performance index, SSA countries, Robust least square regression*

Paper type *Research paper*

1. Introduction

The globalized world is facing high health-care challenges related to the COVID-19 cases. It is exacerbated at an enormous rate due to inadequate health-care infrastructure and meagre supply chain management (Anthonia Obi-Ani *et al.*, 2021; Khan and Bali, 2021). The COVID-19 pandemic damaged health-care sustainability matters because of nationwide lockdowns and immobility of goods transfers from one place to another. The close interaction of buyers and sellers in economic transactions worsens the situation, increasing COVID-19 cases (Rahman *et al.*, 2021. Yu *et al.*, 2021). The World Health Organization (WHO) already sets specific guidelines to minimize coronavirus cases, i.e. avoiding social contact, wearing masks and cleaning their hands frequently (Madan *et al.*, 2021; Stellefson *et al.*, 2021). The shortage of health-care expenditures and meagre health-care protective medical equipment supply make the journey more challenging to reduce coronavirus cases (Mosallanezhad *et al.*, 2021; Hossain *et al.*, 2021). In short, the health-care logistics should be viable to continue supplying medicine and protective equipment on time to improve health-care infrastructure (Kumar *et al.*, 2020). Several early studies in different economic settings proposed policies related to improving the health-care

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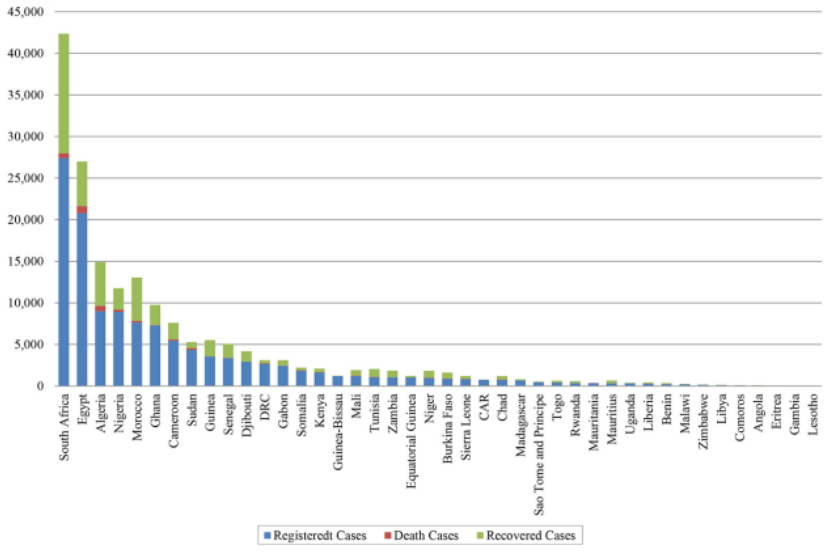
supply chain (Bhaskar *et al.*, 2020; Miller *et al.*, 2021; Karmaker *et al.*, 2021). However, they are overlooked to examine the N-shaped relationship between the health-care supply chain and COVID-19 cases, which is vital to understand the rise and fall in coronavirus cases because of increasing unsustainable logistics activities in the sub-Saharan African (SSA) countries.

Africa is considered the world's poorest continent that faced unwanted socio-economic and environmental challenges that impaired the growth phases of many SSA economies. The vicious cycle of poverty increases more miseries of the poor community from low investment to low production. Investment remains passive, increasing civil wars, armed conflicts, deterioration in trade, poor weather conditions and macroeconomic instability presented a worse situation across countries. Besides all these challenges, there is hope for change, as some SSA countries are showing exceptional growth through adopting some structural reforms and improving trade portfolios to enhance economic performance (Omisore, 2018). The emergence of the COVID-19 pandemic has become declared a global emergency by WHO, its disproportionally affected SSA countries because of an inadequate health-care resource. The Worldometer (2021) shows that South Africa has many coronavirus registered cases in its region. It is followed by Egypt, Algeria, Nigeria, Morocco, Ghana, Cameroon, etc., while the death cases are reported mainly by Egypt, followed by Algeria, South Africa, Nigeria, Morocco, Sudan and Cameroon. Figure 1 shows the fact sheet of coronavirus in the selected SSA countries for ready reference.

The health-care logistics supply chain played a vital role during the COVID-19 pandemic. It provides a free flow of health-care equipment, including surgical gloves, hand sanitizers, surgical masks, testing swabs, laboratory instruments, ventilators, medicines and many more life-saving technologies that are important to reduce coronavirus death tolls (Ranney *et al.*, 2020). The importance of supply chain management in economic activities is evident mainly. It provides logistics services from production to distribution that support industries and associated businesses selling their products in the international market (Tseng *et al.*,

Figure 1 Coronavirus cases – fact sheet for African region



Source: Worldometer (2021)

2020). The supply chain process is largely disrupted because of COVID-19 outbreaks and the world response against them through nationwide lockdown, negatively affecting global logistics activities (Ivanov and Das, 2020). The following main obstructions in logistics activities are found, i.e. the restriction of free mobility of goods from one place to another, travel and transportation restrictions, uneasiness in tracking and tracing consignments and shipments issues that delayed it from their schedule time. These hurdles make them a worse global supply chain process that negatively affects industries and businesses (Newton *et al.*, 2020). Furthermore, environmental concerns also become viable during the COVID-19 pandemic that could be resolved with sustainable economic policies (Gautam, 2020; Bherwani *et al.*, 2020; Fareed *et al.*, 2020). There is a direct relationship between logistics indicators and environmental degradation. The use of non-renewable fuels in the supply chain process degrades the natural environment, affecting the country's health-care sustainability agenda. The increasing health-care compromises make community health more vulnerable than likely to be affected by contagious diseases, including the COVID-19 pandemic. The transformation from fossil fuels to renewable fuels in logistics operations would be helpful to improve the country's health and wealth agenda (Anser *et al.*, 2021a, 2021b; Sasmoko *et al.*, 2021). The logistics supply was largely disrupted because of nationwide lockdown in many parts of the globalized world to contain coronavirus cases (Yu *et al.*, 2021). The inadequate health-care expenditures, population closeness and the mass panic of coronavirus cases make the situation cumbersome (Anser *et al.*, 2020a). The SSA economies required more efforts to improve their health-care supply chain to reduce coronavirus cases. The national and international collaboration among countries and the developed world could reduce the pandemic through technology and knowledge spillover (Ozili, 2020). The logistics performance index (LPI) is a scale through which one can quickly assess supply chain activities across countries. The index value comprises 1–5, where 1 indicates a low-performance index and 5 indicates a high-performance index. The LPI is not very encouraging in SSA economies except South Africa; no other economy reached an index value of 3 (World Bank, 2020). This reflects that the supply chain process is largely weak in SSA economies that need integrated and international collaborative efforts to improve business activities through massive investment in the country financial portfolios. Figure 2 shows the overall LPI in the SSA economy for ready reference.

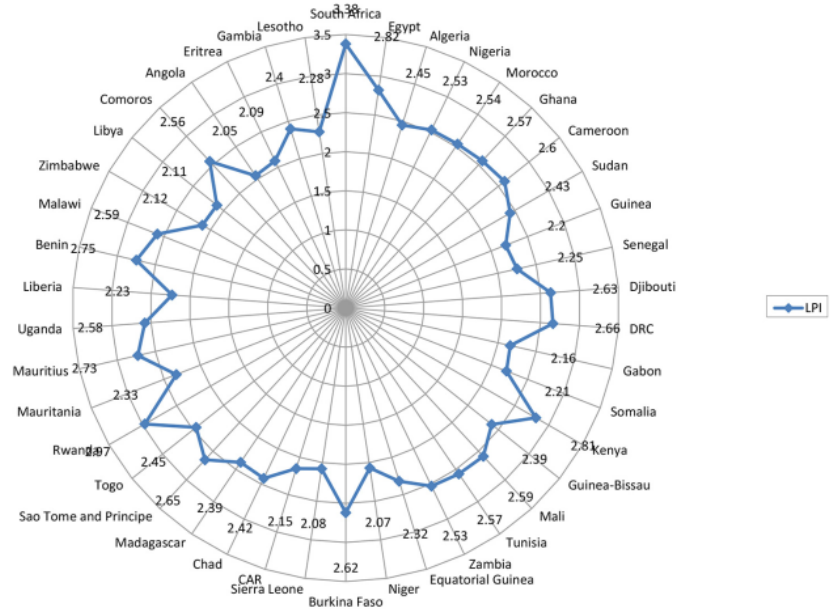
Based on the significant discussion, the study proposed the following list of research objectives for SSA economies to evaluate the role of increasing health-care logistics to reduce coronavirus cases:

- to analyze the dynamic relationship between health-care LPI (HLPI) and coronavirus cases in a cross-section of 42 SSA economies;
- to substantiate the N-shaped relationship between HLPI and coronavirus registered cases across countries; and
- to evaluate an inter-temporal (forecasting) relationship between HLPI and coronavirus registered cases.

The study used robust least square regression and impulse response function to find the parameter and forecast estimates. Both methods are highly acceptable and extensively used in empirical estimation.

The study contributed to the earlier literature by analyzing the N-shaped HLPI related to the COVID-19 cases in a cross-section of 42 SSA economies. The study added square and cubic polynomials of HLPI to assess the rise and fall in the coronavirus cases across countries. There is no direct study available on the topic. In contrast, the latest study of Sasmoko *et al.* (2021) found the W-shaped relationship between case fatality ratio and case-to-test ratio in the presence of corporate social responsibility and LPI. However, the direct N-shaped relationship is overlooked between the HLPI and coronavirus cases, which exerts a serious policy implication to reduce pandemic through the free flow of medical logistics supply in SSA

Figure 2 Logistics performance index in SSA economies



Source: World Bank (2020)

economies. Based on the importance of HLPI, the study imitated to explore the long-run and inter-temporal relationship between the stated variables across countries.

2. Literature review

The previous literature is primarily filled by encouraging global health-care supply chain management during the COVID-19 pandemic. At the same time, little work has been done so far on SSA economies that need to be filled this gap by encouraging more research on the region. Yu *et al.* (2020) emphasized the need to design a reverse logistics network to handle medical waste enormously increasing during the COVID-19 pandemic effectively. The study argued that the location of waste disposition and timing to carry medical waste are essential to pay attention to the health of medical staff and patients in the current pandemic. Ji *et al.* (2020) discussed the COVID-19 vulnerability in the Chinese economy, where the outbreak is sparked from Hubei, Wuhan to the rest of the Chinese provinces and leads to spread across the globe. The results show that the mortality rate is positively associated with the health-care burden. The regional disparity of health-care infrastructure derives from the seriousness of the disease, where some provinces are greatly affected with high mortality while others exhibit lower mortality rates. The need to maintain improved health-care resources proportionally across the provinces would be helpful to contain the pandemic efficiently. Vargas *et al.* (2020) discussed the efficient use of logistics and organizational plans for handling sensitive cases of coronavirus that admitted into a Hospital's ICU. The hospital's areas were divided into red, yellow and green zones, where the patients transferred based on their severity. The green zone is clean, where the duty staff and shift in-charge safely stay during their 12 h working duty. The yellow zone is dedicated to decontamination, and the red zone is the alert area where protective and

preventive care is monitored for coronavirus patients. The profile of Italian hospitals for handling and treating coronavirus patients is appreciable that substantially helpful to reduce human death tolls. Tien *et al.* (2020) concluded that a critical care health-care emergency during the COVID-19 pandemic should require efficient transport services, including air ambulances and private air carriers, to transport the critical patients to well-designated health-care units to save their lives. Brenton and Chemutai (2020) discussed the different challenges that African economies primarily faced during the COVID-19 pandemic, including a shortage of medical goods and services, medical equipment and other protective tools. Hence, African economies strive hard to open their borders for trading medical goods, foodstuff and essential farm inputs to handle the pandemic with various socio-economic reforms. Zhou *et al.* (2020) argued that the time and length of quarantine, horizontal contact rate and quarantine scale are the potential determinants of the COVID-19 pandemic that could be efficiently handled to reduce coronavirus cases. The need for early testing swabs, quarantine, standard operating procedures and public self-awareness and their behaviour to respond would be helpful to slow down epidemic size and peak. Legido-Quigley *et al.* (2020) discussed the different possible factors that are potentially required to contain coronavirus cases through strategic wisdom, which includes the following:

- good governance and cooperation in dealing with public health emergencies;
- provision of financial support to business and health-care system;
- efficient health-care service delivery system;
- supply of medicines and protective equipment;
- increasing health-care staffs; and
- responsible media support.

All these factors would work as resilience against the pandemic and support the health-care system.

Yu *et al.* (2021) argued that the globalized world had taken many crucial steps to control coronavirus cases, including an increase in nationwide lockdown that brings financial depression. The study suggested the need to give some intelligent strategies, including smart lockdowns, managing distance between the economic agents and balancing food price level, which helps to minimize panic among the population. Iyengar *et al.* (2020) concluded that the health-care supply chain is largely disrupted due to stringent measures adopted by the world community to limit coronavirus cases. The production and distribution of medical equipment supply increase more health-care suffering, leading to a cause of an increase in coronavirus cases worldwide. Chowdhury *et al.* (2021) systematically reviewed the supply chain studies related to the COVID-19 pandemic. They reached some conclusive findings, including resilience strategies to limit pandemics, technological breakthroughs to spread massive campaigns for pandemic awareness and sustainability in the supply chain system. Mehrotra *et al.* (2020) highlighted the need to maintain the health-care supply chain due to the massive medical equipment shortage that arises from the COVID-19 pandemic. Safa *et al.* (2021) critically discussed the four functions of the supply chain that need to be corrected during COVID-19 cases, including preparedness, risk, response and recovery. These factors are essential to perform their operational works for minimum losses during catastrophic events. The relationship between health-care logistics indicators and environmental degradation is analyzed in the number of earlier studies in the wake of the COVID-19 pandemic (Govindan *et al.*, 2021; Thompson and Anderson, 2021; Yu *et al.*, 2021). These studies mainly emphasized the need to improve the sustainable health-care logistics supply chain to reduce negative environmental externalities, which are likely to reduce coronavirus cases' intensity through supplying health-care protective equipment. The current study discussed health-care logistics indicators' role in minimizing the incidence of coronavirus cases through improving the environmental sustainability agenda, which is mainly

affected by increasing logistics supply worldwide. Based on the cited literature, the study formulates the following research hypotheses:

H1. An increase in HLPI likely leads to a decrease in COVID-19 cases across countries.

H2. The marginal decrease in COVID-19 cases will depend upon the country's strategic policies to improve health-care logistics and contain coronavirus pandemics through nationwide lockdown.

H3. It is assumed that there will be an N-shaped relationship between HLPI and COVID-19 cases.

These stated hypotheses are essential to understand the relationship between the HLPI and COVID-19 cases. The HLPI provides health-care services to the hospitals and health-care workers through shipment of life-saving drugs, protective surgical equipment, including masks and hand sanitizers, and testing kits, which enable health-care physicians to efficiently diagnose early symptoms coronavirus cases and give systematic treatment for preventing the disease. The quick and efficient HLPI helps to reduce coronavirus cases, which requires smart strategies to improve logistics performance.

3. Data source and methodological framework

The study used LPI to proxy for Healthcare Supply Chain Process (HSCP). The index value ranges from 1 (i.e. low-performance index value) to 5 (high-performance index value). The COVID-19 pandemic is assessed through coronavirus registered cases in Africa. The LPI data is taken from the World Bank (2020), whereas coronavirus registered cases data is taken from Worldometer (2021). The study selected a cross-section of 42 SSA economies in the current period. The different polynomials of HSCP are used to assess the rise and fall in the coronavirus cases by an increasing logistics supply chain. Table 1 shows the descriptive statistics of the variable for ready reference.

Table 1 shows that the natural logarithmic mean value of COVID-CASES is 6.968, while the maximum value is 10.218 and the minimum value is 3.218, while the natural logarithmic median value of HLPI is about 0.896. At the same time, it falls between the maximum value of 1.217 and the minimum value of 0.717. Figure 3 shows the trend analysis of both variables in a cross-section of 42 SSA countries for ready reference. The trend shows that the HLPI value is consistently moving across all selected SSA economies while COVID-19 cases increase with decreasing trends over selected SSA economies. For example, South Africa has high COVID-19 registered cases in the region, whereas Lesotho economy reported lower cases.

The following equation has been used to assess the relationship between HLPI and COVID-19 cases, i.e.

$$\ln(COVID-CASES)_{42,2020} = \beta_0 + \beta_1 \ln(HLPI)_{42,2019} + \beta_2 \ln(SQ.HLPI)_{42,2019} + \beta_3 \ln(CUBE.HLPI)_{42,2019} + \varepsilon_{42,2020}$$

$$\therefore \frac{\partial \ln(COVID-CASES)}{\partial \ln(HLPI)} > 0, \frac{\partial \ln(COVID-CASES)}{\partial \ln(SQ.HLPI)} < 0, \frac{\partial \ln(COVID-CASES)}{\partial \ln(CUBE.HLPI)} > 0$$

$$\because Turning.Point.for.second.degree.polynomial = -\frac{\beta_1}{2\beta_2}$$

$$Increasing.Point.for.third.degree.polynomial = \frac{-\beta_1}{-(2\beta_2 + 3\beta_3)} \quad (1)$$

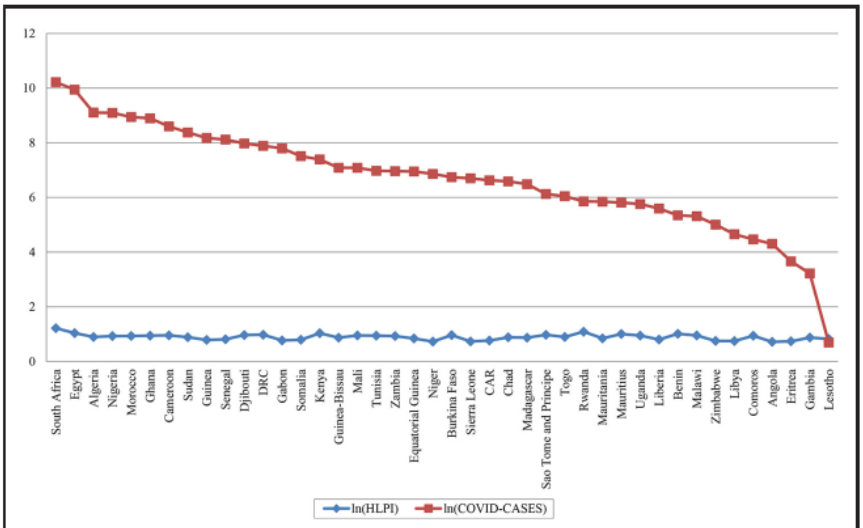
Where COVID-CASES represents the coronavirus registered cases, HLPI represents the health-care logistics performance index, SQHLPI represents the square of HLPI, CUBDHLPI represents the cube of HLPI, "ln" represent the natural logarithm, and ε shows the error term.

Table 1 Descriptive statistics

Methods	*Mean*	*Median*	*Maximum*	*Minimum*	*SD*	*Skewness*	*Kurtosis*
ln(COVID-CASES)	6.968	6.956	10.218	3.218	1.604	−0.103	2.642
ln(HLPI)	0.893	0.896	1.217	0.717	0.106	0.419	3.608

Sources: World Bank (2020); Worldometer (2021)

Figure 3 Trend analysis between ln(HLPI) and ln(COVID-CASES) across 42 SSA economies



Source: World Bank (2020) and Worldometer (2021)

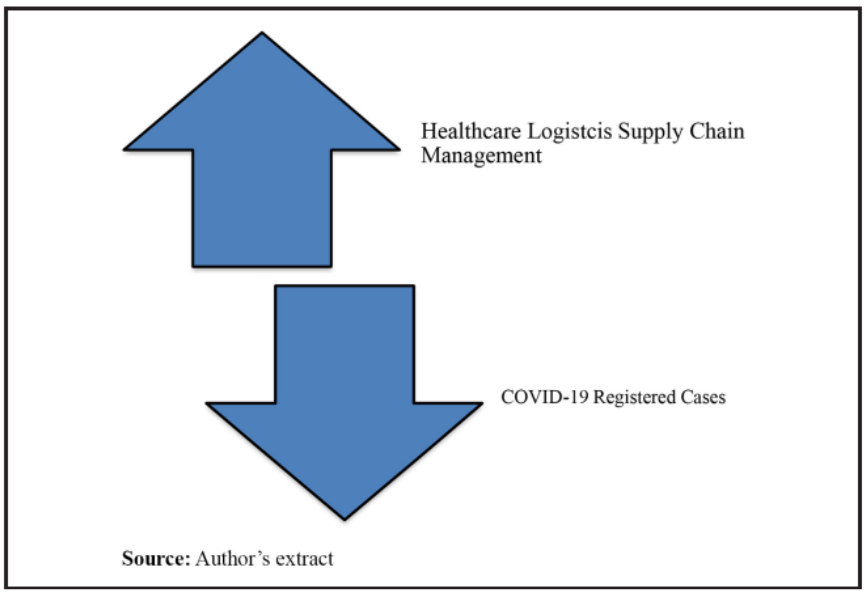
Equation (1) shows that HLPI initially will increase along with an increase in COVID-19 cases. It will decrease COVID-19 cases later due to strict government strategic actions to contain coronavirus and increase health-care equipment. However, at increasing more HLPI in the very later stages, COVID-19 cases begin to increases due to easing in government policies to contain coronavirus. Thus, it will support the N-shaped relationship between the two factors. Figure 4 shows the research framework of the study for ready reference.

Figure 4 shows that an increase in HLPI may lead to decreased COVID-19 cases across countries. The larger the volume of HLPI, the lower the COVID-19 cases, thus the need to understand the degree to which HLPI affects COVID-19 cases across SSA economies. The study used the following methods to obtain the parameter estimates:

- robust least squares (RLS) regression; and
- impulse response function (IRF).

The cross-sectional RLS regression apparatus is used to estimate the parameters. The conventional ordinary least squares estimator is sensitive to the outliers, causing an inefficient and biased estimate. The RLS estimator efficiently dealing the potential outliers that can be visible either in the outcome variable or in the regressors or simultaneously exists in the overall model. Huber (1973), in his seminal work, initially found the outliers in

Figure 4 Research framework of the study



Source: Author's extract

the response variable and addressed it with the M-estimator. Rousseeuw and Yohai (1984) move forward to detect outliers in the regressors and handle them by using S-estimator. Finally, Yohai (1987) combined S-estimator and M-estimator simultaneously to re-correct the overall model by handling outliers across dependent and explanatory variables. After estimating the parameter estimates, the study used IRF for the inter-temporal forecasting relationship between the HLPI and coronavirus registered cases. The one standard shocks in the system generated variance error shocks in the COVID-19 cases by different polynomial factors of HLPI. The positive and negative directions would be helpful to assess the variation in the HLPI to reduce coronavirus cases in the next year.

4. Results and discussion

Table 2 shows the robust least square estimates and found that along with an increase in health-care logistics supply, COVID-19 registered cases first increases, then decreases and again increases to verify an N-shaped relationship between the two stated factors. The economic implication of the stated result is very atrocious, as economies' strategic policy is largely based upon nationwide lockdown, which received success stories in the major parts of the globe (Cousins, 2020; Liao *et al.*, 2020; Wilasang *et al.*, 2020; Lu *et al.*, 2020), however, in SSA economy, the results are not up to the mark. The South African Government has resumed some businesses to reopen, allowed restaurants to deliver takeaway and opened exercise gyms during some hours in a day, while still enforcing their public to avoid massive gatherings, restricting international mobility and limiting most peoples to stay in their homes. The Nigerian economy began by restricting free travel throughout the nation and imposing a statewide lockdown, but it progressively loosened those restrictions in different country areas (Olagbaju *et al.*, 2020). However, Kenya, Ghana and elsewhere in Africa still enforced strict lockdown due to increasing coronavirus cases nationwide (Gaye *et al.*, 2020; Egger *et al.*, 2020). The SSA economies face serious health-care challenges because of inadequate health-care infrastructure. The need for the latest health-care equipment to prevent coronavirus is deemed desirable for health-care

Table 2 Robust least square Cross-Sectional regression with M-Estimator

	Dependent variable: ln(COVID-CASES)			
Variable	*Coefficient*	*Std. Error*	*z-Statistic*	*Prob*
ln(HLPI)	556.7549	313.7837	1.774327	0.0760
ln(SQHLPI)	−587.6487	332.2162	−1.768874	0.0769
ln(CUBEHLPI)	205.6644	115.6727	1.777986	0.0754
Constant	−167.8665	97.45997	−1.722415	0.0850
The turning point of HLPI at second-degree polynomial		-[ln(HLPI)/2ln(SQHLPI)] = 0.473 Antilog(0.473) = 2.971		
Increasing point of HLPI at third-degree polynomial		-[ln(HLPI)]/-[2ln(SQHLPI)+3ln(CUBEHLPI)] = 0.310 Antilog(0.310) = 2.041		
Robust Statistics				
R-squared	0.162284	Adjusted R-squared		0.096149
Mean dependent var	6.685479	S.D. dependent var		1.879883
S.E. of regression	1.811800	Sum squared resid		124.7396

Notes: HLPI shows the health-care logistics performance index; SQHLPI shows the square of HLPI, CUBEHLPI shows the cube of HLPI and COVID-CASES shows COVID-19 registered cases

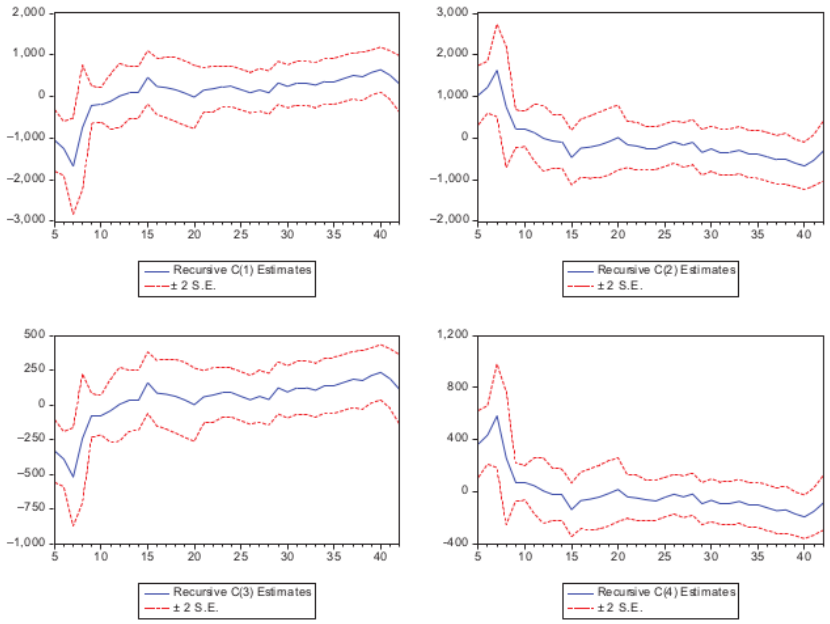
professionals and the community to survive with the free flow of the health-care logistics supply chain. The strict nationwide lockdown in many parts of the SSA economies largely disrupted the health-care supply chain that needs to be assessed and re-activated with international collaboration (Renzaho, 2020; Siedner *et al.*, 2020; Rosenthal *et al.*, 2020). Beyond health-care risks, the COVID-19 pandemic affected SSA economies in a wide variety of ways, for instance, trade shocks in supply and demand of intermediate goods and investment shocks in a country (Kassa, 2020; Oulmane *et al.*, 2020), increasing poverty incidence (Lone and Ahmad, 2020; Anser *et al.*, 2020b), rising national debt (Levin, 2020), imbalance fiscal reforms (Bisong, 2020), oil price shocks (Amewu, 2020) and health-care supply chain issues (Karamouzian and Madani, 2020). These issues led to a decrease in the nation's output manifold and put in a recession. The health-care supply chain shocks during the COVID-19 pandemic required international collaboration and national integration to get a free flow of health-care products supply. It enables to increase testing capacities, treat capabilities and cure medications, supporting their health-care infrastructure and minimizing human death tolls across African economies.

Figure 5 shows the recursive coefficient estimates of the parameter estimates and found that the recursive coefficient estimates are fall in the critical region at a 5% level of significance; hence, the model is stable over a period.

Figure 6 shows the N-shaped relationship between HLPI and COVID-19 registered cases and found the turning point of HLPI at second-degree polynomial and the increasing point of HLPI at third-degree polynomial index values are 2.971 and 2.041, respectively. The available data on LPI value for the SSA economy clearly shows that except for the South African economy, the remaining 41 selected African countries cannot match the turning index value of 2.971. They broadly fall in the maximum index value of 2.82 (Egypt) and the minimum index value of 2.05 (Angola). Thus, the SSA economies should maintain at least the stated LPI value but not less than the 2.041 index to minimize coronavirus cases nationwide.

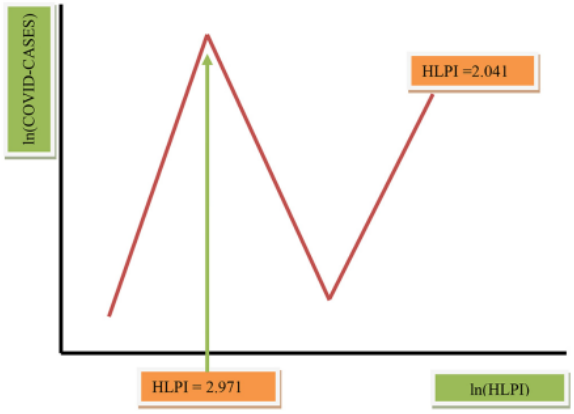
Table 3 shows the forecasting estimates between HLPI and COVID-19 cases and found that SSA economies should increase their health-care logistics supply chain thrice. Thus, the economies could be able to reduce COVID-19 registered cases. The inter-temporal results predicted that from August 2021 onward, HLPI and its second degree would be powerless to reduce COVID-19 cases. A significant decrease in coronavirus cases would be expected at the third-degree level due to enlarging the health-care logistics supply chain. The overall IRF estimates can be viewed in Figure 7 that presented here for ready reference.

Figure 5 Recursive coefficient estimates



Source: Author's estimation

Figure 6 N-shaped relationship between health-care supply chain and COVID-19 cases

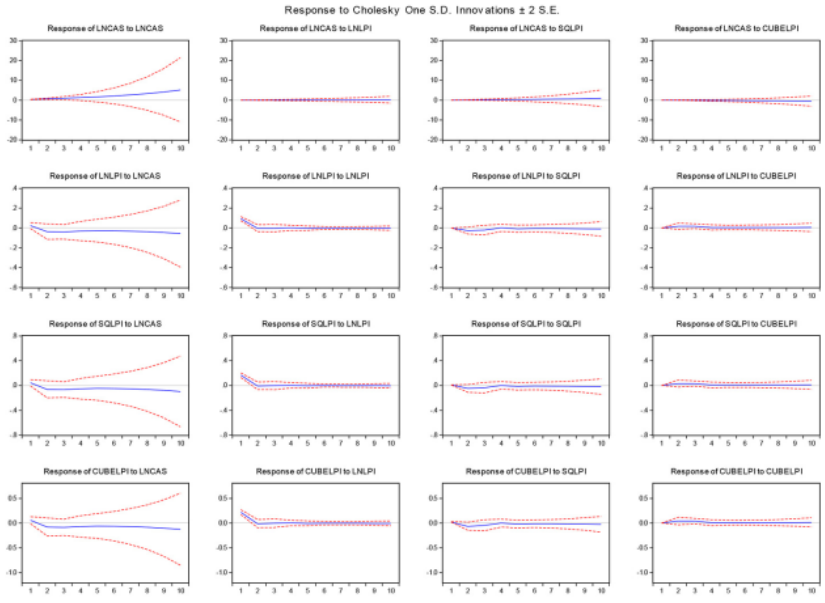


Source: Author's estimation

Table 3 IRF estimates

Months	Response of ln(COVID-CASES)			
	ln (COVID-CASES)	ln (HLPI)	ln (SQHLPI)	ln (CUBEHLPI)
August, 2021	0.653532	0.012691	0.107106	−0.010522
September, 2021	0.967907	0.032390	0.182103	−0.071554
October, 2021	1.300773	0.058203	0.246858	−0.122364
November, 2021	1.668288	0.073217	0.312366	−0.166819
December, 2021	2.107042	0.091875	0.394569	−0.216727
January, 2022	2.646492	0.114791	0.496766	−0.276757
February, 2022	3.315830	0.143184	0.622276	−0.349019
March, 2022	4.149589	0.178974	0.779006	−0.437972
April, 2022	5.190390	0.223671	0.974533	−0.548564

Figure 7 Overall IRF estimates



Source: Author's estimation

5. Conclusions and policy implications

The impact of the COVID-19 pandemic on the health-care supply chain obstructs economic and health-care activities that increase coronavirus cases and human death tolls. The nationwide lockdown disrupts the operational logistics supply, which cannot provide necessary medical protective equipment on well in time. The SSA economies, due to their low adaptability and capacity of health-care infrastructure, meagerly respond COVID-19 pandemic, which is considered the central concern area of the globalized world to jointly support African economies to minimize its associated health-care losses across countries. The study selected a cross-section of 42 SSA economies to assess the role of the health-

care supply chain in reducing coronavirus cases and used sophisticated statistical techniques to obtained sound inferences. The results established an N-shaped relationship between health-care logistics supply and coronavirus cases, which opens new avenues of research in African economies to devise long-term health-care policies in line with health-care supply chain management. Furthermore, the forecast relationship shows that the SSA economy required a thrice increase in its health-care value chain to overcome coronavirus cases.

The primary health-care challenge faced by the SSA economies during the COVID-19 pandemic is the shortage of critical life-saving drugs, protective masks, surgical gloves, surgical instruments, ventilators, hospital space facilities, medical supplies, etc. The COVID-19 pandemic isolates the economies from the rest of the world, limiting the supply chain process that obstructs due to nationwide lockdown critical vicinity and industries. The governments should need to subsidize pharmaceutical companies and health-care businesses to allow working during this pandemic and develop a plan to supply health-care-related assignments in a stipulated given period. Hence, it would eventually enlarge the supply chain process and decrease coronavirus cases across countries. The SSA economies should need to response current WHO policies and guidelines to contain coronavirus. Improving health-care infrastructure, increasing innovation capabilities, knowledge transfer and international collaboration through which the health-care logistics supply will be reached on time to support health-care workers and community members against coronavirus plague.

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