EXTERNAL–INDUCED SHOCK OF COVID-19 PANDEMIC ON STOCK MARKET VOLATILITY IN AFRICAN COUNTRIES: AN EMPIRICAL ANALYIS

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Abstract: The paper empirically investigates the impact of the external-induced shocked of COVID-19 pandemic on the stock market volatility for 15 African countries. Stock returns volatility is generated using the GARCH approach and is regressed on infection-induced shock and death-induced shock, respectively. The pooled Ordinary Least Squares (OLS) and System-GMM estimation procedures were adopted. The empirical findings show that these COVID-19 pandemic generated severe negative shocks that led to strong volatiles in the stock markets of the countries examined. The paper recommends strong economic interventionist policies and resilience to mitigate external shocks associated with uncertainties like the COVID-19.

Keywords: External-induced shock, COVID-19 pandemic, Stock market volatility, Economic vulnerability

JEL Classification: I10, I15, F1

1. INTRODUCTION

The COVID-19 pandemic had significant negative consequences on global economies including African economies. Despite the fact that COVID-19 was recorded relatively late in Africa, it spread to 52 countries within a very short period (Seko-Baga, *et al.*, 2023). Among the critical sectors particularly hit was

the stock market, where it generated adverse effects on stocks in the form of volatility. The pandemic affected the entire economic system causing stock market to decline, resulting in herds' behaviour and financial contagion in which foreign investors engage in mass repatriation of investment funds. Particularly revealing was that the COVID-19 exposed the inherent gaps and weaknesses in Africa's public health system and weak resilience to externally-induced and transmitted shock. The economic impact of COVID-19 has been largely different across countries and regions in line with the prevalent economic and structural vulnerability and the degree of resilience (see Chriscaden, 2020; Ang, 2020).

According to the World Bank (2020), Africa's growth performance declined from 3.5% in last quarter of 2019 to between -2.7% and -6.2% in 2020. The situation took an even sharper turn in 2020 when the COVID-19 pandemic triggered the first recession in SSA in 25 years, leading to a contraction of about 2.1% in regional GDP (World Bank, 2021). The decline was primarily due to significant economic contractions in the continents four largest economies, Nigeria, South-Africa Kenya and Egypt and Angola. These economise also have the biggest stock markets in the African region. Financial market statistics from the World bank show stock market activities and investment contracted by over 17.5% in the US and Europe for the first three months of 2020. For Africa, with underdeveloped capital market, evidence show that stock market activities decline by over by 20% in the comparable period. The decline was reflected in the diminished economic activities and the pulling out of investment funds by foreign investors to smooth out consumption (Ozekhome & Izilen, 2022). For instance, output contraction in in the agrarian, mining and manufacturing sectors was approximately 15.82%, in the peak of the pandemic spread (World Bank, 2020), The decline in global merchandize trade was 9.32%, while trade in services deteriorated by roughly 7.5% (UNCTAD, 2020; IMF, 2020).

Oil exports, which accounts for about 40 percent of Africa's total exports and 7.3 percent of the region's gross domestic product suffered precipitously, as global oil prices plummeted significantly, and Africa's oil exporting economies were affected by fluctuations in oil prices. Africa's fuel revenues shrinked by more than $65 billion by 2020, with Angola, Nigeria, Libya and Algeria among the worst hit. Their average oil exports from 2016-2018 accounted for 90 percent of total exports, while Congo and Gabon accounted for 55 percent. Due to the relatively small oil export of South-Africa, Egypt and Ghana, their effects were

relatively small. The oil price-pass through to stock market channel generated output decline, investment contraction, foreign trade disruption and decline, loss of industrial output, increased risk to financial institutions and capital market short-term-volatility (see Seko Baga *et al.*, 2023).

The exports of South-Africa, a major trade and economic stronghold in Africa fell by over 10.5% in the second quarter of 2020, and that of Kenya, a key regional trade centre in East Africa, and a major economy in the African region declined by 10.1. These contractions were replicated in diminished stock market activities as well as instabilities (Ozekhome, 2023). Two other countries, Egypt and Nigeria also suffered significant declines owing the disruptions caused by the pandemic as market capitalization in African stock markets drop significantly from their pre-pandemic levels and liquidity and savings constraints exacerbated following massive herd's behaviour of risk-averse investors, who pulled out a significant chunk of their investment resources from the stock market to prevent huge capital losses (Ozekhome, 2023). Average stock market performances in Africa significantly reduced during and after the COVID-19 to between -2.7% and -21.0% (IMF, 2020).

For Africa, the restrictions on trade, broken supply chain and production disruptions resulted to significant economic contraction, decline and instability in stock market activities. Away from the health risks, the COVID-19 shock to Africa was in three critical dimensions, lower trade and investment; a demand slump associated with lockdowns, and; a continental supply shock that affected domestic and intra-African trade (OECD, 2020; Ozekhome & Izilein, 2022). Some studies (see Ang, 2020; World Bank, 2020; Eichenbaum *et al.*, 2020; Barro *et al.*, 2020; Albu, *et al.*, 202; Ataguba, 2020) have examined the impact of the COVID-19 pandemic on economic performance at regional and cross- country levels. There is however, paucity of empirical studies on the external-induced shock of the pandemic on stock market volatility. Given that the financial market constitutes the main resource and investment mobilization channel, and the fact that volatility shock can easily be transmitted to the entire economy, a study as this is timely and of great importance to policy and investment analysis.

1.2. Statement of the Problem

The coronavirus pandemic, known as COVID-19, had detrimental impact on financial markets, across the globe. In Africa, the effect of the pandemic was

very challenging, given the underdeveloped, evolving and externally-dependent nature of their capital markets. Nigeria, South-Africa, Egypt and Kenya capital markets were severely hit by the pandemic, although the impact varied significantly. The fact that African economies are highly vulnerable to externally-induced and transmitted shocks, the disruption in investment caused by the coronavirus pandemic was devastating. Some studies (see OECD; 2020; Kassa, 2020; McKibbin & Fernando, 2020; Gruszczynski, 2020) have examined the impact of the novel coronavirus pandemic on global trade. Nevertheless, none of these existing studies has modelled the disaggregated impact of the COVID-19 shock, in terms of infection-induced and death-induced shocks and the implications on stock market volatility. Such analysis is critical given the fact that the variability of the stock market is more problematic and thus, poses a more challenging policy issue to African policy makers, government and market regulators.

This papers, therefore, seeks to fill the gap by examining the impact of the external-induced shock of pandemic on stock market volatility in a sample of African countries. To this end, the finding of the study will have immense policy outcome relevant for effective macroeconomic and financial management, particularly in ensuring the stability of the stock market in times of uncertainty and externally- induced shock. Following this introductory Section, the rest of the paper is organized as follows. Section 2 provides some stylized facts. The literature is presented in Section 3. Section 4 contains the methodology and data and Section 5 presents the empirical results and discussion. The conclusion and evidence-based policy recommendations are presented in Section 6.

2.   SOME STYLIZED FACTS

The first case of the novel Coronavirus (COVID-19 Pandemic) in Africa was 14th of February, 2020, after it was reported in Wuhan, China in 2019. The World Health Organization (WHO) officially declared it a pandemic in March, 2020. From initial COVID-19 tested positive cases of 52, a rise of 5 % percent was followed. This figures increased astronomically at the global level. By 29th February 2020, 85,403 confirmed cases were reported (95.5% in China); 2,924 deaths; 49 countries affected; 3 countries affected in Africa, Egypt, Algeria and Nigeria. The rise continued in the succeeding months of January 2020 at an astronomical level, with China, USA, Italy and the United Kingdom accounting

for a large proportion of the growth. At the global level, as at 27th February, 2021, over 123 million people were confirmed to have contacted the diseases, with 2.7 million deaths, following data released by the World Health Organization (WHO).

Apart from the humongous deaths recorded, economies of developed and developing countries have been greatly hit, with vast shortage of medical facilities and the needed personnel, including millions of job losses due to declining productivity and production stoppages arising from total lockdown, trade restrictions and confinement measures. In Africa, as at 24th February, 2021, the total number of confirmed cases stood at 4,333,259. According to the COVID-19 outbreak situation report by the Nigeria Centre for Disease Control (NCDC), the first active COVID-19 case was recorded in Nigeria on 27th February 2020, when a 44-year-old Italian citizen was diagnosed with the virus in Lagos. The five countries with the highest rate of infection of the novel coronavirus (COVID-19) in Africa are Egypt, Algeria, Kenya, Nigeria and South-Africa. With the restriction on movement, lockdowns, border closure and isolations, African business, trade and investment performance fell drastically, with many of the African countries yet to fully recover till date. The external induced shock of the pandemic on African stock markets was in two dimension, infection-induced shock and death-induced shock, both which combined to cause instability in the market by an average of arising from the uncertainty syndrome

3. THEORETICAL AND EMPIRICAL LITERATURE

The theoretical foundation of the nexus between COVID-19 and stock market is the pandemic proliferation theory, attributed to Anderson and May (1992) and Gersovitz and Hammer (2004). The main tenet of this theory is that pandemic proliferation has adverse impact on economic performance, which in the context of this study is demonstrated in stock market. The theory posits that through the contractive effects of pandemic spread, trade, business and investment are negatively affected given that the spread of infectious diseases and epidemics like Spanish Flu, HIV, Ebola, and COVID-19, for instance result to huge economic losses in the form of line production cuts arising from lockdowns and other containment measures to control the spread. Chakraborty, Papageorgiou and Sebastián (2010) expounding on the theory suggest that the

infection dynamics and development of contagious aliments due to diseases and pandemic results to a significant decline in economic activities, such as stock market activities, business, trade and investment (Ozekhome & Izilein, 2022). Contextualizing this theory in terms of the stock market, it is seen that thus, the COVID-19 had a significant detrimental impact on financial activities, particularly stock market causing instability due to widespread uncertainty (Ozekhome & Izilein, 2022).

On the empirical nexus between COVID-19 and stock market volatility, several authors concentrate their analyses on the medical side, trying to estimate the extent to which the medical system/facilities have been exposed at the maximum expansion level due to this pandemic. Other authors try to directly model the expansion mechanism within the population, as well as the dynamics of the pandemic (Harpedanne, 2020). Some authors attempted to evaluate the impact on certain economic sectors, for instance, stock market (Ataguba, 2020; Ivanov, 2020; Karnon, 2020; Sirkeci and Yucesahin, 2020; Zhang *et al.*, 2020). Studies (see Ang, 2020; World Bank, 2020; Eichenbaum *et al.*, 2020; Barro *et al.*, 2020; Albu, *et al.*, 202; Ataguba, 2020) have examined the link between pandemic and economic activity. These studies (see Eichenbaum *et al.*, 2020; Kohlscheen *et al.*, 2020; Correia *et al.*, 2020) simulate certain scenarios of the impact of the pandemic on economic activities and specific sectors.

Other studies investigate the impact of coronavirus pandemic on the economy in general (see Barro *et al.*, 2020; Correia *et al.*, 2020; IMF, 2020; Jordà *et al.*, 2020; Kohlscheen *et al.*, 2020; McKibbin and Fernando, 2020; OECD, 2020; Saez and Zucman, 2020; UNCTAD, 2020). Craven, Liu, Mysore and Wilson (2020) , for instance, examine the implication of COVID-19 pandemic on business and production capacity in developed and developing economies, utilizing dynamic global model. He finds evidence that the pandemic impact negatively on the production capacity of manufacturing firms, thus limiting business and trade. Carliguiri *et al* (2020) utilizing decomposition estimation approach, find that the COVID-19 has altered the work environment, cities and continents, making them face turbulent challenges, with severe economic downturns, political instability, and escalating a people-based crisis, causing insecurity, disempowerment and vulnerability for individuals, trade and organizations.

Carnevalea and Hatakb (2020), utilizing conceptual and statistical approaches examined the impact of the COVID-19 pandemic on the economic

well-being of people and the Implications for policy analysis. The evidence show that the pandemic had a detrimental impact on the standard of living of people due to business, trade and investment lockdowns that characterized the period. Based on the findings, they recommend appropriate government fiscal responses to mitigate the effects of such exogenous shocks on the people in times of uncertainty.

Takyi and Bentum-Ennin (2021) evaluates the impact of COVID-19 on stock market performance in Africa. They utilize panel evidence from a sample of thirteen African countries, and daily time series stock covering October 1, 2019- June 30, 2020 and a novel Bayesian structural time-series approach (a state - space model) to evaluate the relative impact of the COVID-19 pandemic on stock market performance in those countries. The results show that the COVID-19 caused significant deterioration in stock market performance in Africa between -2.7% AND -21.0%. At the level of heterogeneity, 10 countries' stock markets are adversely and significantly affected by the pandemic, while three countries had no robust impact (or a somewhat short-term negative effect). Further findings show that across the sample, there is nearly no likelihood of a positive impact of the COVID-19 on African stock markets. The finding of a negative and significant decline in stock performance of 14 African stock markets is also found by Raifu (2021).

In a recent IMF (2022) study on the global impact of the COVID-19 pandemic on business and investment based on sectoral analysis, it is found that the pandemic contracted African stock market and investment by over 15%, resulting in loss of trade and investment finance. The study concludes that for African markets to improve significantly, strong policy interventions to increase investment inflows are needed.

Udeaja and Isah (2022), utilizing dailypool Mean Group (PMG)-based panel ARDL data set spanning January 5, 2015 –January, 28, 2021 assesses African stock market's reaction to COVID-19 based on evidence of countries with high vulnerability. Specifically, they divided the period of analysis into different phases of the COVID-19 outbreak covering pre-COVID, epidemic and pandemic periods. The findings show evidence of declining stock returns during the epidemic phase of the COVID-19. This, according to the findings was fundamentally due to international oil price changes as well as changes in exchange rates.

Tetteh, Amoah and Ofori-Boateng and Hughes (2022) investigate stock market response to COVID-19 pandemic based on comparative evidence from two emerging markets of Botswana and Ghana using daily time-series data from March 1, 2020-September, 30, 2021. The study estimates parametric, semi-parametric and non-parametric models and finds evidence of the negative impact of the COVID-19 on stock market performances of Botswana and Ghana. The study further finds that the quantitative impact of the pandemic on Ghana's stock market is greater than that of Botswana The study recommends strong fiscal and monetary policies aimed at building a robust stock market to withstand to withstand external shocks as the COVID-19 pandemic.

Barttacharjee (2022), using cross-country evidence from the developed stock markets in North-America and the frontier market in Africa and volatility modelling EGARCH techniques, investigate the impact of epidemics like the Black Swan event on the volatility of stocks. He finds that the developed markets and frontier markets in Africa are associated with a symmetric volatility response to COVID-19 pandemic.

Onourah, Ehiedu and Okoh (2022) investigate the nexus between COVID-19 crisis and stock market volatility in Nigeria. They utilize GARCH (1,1) and EGARCH models. In particular, the sought to examine the differences in the performance of stocks due to COVID-19, as well as determine volatility persistence and leverage effects on stocks in the stock exchange floor. The results show that there existed volatility in the market. However, volatility persistence was found to be low. Other studies that find significant negative volatility in stock markets as a result of COVID-19 are Topcu and Gulal (2020), Kusumahadi and Permana (2021), Kunjai (2021), Vo *et al.* (2022), Jaben (2022), Adeboye (2023), Cevik (2023), Prempeh *et al* (2023), amongst others. The general findings of these studies reveal that COVID-19 caused significant instability in African stock markets.

Using evidence form a sample of African countries and the GARCH model, the impact of COVID-19 on stock returns conditional volatility in South-African stock market as well as the volatility of African capital markets is investigated by Cevik (2023). The findings of the forecast values indicate a constant trend of volatility shocks for all the countries in the continuous presence of COVID-19 pandemic. The paper suggests strong measures to stabilize the market from external shocks induced by COVID-19.

Seko Baga *et al* (2023) assess the economic impact of Covid-19 on Africa, based on several economic performance indicators that include stock market and investment. Employing descriptive statistics and comparing based on economic outcomes of the pandemic compared with pre-pandemic levels; the findings indicate that various economic indicators suffered a downward decline. They further find that the impact of the pandemic on Africa's major trading partners such as the USA, Europe, NAD China, exacerbated the problem

Ozekhome (2023), using evidence from Utilizing panel data evidence from thirty African countries and the Fully Modified Ordinary Least Squares (FMOLS), as well as System-GMM, finds that the coronavirus pandemic had a significant detrimental impact on African external trade and finance arising from economic shutdowns, broken production and supply chains (i.e. a continental supply shock and a demand slump. He recommends robust shock-mitigating measures to mitigate the effects of external shocks and vulnerabilities such as the COVID-19 pandemic.

Gap (s) in Literature

Whereas empirical studies on the impact of COVID-19 on economic performance are rife, sectoral-based studies on the subject matter is still scanty. Given that the economy wide-effects of the COVID-19 can only be effectively analysed from the sectoral-induced effects, and the fact that the aggregation of the micro effects make up the macro effect, it becomes imperative to model the impact of the external-induced shock of the pandemic on a resource/investment channelling sector like the stock market, particularly with respect o its instability. This is because, more than anything, the stability of the stock market is much more important for investment decisions than the average market performance. Besides, while country-specific studies have been the major focus of the modelling of the impact of the pandemic (see for instance, Zhou, *et al.*, 2020), this paper utilizes cross-country evidence to analyse the impact of the external-induced shock of the pandemic on stock market volatility. This is an advance and significant contribution to the literature in terms of a regional – based pandemic-induced-shock effect on capital exchanges in Africa, particularly given the structural peculiarity of the African financial markets, and their vulnerability to externally generated and transmitted shocks, particularly the episodic nature of their stock markets.

4.   EMPIRICAL METHODOLOGY

4.1. Theoretical Framework

The theoretical basis of this study is the pandemic proliferation dynamic theory. The theory is used as the basis of this study because it comprehensively models the dynamic relationship between COVID-19 and stock market activities. In line with the theory, pandemic spread has a destabilizing impact on economic activities, and hence stock market. By inducing uncertainty and negative shocks in the macroeconomic environment, the stock market is subjected to instability (see Gersovitz and Hammer, 2004).

4.2. Model Specification and Estimation Strategy

To effectively capture and model the external-induced shock of the COVID-19 pandemic on stock market volatility in African countries, we decomposed the shocks into two variants, according to the degree of perceived impact; infection-induced shock (INFECS) and death –induced shock (DINS). Following this, the empirical model is specified as:

$$SMV_{i,t} = \alpha_0 + \alpha_1 INFECS_{i,t} + \alpha_2 DINS_{i,t} + \varepsilon_{i,t} \tag{1}$$

where SMV $_{it}$ is the dependent variable, here, Stock market volatility, where the volatility of stocks is generated using the GARCH process, INFECS is shock owing to infection (i.e. shocks arising from fear of infection or contamination of the virus), and (DINS) is shock arising from fear of deaths (i.e. fear death-induced shock), i represents the number of countries (i.e. 15 African countries), and t is year fixed specific effect; $\alpha_1 - \alpha_2$ are parameters to be estimated, and å is the unobserved error term.

The apriori expectations are $\alpha_1, \alpha_2, < 0$.

The estimation is done using the Fully Modified Ordinary Least Squares (FMOLS) and the system-GMM, with the latter used for the test for robustness and policy inferences. The FMOLS corrects for autocorrelation, potential endogeneity of regressors and reverse causality. It is able to account for considerable heterogeneity to produce asymptotic unbiased, consistent and efficient estimates (Pedroni, 2000). The system-GMM, on the other hand, is asymptotically efficient, robust to heteroskedasticity, and capable of addressing the problems of endogeineity, omission bias and reverse causality (simultaneity). The system-GMM estimator also provides highly precise and

less biased and consistent estimates when compared to the first-differenced-GMM estimator.

4.3. Data

Monthly COVID-19 data for seventeen (17) African countries, from March to November, 2020 is utilized for the estimation. The countries include Nigeria, Ghana, South-Africa, Kenya, Egypt, Algeria, Angola, Sierra-Leone, Botswana, Ethiopia, Togo, Cameroon, Senegal, The Gambia and Guinea. The choice of the countries is partly based on the fact that some of dominate constitute the big African financial markets, and by implication, big stock market, particularly, Egypt, Ghana, Kenya, Nigeria and South-Africa), and partly on account of the fact that the countries recorded the highest COVID-19 infection rate during the period of accelerated growth in the pandemic. The year 2020 marked the Covid-19 pandemic and its impact on African economies. The data were sourced from various sources to include the World Bank World Development Indicators (WDI) and Worldometer. Specifically, data on the coronavirus pandemic are obtained from World meter. Many international data sources on the coronavirus pandemic exists. Worldometer hosts the most popular, where the official data for eleven indicators regarding the pandemic expansion, both at global level and for each individual country.

5. DATA ANALYSIS AND DISCUSSION OF RESULTS

5.1. Descriptive Statistics

Table 1 shows the descriptive statistics of the data on the variables used for the analysis. The mean stock market volatility is -12.7 percent, with a standard deviation value of 4.2. The maximum and minimum values are -15.8 percent and -1.22 percent. The mean infection-induced shock is -1.17, while death – induced shock is -1.16.

Table 1: Descriptive Statistics

	Mean	*Median*	*Max.*	*Min.*	*Std. Dev.*
SMV	-12.72	-12.23	-15.8	-1.22	4.20
INFECS	-1.17	-0.99	-1.85	-0.06	0.67
DINS	—1.16	-0.73	-1.13	-0.17	0.23

Source: Authors' estimation

5.2. Test of Endogeneity

The test for endogeneity of the variables against the dependent variable (Trade Growth) is carried out. The test is necessary to determine the appropriateness of the system GMM, given that the system GMM is usually adopted when there is endogeneity problem in a model. The test requires that the error terms or residuals of the instruments are obtained and included in the baseline estimation of the trade model. The result of the Hausman test for endogeneity is reported in Table 2.

Table 2: Hausman Test of Endogeneity

Variable	*Coefficient*	*T-ratio*
Constant	9.014	2.443
INFECS	-68.70**	-2.721
DINS	-1116.2***	-3.102
Diagnostics:		
Adjusted R^2	0.83	
F-statistics	15.78	
Durbin-Watson	1.73	

Note: ***, ** & * indicate significance at the 1%, 5% & 10% levels, respectively.

Source: Authors' estimation

The results show impressive goodness of fit statistics, thereby displaying the suitability of the estimation. Focused is on the coefficient of the residual variable that is statistically is significant at the 5 percent level, leading to rejection of the hypothesis of no endogeneity between stock market volatility and the regressors, a justification for the adoption of system GMM, that has the capacity to address endogeneity bias in the model.

5.3. Main Results

The results of the pooled OLS and dynamic system-GMM results are reported in Table 3, with the focus and policy inferences drawn from the latter.

First lag of stock market volatility is positively signed and statistically significant at the 5% level. Thus, volatility of African stock markets follows a dynamic process and is explained by past volatility. Accordingly, previous volatility tends to fuel current or future volatility in the market, Infection-induced

Table 3: Estimates of COVID-19 Pandemic-induced Shock and Stock Market Volatility and

Variables	Pooled OLS	Two step-System-GMM
C	-1.13	
	(0.45)	-
SMV(-1)		0.721**
		(2.15)
INFECS	0.065	1.07
	(1.88)	(2.32)**
DINS	0.018**	1.19**
	(2.25)	(3.17)
RESID	-1.162***	-4.871
Instrument Count		6
p-value of Sargan test		0.712
Hansen-J		2.88 (0.70)
AR (1)		-2.97 (0.03)**
AR(2)		-0.74 (0.61)

T-statistics in parenthesis; ***, ** & * indicate significance at the 1%, 5% & 10% levels, respectively.

Source: Authors' estimation

shock and death-induced shock are positively related to stock market volatility and significant at the 5% and 1% levels, respectively. This implies that the COVID-19 pandemic induced infection and death shocks on stock market activities, through business closures, outright lockdowns, and other solitary confinement measures causing significant disruptions and reductions in economic activities, and consequently precipitating and intensifying volatility in the market via its uncertainty- syndrome. The findings are consistent with the results of Albu *et al* (2020), Ang (2020), Atagbua (2020). A 1% rise in the infection-induced shock and death-induced shock of the COVID-19 are associated with stock market volatility of 1.07% and 1.19%, re4spectively.

The post diagnostic tests for the robustness and validity of the results obtained show that the results are satisfactory. Both the Sargan and Hansen tests of over-identifying restrictions verify the validity of the instruments used in the estimation, and hence, confirm the, appropriateness, validity and consistency of the system- GMM estimator. The empirical evidence

underscoring the choice of the exogeneity of the levels and differenced instruments is thus fulfilled. The post-estimation evidence also leads to the rejection of the null hypothesis of no serial correlation at order one in the first-difference errors, but a failure to reject same at order two {with AR (1) = 2.97 (0.03)*** and AR (2) = -0.74 (0.61)}. There is thus, no evidence to invalidate the model, as it is robust for structural and policy analysis.

6.   CONCLUSION

The paper examined the impact of the external-induced shock of COVID-19-pandemic on stock market volatility, using evidence from 15 African countries. To effectively capture the aggregative shock arising from the pandemic on stock market activities, we decomposed the shock into infection-induced shock and death-induced shock, given that a degree of difference in the individual impacts of the shock on stock market activities COVID-19. The pooled OLS and system-GMM estimation techniques (with the latter also used for the test of robustness) were employed. The empirical results show that the coronavirus pandemic had a significant-externally generated and transmitted shock on the activities of the stock market in African countries, leading to an exponential volatility in the stock market as the spread of the pandemic accelerated up to the peak growth period.

Against the foregoing background, it is important that African countries develop strong policy capacity, economic resilience, effective and efficient initiatives and strategies to address uncertain and vulnerable times, like the coronavirus pandemic. These include economic diversification to mitigate the effect of vulnerabilities and downturn on economies, safety nets and financial soundness, Governance and planning e.g. balancing health priorities with economic and fiscal policies and a strong healthcare system and research and development (R&D) that creates competitiveness. Appropriate government and regulatory interventions to stabilize the capital market in times of vulnerability are also important to9 restoring the financial markets to in Africa to their new normal, after such external shock.

<div align="center">***References***</div>

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