

Challenges of Forecasting the Long-Run Economic Consequences of Pandemics for Selected sub-Saharan Economies

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Abstract

As the global economy continues to wrestle with the recent COVID-19 pandemic, the effect of the pandemic continues to negatively affect economies and markets' supply and demand trends. The significant decrease in trade and increase in unemployment rates across the globe are indicators of the widespread economic slump. This paper aims to illuminate the long-term effects of the ensuing COVID-19 pandemic by studying the effect of historical catastrophes that also had negative and long-lasting effects in the societies and contexts in West Africa. A desk review and analysis of the challenges encountered in forecasting the long-term effects of pandemics was undertaken to highlight some of the macroeconomic effects of pandemics. One of the takeaways from this critical analysis was that Economists face challenges when forecasting long-run effects across contexts and scenarios. The paper concludes by identifying some of the essential behavioral changes and the role that regional blocs could play in cushioning economies in their regions and mitigating for dangerous levels of economic ruin bought about by future pandemics.

Keywords: Forecasting; Economic Consequences of Pandemics; Sub-Saharan Economies

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1. Introduction

In a bid to tackle and slow down the spread of the novel corona virus, most global, regional and local economic activities significantly reduced in momentum as Nations initiated hard lockdowns, restrictions and curfews to be adhered to by everyone. In West Africa, which is the scope of this paper, businesses relying on in- person interactions were significantly affected and some collapsed, which led to adverse effects such as unprecedented decrease in trade, retrenchments, salary reductions and in some cases full closure of entire organizations. Forecasts from the International Monetary Fund and World Bank have stipulated that the gross domestic product (GDP) per capita at the end of 2021 will still be expected to be lower than that of December 2019 in most countries. The collapse of economies because of this pandemic can be placed on a continuum along with other pandemics that have ravaged societies in the past such as the 1918 Spanish Flu, 1957 Asian flu, 2003 SARS and the 2014 Ebola Virus. In today's context of fast- growing technological era, it can be argued that the pace and process towards economic recovery will be determined by the astuteness of policymakers as they make decisions (Anyanwu and Salami, 2021).

Each pandemic comes with its own set of challenges, and the degree to which it affects societies differs from one pandemic to another. Some of these pandemics include the severe acute respiratory syndrome (SARS) in 2003, though the effect was minimal in the African continent; the 2009–2010 swine flu (H1N1 influenza pandemic), the first of the 21st century, which proved how rapidly a new virus can spread to every corner of the globe; and the 2015–2016 Zika virus outbreak in Latin America. Subsequently, the world saw the emergence of the Ebola virus disease, which was widespread in West Africa between 2013 and 2016, and the COVID-19 pandemic, which emerged at the start of 2020. While different regions and countries have responded differently to the spread of the pandemics, all the pandemics have had devastating effects on the regions of concern. The two most devastating pandemics that the African continent has witnessed are the Ebola virus and the new coronavirus (COVID-19). The economic impact of any widespread infectious disease will depend on many factors. Unusual features may also be noticed; for example, during the Spanish flu pandemic, an unusual pattern was the high mortality rate among young adults without pre-existing medical conditions. According to Barro et al. (2020), this type of pattern implies greater economic effects than the effects of a disease with comparable mortality rates observed mostly among the old and very young. Regarding COVID-19, older people are the most at risk of contracting the disease, and over 75% of the deaths from COVID-19 have occurred among those older than 60 years of age.

As the virus continues to spread across different regions and countries, it is killing thousands of people, disrupting economies, and destabilizing national security. According to the World Bank (2020), climate change, urbanization, and the lack of water and sanitation are all factors that could contribute to fast-spreading, catastrophic outbreaks in communities. Strong health systems that reach all people—especially the most vulnerable—with effective services are some of the ways to ensure protection from major disease outbreaks.

This paper is structured as follows: an overview of the comparison between the Ebola virus and the COVID-19 pandemic. Subsequently an analysis of the short- to medium-term effects of the COVID-19 pandemic in selected African regions is done, along with a discussion of some of the main difficulties in modeling the long-run impact of pandemics. In concluding, essential behavioral changes are identified as necessary conditions for economic recovery in the event of a future outbreaks.

2. Effects of the Ebola Virus Pandemic in West Africa

Ebola virus was first discovered in 1976 in the Democratic Republic of Congo and since then, countries in Africa that have experienced cases of Ebola include Gabon, Guinea, Ivory Coast, Liberia, Mali, Nigeria and Sierra Leone. But the epicenter of the outbreak in 2014 when it became a pandemic was in Guinea, Sierra Leone, and Liberia. The average fatality rate of cases of the Ebola virus disease was approximately 50% of those who became ill (World Health Organization [WHO], 2016). As of February 28, 2016, there were approximately 28,639 suspected and confirmed cases and 11,316 deaths from the Ebola virus in West Africa (Centers for Disease Control and Prevention [CDC], 2019). Given the above statistics, Qureshi (2016) research shows that, there was a substantial loss of productivity due to diversion of workforce especially by those who are taking direct care of these patients and in some cases increased in unemployment. Other effects include less trade and cross border transportation, high fiscal outlay, fewer investors, reduced tourism and decreased agricultural production.

One unique factor regarding the symptoms of Ebola was that health officials were able to quickly identify and isolate those who had been in contact with people who had been infected. The average fatality rate for COVID-19 in Africa is reported to be 2.5% and as of July 2021, there are more than 278,000 cases and more than 172,000 deaths as a result of the virus in Africa (WHO, 2021). Health officials are unable to easily pick up on individuals carrying the virus. Although COVID-19 has a much lower mortality rate (between 2% and 4%), the spread of Ebola occurred predominantly through bodily fluids, such as blood and sweat, and it was not as contagious as COVID-19 (Fernandes, 2020). Comparatively the negative economic effects of the Ebola virus are lower than the effects of the COVID-19 virus. This means that as the COVID-19 pandemic continues to spread within the different economies, health, employment, tourism, trade will continue to be adversely affected.

Given the measures put in place to combat the Ebola virus such as infection prevention and control such as installing handwashing units in health facilities and Psychosocial support to assist families, particularly children affected by the disease has helped in slowing the spread of the virus. Also, the experiences and lessons that the affected countries learned during the previous pandemic has also been helpful. Lesson such as engaging with the sociocultural dimensions of epidemics which is critical to mounting an effective response system has seen some West African economies witness a slow spread of the COVID-19 pandemic (WHO, 2020). Maffioli's (2020) analysis of the initial outbreak of the Ebola virus shows that when the virus was encountered in West Africa, Governments of these economies were unprepared, and the initial response was slow and insufficient. Many international health workers were evacuated instead, and hospitals were temporarily shut down.

From the start of the outbreak in 2014 to the end of 2015, approximately 881 confirmed health-worker infections were recorded and 513 deaths were reported in Guinea, Liberia, and Sierra Leone. In Liberia, 8% of its doctors, nurses, and midwives lost their lives to Ebola. In Sierra Leone, the mortality rate of the health personnel was 7%, and that of Guinea was 1% (Evansa, 2015). The CDC played a vital role in the containment of the virus. During the outbreak of the Ebola virus, 24,655 healthcare workers in West Africa were trained on infection prevention and control practices. In Guinea, Liberia, and Sierra Leone, 24 laboratories were created in total; some were renovated and expanded to become capable of testing for Ebola by the end of 2015 (Tableau Public, 2015).

The cost of the pandemic to the African continent has been immense, and it has arisen from the cost incurred in taking preventive measures to avoid a widespread outbreak from occurring. It has required a significant trade-off with regard to government fiscal outlays. As a result of the Ebola epidemic in 2014, households saw a drop in their incomes, and poverty grew in the countries most affected by the virus. In a study conducted by the World Bank in 2016, the overall impact of the Ebola epidemic on Guinea, Liberia, and Sierra Leone was estimated at \$2.8 billion (World Bank, 2016). The costs included the loss of jobs, fall in tourism, fewer investments, fall in agricultural production, and loss in trade.

The Ebola virus affected cross-border trade in different ways. For example, one of the typical and visible effects was the trade in bushmeat. Bushmeat trade has been traditionally massive in West Africa, and a significant number of people in the workforce are involved in the trade (Fa et al., 2006). According to Akani et al. (2015), after the spread of Ebola in many West African countries, including Nigeria, there was a collapse of all the main traded types of animals after Ebola had reached Nigeria in June 2014.

Many countries in West Africa had to place restrictions on the movement of people and the flow of goods to curb the spread of the virus. Quarantine centers were established in areas where the risk of infection was high, and, in some cases, borders were closed. There was an inverse relationship between the measures put in place to combat the pandemic and the flow of internal and regional trade since the official figures of the reduction in trade did not include informal trade, which accounts for a significant amount of total trade flow. Mobility constraints implied breaks in the supply chain that scaled back production and revenues for the government (Sy and Copley, 2014). In 2011, informal cross-border trade in West Africa was estimated to range from 20% of the GDP in Nigeria to 75% in Benin (Africa and Ajumbo, 2012). The Ebola pandemic in 2014 led to approximately 11,300 deaths. In terms of the economic impact, there are estimates of a US\$ 53 billion loss from the economic and social impacts of Ebola in West Africa. An important lesson learned from the Ebola outbreak, despite the fact that some countries encountered a limited health impact of the outbreak, is that the economic consequences can be devastating and long-lasting. Liberia is a suitable example, as it saw its GDP decline 8 percentage points from 2013 to 2014, even as the country's overall death rate fell over the same period (Fernandes, 2020).

3. Macroeconomic Effects of COVID-19 Pandemic

3.1 Mortality rate

The numbers of deaths and illnesses have long been used as an indicator to evaluate the economic damages of an outbreak or pandemic and the loss of future income due to death and disability. Mortality rate is considered as the estimate of the proportion of a population that dies during a specified period. Other costs resulting from deaths due to illness include time lost, the loss of income from not working, and medical care expenditures since most households in sub-Saharan Africa do not have health insurance (Atake, 2018). Policymakers have the advantage of being able to draw from previous pandemics in thinking about economic recovery strategies of the current COVID-19. Insights and evidence from prior outbreaks can provide some useful information such that researchers and policymakers can start thinking about the full implications of COVID-19. According to Fernandes (2020), initial studies have suggested that there is no clear correlation between the economic impact and mortality rates of the COVID-19 pandemic but rather that the collapse of many economies is a result of governments,

companies, and consumers' reactions propagated by the media. This has led to a significant shock in supply and demand. (Fernandes, 2020).

3.2 Supply chain

The concept of supply chain can be defined as an integrated manufacturing process wherein factors of production are transformed into finished products, then delivered to customers (Beamon, 1999). As governments around the world continue to force quarantines and other restrictions on movement, seen in the continuous closures of businesses, schools, and factories, there is a common understanding that the economic costs will be considerable. One important aspect that should not be underestimated is the disruption to the integrated international supply chain. In 2020, the pandemic has severely affected the flow of goods and services, leading to many countries currently facing a slowdown, and the prices of metals, oil, and other materials have also fallen due to expectations of lower demand (Maffioli, 2020).

It is expected that sub-Saharan Africa will be significantly affected by the COVID-19 pandemic. According to the World Bank's biannual Africa's Pulse report, the pandemic will affect the growth rate negatively, and a decline between -2.1% and -5.1% is expected by the close of 2021. This depends heavily on the measures that the different governments of the continent have put in place to combat the pandemic. Sub-Saharan Africa has been enjoying a growing trade linkage with the rest of the world through the steady increase in exports to Asia. Despite many African economies still concentrating heavily on the production of resource-intensive products, such as petroleum, minerals, metals, and primary goods, some economies, such as Ethiopia and Tanzania, have managed to diversify their export portfolios during the boom in exports to Asia (Zeng, 2020).

The COVID-19 pandemic is slowing down the flow of both national and cross-border trade as the supply chain is being disrupted due to the supply-demand shock affecting the global economy due to ripple effects. The problem of the collapse in the supply chain especially in 2020 was further aggravated in some countries by the widespread geopolitical and economic instability. Recovery will also depend on how fast Africa's main trading partners recover from the pandemic. With China gradually reopening its economy, implying the same for Africa's key trading partners, some African economies might soon start seeing improvements in exports.

4. Modeling the Long-run Impact of Pandemics

Cross-country data is normally used to estimate the macroeconomic impact of pandemics on the selected countries. If the Great Influenza pandemic of 1918–1920 was considered by some experts as one of the most significant negative macroeconomic shocks for the world, can the recent COVID-19 pandemic be the next? The distinguishing factor about the Great Influenza is that there is a large challenge in distinguishing it from the aftermath effects of World War I. Nevertheless, the outlay on resources by governments to attempt to limit the damage resulting from the contraction in economic activities was substantial. The mortality shock of COVID-19 will likely remain two orders of magnitude smaller than that associated with the Spanish flu (Altig et al., 2020).

Seen in this light, the significant economic toll of COVID-19 is anomalous. By March 2021, approximately 1 year after the new coronavirus had become a global pandemic, and when the first case was detected on the African continent, 116,830,061 cases had been detected. Of this total, the number of confirmed cases on the African continent was 3,964,055, approximately 3.45% of the global COVID-19 cases (Anyanwu and Salami, 2021). Using annual, country-level regression models, Barro et al. (2020) estimated Spanish-flu-generated economic declines of 6% and 8% in GDP and consumption, respectively, in a typical country. The COVID-19 pandemic appears to be driving similar, and probably larger, percentage declines in GDP and consumption as compared to those due to the Spanish flu. Despite the expected declines, the COVID-19 mortality shock is very small as compared to that caused by the Spanish flu.

4.1 The problem of using GDP

This “direct” impact of the pandemic has reduced and continues to reduce the GDP growth rate. The precise figure and percentages will depend on what proportion of the population become ill, what the fatality rate is, and how many people are absent from work and cannot work from home in an attempt to not contract the disease. Forecasts of the impact on the GDP for the whole year following the pandemic are not very accurate, partly because outputs have shown to fluctuate due to governments’ responses to the closures and openings of economies. Some experts might assume less severe effects and a positive GDP as firms replenish diminished stocks and meet postponed demands. As the months proceed, the availability of data makes it easier to analyze the impact of the pandemic on GDP growth.

Despite the advantages associated with the GDP, it has proven to fall short in measuring the true economic effects of these pandemics. Some countries, such as Australia, have made adjustments to the GDP to cater to their well-being. One such measure is the Herald/Age-Lateral Economics Wellbeing Index, which adjusts the GDP to take account of changes in education, health, work-life, social inequality, and environmental degradation. According to Matt (2020), this creates a much broader measure of national progress than the traditional GDP measures. These measures are rarely found in countries located in sub-Saharan Africa due to the difficulties in conducting such measurements.

4.2 Uncertainty and government action

Uncertainty at times relates to potential government policy responses. When modeling policy responses, econometric models will likely include different scenarios of government interventions, which include, but are not limited to, fiscal policies in the form of relief packages for both households and firms during a pandemic. A time lag is, in essence, the time between when the policy response is announced and when households and firms receive the relief packages. Another problem is the criteria used to differentiate those who need the packages from those who can survive without the packages. Despite the uncertainty that can exist, according to Kiss-Dobronyi (2020), modeling government policy responses could play an important role in understanding the effectiveness of government action, and it can also identify how the spread of COVID-19 will affect different economic sectors.

Uncertainty about the continuing spread of the coronavirus is accompanied by fear as people fear for their health and their lives. Frugality is widespread as people are also uncertain about the future of their livelihoods. This can lead to a situation where business leaders find it difficult to make reliable plans for investment. Attempts have been made to overcome the problems associated with uncertainties. Some authors, such as Onatski and Williams (2003), presented a lag specification of uncertainty and took into consideration the serial correlation of shocks and

the effects of real-time data, incorporating these as one coherent structure into their model to analyze the effects of uncertainty on monetary policy decisions. The authors argued that different specifications of uncertainty may have significantly different implications for monetary policy. Uncertainty is toxic for economic recovery as each pandemic has unique characteristics, and the extents to which different pandemics spread across the globe are varied. The speed and scale of previous shocks in the modern era cannot be compared to those of the COVID-19 employment shock.

In the analysis of pandemics, different econometric models have been used over the years with different outcomes. For example, COMPACT has been used to study the economic effects of the influenza pandemic. The focus was on policy analysis rather than short- and long-term forecasting. A consumption function is included in the model, which is derived from a vintage production technology, an intertemporal optimization, nominal rigidities in wage and price settings, and trade equations (Darby et al., 1999). COMPACT tried to bridge the gap that has been present between econometric macro models and macroeconomic theory for a long time. According to Wren-Lewis (2020)¹, some lessons from the application of COMPACT to previous pandemics can be of relevance to the coronavirus pandemic. However, one key assumption that was made in the study of the influenza pandemic was that it was mainly a 3-month affair, which is evidently not the case with the coronavirus pandemic. Based on that assumption, the current coronavirus outbreak has characteristics different from those of the influenza pandemic.

It is difficult to find a model that can simultaneously assess how a disease will spread and how the economy will react. Due to uncertainties, estimates of infection rates have very wide bands. Augmented Computable General Equilibrium (CGE) models have been used to analyze past pandemics. A typical example is the G-cube model, which has been designed to provide a bridge between the CGE models and macroeconomic models by integrating the more desirable features of both approaches (Mckibbin and Wilcoxon, 2020).

The problem with CGE models is the assumption that they make in claiming that the global economy is in equilibrium, even in the middle of a crisis (Pollitt, 2020). This is barely true as, during any pandemic, the global economy tends to experience both demand and supply shocks. For example, lockdowns reduce the working capacity and, therefore, reduce the level of production, and restrictions on movement and feelings of panic among households further reduce people's spending powers, hence bringing about a fall in demand. A supply imbalance was evident during the lockdown as some basic necessities, such as toilet paper, were out of stock, and Apple had scaled back its iPhone production in some of its factories. This imbalance was further exacerbated in the agricultural sectors where farmers had to dump tons of fresh flowers, fruits, and buried potatoes due to upsets in the supply chain. The CGE model will find it difficult to accommodate the above changes. An augmented version of the CGE model, such as the New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model, commonly used by the Organization for Economic Cooperation and Development (OECD) in their policy analysis, lacks the sectoral detail that is notably important for extracting any meaning from the analysis (Pollitt, 2020).

To address some of the policy challenges mentioned, new models, such as the E3ME model, have been developed and applied in assessing different policy challenges as they are believed

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to be able to capture sectoral disaggregation. E3ME (e3me.com) is a macro-econometric model designed to assess global policy challenges and is an integrated, global, dynamic simulation macro model used for analysis. The model provides an approach that can add further insights to global policy challenges that cannot be achieved from more traditional CGE models (Action, 2018). It has been used for policy assessment and forecasting and can assess both short- and long-term impacts. It has also been proven to perform better in its assumption about stimulus policies being ineffective than the CGE model. Despite being considered to be an advanced model in forecasting, the range of uncertainties in the inputs—for example, fatality and infection rates—continues to make it inadequate for forecasting the long-term economic impact of pandemics.

To model the effect of coronavirus scenarios in the E3ME model, key assumptions have to be made. Though the E3ME model provides a framework to assess both the demand- and supply-side shocks associated with such a scenario, as mentioned above, the problems are the uncertainties that prevail with the pandemic. For example, Kiss-Dobronyi (2020), from Cambridge Econometrics, modeled the effect of the coronavirus using the E3ME econometric model, assuming several outcomes of the infection. The assumptions include the loss of working hours due to severe symptoms as time is needed for people to recover from the virus and the strict global quarantine period lasts for up to a month. The lockdown or quarantine period is not consistent across the globe. Governments are unable to effectively cooperate, and there is a lack of uniformity in the application of strict measures. The emergence of the second and third waves of the pandemic have been observed in some countries, and the governments have been forced to close parts of their economies for the second or third time². In addition, in this model, the experience of past pandemics and the magnitude of the effect seen in China, as one of the first countries to have been affected by the pandemic, were used to overcome the uncertainty of the demand-side effects. Using past experiences from previous pandemics to forecast the effects of the coronavirus pandemic has shortfalls due to the growth in technology reshaping the demand and supply patterns.

5. Conclusion

The COVID-19 pandemic has placed epidemic modeling at the forefront of worldwide public policymaking. Better preparedness through the strengthening of the public health system—for example, through the creation of a regional center for disease control—can be very effective in providing real-time data on the crisis and how the pandemic can be managed regionally given the interconnectedness of African economies. As the world population continues to grow, and with the increase in the integration of world economies, the interaction between people and animals will increase, and this interaction will likely lead to new and re-emerging pathogens that will appear even faster than previous ones. There is an urgent need for governments in sub-Saharan Africa, especially the least developed countries, to invest in improving their fragile health systems and for donors to support their preparedness. It is essential that the international community be more alert and engage in a timelier manner as compared to what it has done regarding the COVID-19 pandemic to defeat future health threats affecting countries of lower economic status.

Experience has shown that there will likely be more pandemics in the future, and how mankind deals with them will depend on people's interaction and cooperation. Previous pandemics and

² This has been seen in South Africa, Rwanda, Mauritius, Australia, and Germany.

outbreaks, such as SARS and Ebola, have demonstrated the importance of regional cooperation in addressing pandemics. Well-developed regional institutions are needed to ensure accountability and also to ensure that national economies adhere to regional policies and actions put in place to combat the pandemics. The United Nations Economic Community for Africa has identified some of the institutions that need urgent attention as follows: a robust human resources management system in the health sector; proper regional supply-chain management; financial resource mobilization; and improvement in the data and information and communications technology (ICT) infrastructure on the continent and partner engagement, coordination, and communications.

Overall, the greatest economic consequence occurs when a pandemic mostly targets the working-age population and when there is a shutdown of the economy, and the healthcare system is overloaded. The coronavirus seems to cause more severe symptoms in people of old age, sparing the young and middle-aged groups. The true economic effect remains to be ascertained, and the long period of economic shutdowns in some countries, such as Mauritius and South Africa, due to the emergence of second and third waves is having damaging effects on these economies.

Behavioral changes during and after a pandemic are of the essence. It is merely a matter of time until new public health measures are phased in, though some of the recommendations with regard to behavioral changes will likely be different from social and cultural conventions in many ways. However, as time is of the essence, people will gradually adjust to a new normal way of life. Changes in social expectations, such as wearing face masks in public or refraining from shaking hands, can become the norm, as has been observed in some Asian countries, such that people can leave their homes and feel safe again.

Collaboration and trust between local communities and government institutions, along with the respect of community members, are all necessary conditions needing to be present to mitigate the risks and effects of potential future pandemics. According to Lagarde (2018), the world is facing a crisis of trust in institutions across all sectors. In a survey carried out by the Edelman Trust Barometer, 20 of the 28 countries surveyed showed that the average trust in institutions was less than 50%. The persistence of corruption in society and the abuse of public offices for private gain will continue to create an environment that will worsen the crisis of trust, which sustains a vicious cycle that undermines economic health and social cohesion.

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