Dynamic Quantile Impact of COVID-19 Pandemic on the Stock Markets in African Countries: Evidence from Rolling Window Analysis

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Abstract: A few studies have been conducted to present the impact that COVID-19 has had on the cost of mobile markets. The objective was to use rolling quantile and quantile on quantile strategies to report the quantile elements between COVID 19 and stock markets using daily data of COVID-19 cases, COVID-19 deaths and stock market ranging from 1st March 2020 to July 31, 2020 to estimate the relative effects of the COVID-19 pandemic on stock market performance in these countries. Quantile cointegration demonstrate that inventory costs are installed with COVID-19 cases, while QQRs show a weak positive relationship at upper quantiles of inventory costs, and a strong negative consequence is observed at lower quantiles of inventory costs. Overall, our posterior estimates show that in relative terms, stock market performance in Africa has reduced significantly during COVID-19. We view that, during our example period, there is basically no chance that the COVID-19 pandemic will significantly affect stock exchange execution in Africa. The experimental results demonstrated that the relapse coefficients of the quantile of financial exchanges changed with COVID-19 cases over the long term and were generally huge for countries without guarantees (5 countries among the 8 countries); furthermore, the results showed that COVID-19 cases can influence the stock market in certain quantiles. Our discoveries add to the conversation and examination on the monetary effect of the COVID-19 pandemic by giving exact proof that the pandemic has limiting consequences for financial exchange execution in African economies. A quantile-on-quantile survey found that the impacts of COVID-19 on market actions differed across quantiles and were heterogeneous and dynamic.

Keywords: Quantile Impact, Stock Markets, COVID-19, Quantile-on-Quantile Regression, Rolling Window

1. Introduction

In February 2020 the World Health Organization proclaimed COVID-19 a worldwide pandemic when it spread to 110 nations with 118,000 announced cases (WHO, 2020). all through the year 2020, the African continent recorded 64,790 affirmed deaths and 2,280,488 recuperations for 2,728,602 recorded cases, (AU 2021). Since the appearance of the COVID-19, the worldwide economy overall and the African countries specifically have encountered an outstanding stoppage more than the monetary emergency of 2008. In any case, the signs demonstrating that this accounting report is genuinely underrated are duplicating. South Africa is the nation generally impacted by the pandemic with 1,057,161

pronounced cases and 28,469 deaths (AU 2021). Curiously, the principal instance of COVID-19 in Africa showed up at February 2020 in Egypt (TV5 Africa 2020). This has required the suspension of government exercises and the execution of severe regulation measures including social separating, travel limitations, remain at-home and different measures in a few nations across the continent.

The quick spread of the COVID-19 infection has impacted every single financial area, including stock exchanges. The securities exchanges of created nations, arising nations as well as African nations experienced critical vacillations. Be that as it may, because of the solid underpinnings of securities exchanges in created nations, the impact of COVID-19 on financial execution might be impermanent and recuperate

during monetary recuperation. Be that as it may, African nations might be impacted by the pandemic for longer. The United Nations has upheld this view that the adverse consequence of the COVID-19 pandemic might be more serious in nations on the African continent than in others continents (WHO, 2020). Past examination upholds the view that, comparative with those in created nations, hazard and return profiles are higher in non-industrial nations Harvey, [1]. This concentrate along these lines investigates the impact of the COVID-19 pandemic on the securities exchanges of 8 African's nations, to be specific Nigeria, Cameroon, Tunisia, Morocco, Zambia, Ivory Coast, Rwanda and South Africa. We select these 8 African nations since they address a significant piece of the African economy (Statista 2021).

Scarcely any investigations have inspected the impact of COVID-19 on monetary securities exchanges. Ramelli and Wagner demonstrated that the more the pandemic expands [2], the more it adversely influences the securities exchanges, while others accept that this pandemic has not impacted the securities exchanges of Iran, South Korea and different nations. Gormsen and Koijen [3]. Additionally, the stock exchange of the 7 arising nations began falling following the COVID in 2020, Shabir et al. additionally upheld the adverse impact of this pandemic on the securities exchanges of the E7 [4] among the couple of China and Russia 2 world financial powers. He, Sun et al. found that the impact of COVID-19 on stock costs relies upon the seriousness of the emergency [5]. Alfaro et al. inferred that it has an adverse consequence of COVID-19 on stock costs [6]. Heyden and Heyden established that fresh insight about the principal passing and the primary pandemic case impacted securities exchanges in an unexpected [7] way, with the securities exchange being adversely impacted by fresh insight about the main demise. Notwithstanding, the restriction of these investigations is that they didn't consider developing business sectors. As indicated above, African nations are bound to be impacted than created nations since returns and dangers are higher in non-industrial nations.

Given the above restrictions, this study adds to the current writing in two ways. In the first place, the principal concentrate on gives specific consideration to African nations. Second, this review utilizes progressed procedures, for example, quantile cointegration, quantile setback test, and quantile-on-quantile relapse technique. These high-level strategies permit inspecting the relationship across the appropriation of the series as well as on the restrictive means and in this manner present a far-reaching connection between the COVID-19 pandemic and E7 stock costs Bhutto and Chang [8]; Chang and Rajput [9]; Chang et al. [10] and Anjum et al. [11].

The rest of this article is organized as follows. Section 2 highlights the empirical literature; Section 3 highlights data sources and measurement and discusses the quantile cointegration test, and QQR approach. Section 4 examines the results Section 5 Robustness Check and Section 6 gives the conclusion of the study as well as the implications.

2. Literature Review

This part highlights the observational writing that analyzes the impact of the Pandemic in COVID-19 the stock market. Shabir et al. introduced the adverse impact of this pandemic on the E7 stock market among the China and Russia 2 worldwide economic powers, Brazil, Turkeys, India, Mexico and Indonesia [4]; their partners demonstrated that the COVID-19 affects the stock price of Emerging countries. Safiyanu et al. Explore the Impact COVID-19 On the Nigerian Stock Exchange Market (NSE) [12] and they Concluded That the Impact is Very considering. He et al. inspected the direct effect of COVID-19 on the stock market of the United States, Japan, Germany, Spain, France, South Korea, Italy and the People's Republic of China utilizing T tests, tests Non parametric Mann-Whitney [13]. Their assessment showed that stock market answer adversely to the COVID-19 pandemic for the time being. Onali Examined the Impact of COVID-19 Related Cases and Death on US Stock Market [14]. Utilizing Garch, the investigation discovered that adjustments of the quantity of cases and passing in the Us and six different nations impacted by the COVID-19 don't affect Us stock return apart from the quantity of announced cases from China. Liu et al. broke down the momentary impact of COVID-19 on the value markets of the 21 nations [15]. Utilizing a technique for concentrating on the occasion, their decisions showed that stock market are adversely impacted by the COVID-19 pandemic. Yan et al. investigated the effect of COVID-19 on the stock market and recommended how a singular financial backer can profit from the market during the pandemic [16]. They analyzed the impact of past epidemics and pandemics and reasoned that these occasions adversely affect the present moment, yet long term markets, markets have been changed and, accordingly, share costs have expanded in the long term. Thus, they suggested exploiting such occasions, financial backer's ought to at first sell the portions of these ventures that are immediately impacted by the infection, while these activities can be bought when the costs of these businesses have diminished impressively. Ozili and Arun concentrated on the effect of COVID-19 on the worldwide economy [17] uncover that COVID-19 adversely affect Nigeria stock market in which the infection energized social removing which LED to has close of monetary business sectors, corporate workplaces, organizations and occasions. Baker et al. inspected the COVID-19 impact on US stock market [18] utilizing text strategies and reasoned that, albeit past pandemics, for example, Spanish influenza reasonably affect the US market, COVID-19 arrived at United States market. Adenomon et al. examine the impact of COVID-19 on the exhibition of Nigerian Stock Exchange (NSE) market [19] due to hypothesis of the staggering impact of this infection on world economy and monetary market. we consider the verifiable information of the everyday All Share Price (ASP) of the Nigerian Stock Exchange (NSE) from second March 2015 to sixteenth April 2020 utilizing the Garch model and the outcome uncovered an adverse consequence of COVID-19 on the stock returns in Nigeria under the period under study. Ahundjanov et al. likewise checked on the effect of Google

Research Requests connected with COVID-19 on the financial exchange execution of non-industrial nations and created nations [20]. Their conclusions, utilizing a Structural Var (SVAR) model in view of a Bayesian surmising, reasoned that Google's pursuit adversely arranged the monetary records. All the more explicitly, their evaluations demonstrate that an expansion in Google's Research Requests Unit at COVID-19 has caused a combined lessening in worldwide monetary files of around 0.38% to 0.069% following a day, while there has been a reduction. Aggregate worldwide monetary lists. Around 0.054% to 0.150% in multi week. Papadamou et al. examined the connection between the COVID-19 pandemic and financial exchange unpredictability in different Asian, Europe, Australian and the United States nations [21]. Their decisions, in light of a model of var board, have gone into a positive connection between Google Trend Metrics for financial exchange unpredictability and COVID-19 pandemic. Goodell and Goutte analyzed whether resources become more related during times of emergency [22]. Utilizing progressed econometric strategies, for example, wavelet intelligence and neuron network dissects, they inspected the job of COVID-19 on four crypto-useful co-movement with seven value files. That's what their decisions demonstrated, as the COVID-19 expanded, the union among cryptocurrents and capital lists has expanded, nonetheless, this positive or insignificant relationship to most cases, proposing that cryptocurrencies. Can't be utilized as a broadening during the economy log jams. A special case has been tracked down in the development of the connection. It moves adversely with value records that recommends that the connection can be utilized as a protected shelter during monetary lulls. Utilizing wavelets, Goodell and Goutte analyzed the connection between worldwide passings and bitcoin costs [23] and tracked down that in the later April 5, 2020, COVID-19 has brought about an expansion in Bitcoin costs.

This study adds to the realized writing by focusing on the impacts of COVID-19 on the stock exchange of 8 African nations, Nigeria, Cameroon, Tunisia, Morocco, Zambia, Ivory Coast, Rwanda and South Africa. We utilize the quantile coting analyzer, the root trial of the quantile unit and the QQR approach. As per the information on the creator, these strategies have not been utilized in the current writing to look at the impact between different quantiles of the appropriation as well as on the restrictive normal. In particular, the quantile-on-quantile approach dissects the impact on different quantile of the absolute number of COVID-19 cases on the quantile of various independent and dependent variables.

3. Data and Econometric Methodology

3.1. Data

The data used in this study was collected from www.investing.com. Daily stock market and the COVID-19 cases of the 8 African's Countries COVID-19 confirmed cases

and death data for each country was obtained from the World Health Organization website. COVID-19 case data were deleted for the days with missing stock price data. We use the log of both COVID-19 and stock price data. Start from March 2020 to end of July 2020. The sample period starts in march because must of African countries had the first case in march except Egypt where the first case of COVID-19 appeared in February 2020 (TV5 Africa 2020).

3.2. Econometric Methodology

3.2.1. Rolling Quantile Regression

Ongoing advancements in the field of applied econometrics propose that board-based unit root testing will in general be more remarkable and stronger than individual time series unit root. Numerous analysts offer various techniques for computing the unit root test in board information and the Fisher type test utilizing the tests ADF and P. P. Galvao [24] expanded the unit root trial of quantiles initially proposed by Koenker and Xiao [25]; This test measurement actually looks at the stationarity of information across various quantiles as well as the restrictive mean of the variable. Galvao [24] expanded Koenker and Xiao [25] in analyzing these issues. To actually take a look at the stationarity of factors on various quantiles and the mean of the series, we utilize the quantile unit root test proposed by Galvao [24]. The accompanying quantile relapse model will be utilized to check the unit root properties of the factors.

$$Q_\pi^x(X_i M_i^x) = \gamma_1(\pi) + \gamma_2(\pi)i + \beta(\pi)Xi - 1 + \sum_{k=1}^n \beta(\pi)\,\Delta X_{i-k} + F_v^{-1}(\pi) \tag{1}$$

where represents the πth quantile of represents the drift term, $\beta(\pi)$ indicates the persistent parameter, i shows linear trend, shows the error of the different quantiles of the distribution.

3.2.2. Quantile Cointegration

Studies in economics and finance show that cointegration between factors shifts as indicated by quantiles Syed et al. [26]. Thus, it revolves around the new quantile cointegration test proposed by Xiao [27]. This test examines the impact on form, scale, and surface of the restrictive transmission of the criticism variable. Xiao [27] further extended the cointegration model used by earlier reviews Saikkonen, [28] by partitioning the errors from the cointegration condition to lead release. This long model is a development of the past usual models since it considers the normal endogeneity problems for past cointegration procedures. Xiao [27] characterized quantile cointegration such that quantile cointegrating coefficients fluctuate across different quantile levels.

In this model, $\alpha(\pi)$ demonstrates the vector of constants. The model is addressed as follows:

$$\text{If we considered } X_1 = \beta + \alpha\gamma_1 + \sum_{k=-s}^s \Delta\,\gamma_{i-k}\prod_k + v_i \tag{2}$$

The new equation will be

$$Q_\pi^X(X_i M_i^x, M_i^y) = \beta(\pi) + \alpha(\pi)\gamma_1 + \sum_{k=-s}^s \Delta\,\gamma_{i-k}\prod_k + F_v^{-1}(\pi) \tag{3}$$

is characterized as in Equation (1), and $\beta(\pi)$ is the float term, $\alpha(\pi)$ demonstrates diligent boundaries, and shows the mistakes for various.

Then, the model in light of the quadratic term is displayed as follows:

$$Q_\pi^X(X_i M_i^x, M_i^y) = \beta(\pi) + \alpha(\pi)\gamma_1 + \delta(\pi)\gamma_i^2 + \sum_{k=-s}^{s} \Delta \gamma_{i-k} \prod_k + \sum_{k=-s}^{s} \Delta \gamma_{i-k}^2 \prod_k + F_v^{-1}(\pi) \qquad (4)$$

The terms in Equation (4) are characterized as above. To gauge the strength of cointegrating coefficients, Xiao [27] proposed a test as given in Equation (4). The invalid speculation in this test is that: $\alpha(\pi) = \alpha$, where π addresses all quantiles. Further, the supremum standard capacity is inferred as test insights by Xiao for the difference in outright qualities. Subsequently, this review utilizestest measurement for all amounts, as well as 1,000 Monte Carlo recreations to acquire the basic upsides of test insights.

3.2.3. Quantile on Quantile Regression

To investigate the total connection between COVID-19 cases and stock records, we utilize the quantile-on-quantile relapse approach on the side of that introduced by Sim and Zhou [29]. This model is a long variation of the standard quantile backslide, which is introduced by joining the nonparametric evaluation and the standard quantile backslide technique. Standard quantile backslide reviews the impact of autonomic elements on various quantiles as well as the prohibitive mean of the consistent variable. Therefore, the quantile backslide strategy yields favored results over the standard least squares procedure. Stone [30] and Cleveland [31] proposed an ordinary straight backslide, which looks at the effect of express quantiles of the free element on the contingent mean of the reliant variable. In this sense, joining customary straight backslide and standard quantile backslide permits us to deteriorate the effect on various quantiles of free and subordinate elements. Accordingly, it assists with bettering grasp the association among free and subordinate variables.

In this survey, we utilize the QQR methodology proposed by Sim and Zhou [29] to inspect the effect of various quantiles of COVID-19 cases on different quantiles of stock records. Thus, we utilize the going with nonparametric quantile backslide model.

$$SP_t = \gamma^\theta(COVID_t) + u_t^\theta \qquad (5)$$

where demonstrates the stock costs for each of the stock markets at time t, deals with the quantity of COVID-19 cases at time t, and θ means the dispersion of the quantile of the quantity of COVID-19 cases. Then the quantile outlier term is addressed by uσt where becomes zero. (.) is not known because data is not accessible on the link between COVID-19 cases and stock records from African countries. The decision of the data transfer capacity is essential to distinguish when the nonparametric method is applied. At the time when the data transmission h is huge, it could create the evaluation gap while decreasing the fluctuation as well as the reverse.

4. Empirical Analysis

Table 1. Descriptive statistics COVID-19 cases.

	Ivory coast	Morroco	Cameroon	Nigeria	South Africa	Rwanda	Tunisia	Zambia
Mean	4306.4540	7081.1050	5921.3680	11558.8200	81395.9900	508.3750	867.9474	960.1382
Median	2065.0000	6740.0000	3052.0000	5530.0000	14100.0000	289.5000	1037.5000	673.5000
Maximum	16000.0000	23301.0000	17325.0000	42700.0000	471000.0000	1960.0000	1530.0000	5250.0000
Minimum	2.0000	2.0000	2.0000	5.0000	5.0000	2.0000	5.0000	2.0000
Std. Dev.	5023.2710	6077.9750	6026.4300	13437.6200	128905.0000	542.4926	446.6736	1184.9710
Skewness	1.0803	0.6624	0.6442	0.9281	1.7283	1.2003	-0.8697	1.6752
Kurtosis	2.7472	2.5587	1.8668	2.4636	4.7477	3.2718	2.4858	5.8275
Jarque-Bera	29.9699	12.3483	18.6452	23.6456	95.0169	36.9668	20.8363	121.7263
Probability	0.0000	0.0021	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000

Table 2. Descriptive statistics Stock markets.

	Ivory Coast	Morroco	Nigeria	South Africa	Tunisia	Zambia	Cameroon	Rwanda
Mean	3.9676	4.0023	4.3510	4.7206	3.8132	3.7805	3.7985	3.9841
Median	3.9734	3.9982	4.3335	4.7067	3.8126	3.8132	3.8177	3.9800
Maximum	4.0085	4.9930	4.4178	5.7390	3.8575	3.8279	3.8956	4.0849
Minimum	3.8667	3.9495	4.3165	4.5823	3.7889	3.4992	3.6239	3.9495
Std. Dev.	0.0272	0.0853	0.0289	0.1433	0.0146	0.0765	0.0489	0.0254
Skewness	-1.8943	10.3538	0.7791	6.1749	0.7555	-2.2578	-1.7111	2.0663
Kurtosis	6.6649	120.5842	1.9177	42.9086	3.7525	7.1286	5.6685	8.0548
Jarque-Bera	177.1269	90874.6600	22.9444	11125.7500	18.1633	238.6563	120.0537	271.7604

This tables presents descriptive statistics of the stock markets and COVID-19 cases data. Panel A presents the descriptive statistics for COVID-19 cases of 8 African's countries whereas Panel B presents the descriptive statistics of stock markets. Jarque–Bera test is used to test the null hypothesis that the data is normally distributed. P-values below 0.05 indicate the rejection of the null hypothesis.

Model	Coeff.	$Sup_\tau \| V_n(\tau) \|$	CV10	CV5	CV1
South Africa	γ β	290.544	121.848	274.548	360.212
COVID$_t$ vs. SM$_t$		2361.980	1258.329	2038.357	3415.317
Rwanda	γ β	3471.425	1946.786	2257.118	2842.457
COVID$_t$ vs. SM$_t$		8482.446	3931.471	4832.778	5834.221
Zambia	γ β	289.325	98.329	124.553	193.332
COVID$_t$ vs. SM$_t$		537.436	233.466	293.567	321.392
Cote d'Ivoire	γ β	673.428	289.653	302.474	453.548
COVID$_t$ vs. SM$_t$		938.239	402.227	542.553	748.432
Tunisia	γ β	948.557	348.971	493.672	684.369
COVID$_t$ vs. SM$_t$		1835.632	993.580	1039.654	1546.328
Nigeria	γ β	783.557	375.448	499.256	589.578
COVID$_t$ vs. SM$_t$		1246.449	204.345	548.539	934.410
Cameroon	γ β	202.898	89.547	100.006	142.475
COVID$_t$ vs. SM$_t$		1598.332	861.157	1066.499	1372.322
Morocco	γ β	252.878	92.540	110.140	123.468
COVID$_t$ vs. SM$_t$		1608.332	861.251	1096.500	1401.285

This review utilizes the quantile cointegration test Xiao, [27] to analyze the cointegration between COVID-19 cases and stock market in African nations. Table 3 presents these quantile cointegration test brings about which β and γ coefficients are the supremum standard qualities. Additionally, this table presents basic qualities at the 1% (CV1), 5% (CV5), and 10% (CV10) importance levels. The outcomes demonstrate that the coefficient values for γ and β are more noteworthy than the CV at the 1% importance level. These outcomes, in this manner, demonstrate that cointegration exists between COVID-19 cases and stock prices for our choice nations.

5. Robustness Check

The Figure presents the grade coefficients β1(θ, τ), which shows the effect of the πth quantile of the number of COVID-19 cases on the θth quantile of 8 African nations stock records. The results show that the effect of each quantile of COVID-19 cases on stock records changes across various quintiles of stock prices.

He exhibits that Cameroon COVID-19 cases unequivocally impact stock expenses at upper quantiles of stock prices (0.65-0.95). This valuable result happens across all quantiles of COVID-19 cases. This effect becomes unimportant during ordinary quantiles of stock prices (0.4-0.65) and becomes negative at lower quantiles (0.05-0.4) of stock prices. It can moreover be seen that the valuable result saw at the upper quantiles of stock prices is weak since the most outrageous positive coefficient is one, however the negative coefficient seen at lower quantiles of stock expenses extends around four. These results show that COVID-19 cases have a weak positive relationship with Cameroonian stock price at upper quantiles of stock prices; regardless, this effect ends up being unequivocally negative at lower quantiles of the stock prices.

For Nigeria, we moreover find a feeble positive association between COVID-19 cases and stock prices at upper quantiles (0.65-0.95) of stock prices. This frail positive relationship is unsurprising across all quantiles of COVID-19 cases. Nevertheless, this effect becomes negative when we move to the lower quantiles (0.05-0.4) of the stock prices. This unfavorable outcome during lower quantiles of stock prices is much more grounded during lower and focus quantiles (0.05-0.75) of COVID-19 cases. Then again, this unfriendly outcome turns out to be more powerless when we move to the upper quantiles (0.75-0.95) of the number of cases. The disclosures for Tunisia, Morocco and Zambia are unsurprising with the revelations for Nigeria and Cameroon. These results suggest that the number of COVID-19 cases fundamentally influences the protections trades like Nigeria, Cameroon, Tunisia, Zambia and Morocco especially when these protections trades are in a negative state.

In South Africa, a positive relationship is found between the upper quantiles of stock expenses (0.9-0.95) and lower quantiles (0.05-0.2) of the number of circumstances where this positive coefficient is around two. The valuable result of the number of cases is feeble across all quantiles of COVID-19 circumstances when stock prices are in the ordinary (0.35-0.65) quantiles. This exhibits that a development in COVID-19 cases increases stock prices during bullish states of the protections trade, however these cases don't impact stock prices when the South African stock exchange is in a common state. Finally, serious solid areas for an effect are seen during lower quantiles of both stock prices and the number of cases. This suggests that the number of cases decreases stock prices when the protections trade is in a negative state. The revelations for Cote d'Ivoire and Rwanda are unsurprising with the disclosures for South Africa. Like different protections trades, the South African, Cote d'Ivoire and Rwandese protections trades are unfavorably affected by COVID-19 circumstances when these business areas are in a negative state.
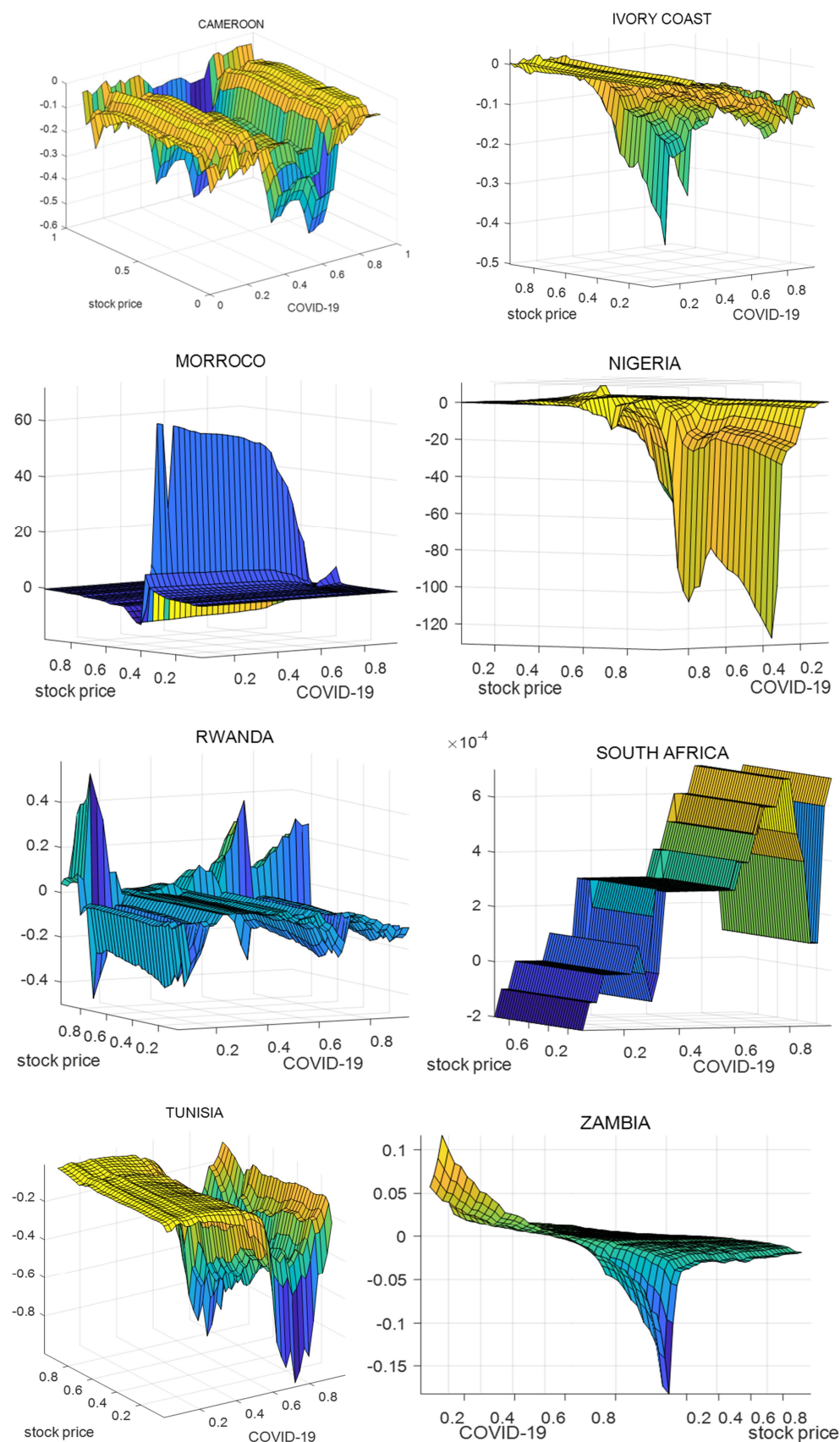
Figure 1. *the results of quantile-on-quantile regression for COVID-19 cases and stock price.*

This figure presents the results of quantile-on-quantile regression for COVID-19 cases and stock price data for the African countries.

6. Conclusion

In this article, we research the possible impact of COVID-19, who began in China and spread to different part of the world, including Africa, on the stock market of 8 African nations to be exact: Cameroon, Nigeria, South Africa, Tunisia, Morocco, Zambia, Ivory Coast and Rwanda. We utilize the day-to-day stock trade record data report, for the stock trade in every nation and we used the QQR approach proposed by Sim and Zhou [29], as this methodology helps with concluding the effect of COVID-19 occurrences of each and every country stock exchange across various quantiles of both the independent and subordinate variables. Quantile unit root test measures exhibit that stock exchange for most countries is fixed at lower quantiles anyway are not fixed at focus and upper quantiles. Going against the standard, the stock prices for the rest of the countries as well as the number of COVID-19 cases are not fixed for all of the countries. The quantile cointegration methodology exhibits that COVID-19 cases are consolidated with stock exchange for all stock. Finally, the assessments from QQR exhibit that the revelations vacillated across different quantiles of COVID-19 cases and stock. For example, the number of COVID-19 cases unequivocally impacts stock for upper quantiles of stock. Nevertheless, this productive result is feeble for upper quantiles of stocks. Then again, serious solid areas for an effect are found during lower quantiles of stock exchange.

Evidence from chosen nations recommends that the COVID-19 pandemic is adversely influencing stock trades in 5 nations. At any rate, the leftover 3 countries see no critical impact of COVID-19 on their stock trades. Solidly, this is the very thing that our outcomes show, in relative terms, Nigeria has its stock exchange unequivocally and in a general sense decreased by the COVID-19, trailed by Morocco, Tunisia, Cameroon and Zambia. In any case, we see that the securities exchange in South Africa, Ivory Coast and Rwanda sees no basic impacts of COVID-19, albeit the impacts are negative. Quantile-on-quantile diagrams show that the basic antagonistic outcomes of COVID-19 on the stock exchange of these countries are to some degree transient. This recommends that the stock exchange in South Africa, Ivory Coast and Rwanda has seen a recuperation in the wake of being unfairly impacted by the COVID-19. unquestionably, because of the reality of the quick going to of the join lengths by the public authority and furthermore the fast help as in China.

Finally, this is the very thing that we find, inside our model period, there is practically no likelihood that the COVID-19 pandemic will influence the securities exchange well in every one of the nation's thoughts about in this survey. The discoveries in our survey add to the investigation of the monetary impact of COVID-19 by giving observational proof that the COVID-19 pandemic is restrictively influencing stock exchange execution in African economy.

Acknowledgements

Highlights

a) This article examines the impact of COVID-19 Pandemic on the stock markets in African's countries.
b) The Rolling Quantile Regression, Quantile cointegration and quantile-on-quantile approaches are utilized.
c) the COVID-19 pandemic has a significant dynamic impact on the African's stock market.

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