THE DIRECT AND INDIRECT EFFECTS OF THE COVID 19 PANDEMIC ON AFRICA’S MAJOR STOCK EXCHANGES:
AN APPROACH BY THE METHOD OF GENERALIZED MOMENTS

EFFETS DIRECTS ET INDIRECTS DE LA PANDEMIE DE COVID 19 SUR LES PRINCIPALES PLACES BOURSIERES AFRICAINES :
UNE APPROCHE PAR LA METHODE DES MOMENTS GENERALISES

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Abstract
This paper studies the direct and indirect effects of the Covid 19 health crisis on the performance of major African stock indices. The methodological approach is based on dynamic panel data using the system generalized method of moments. The sample consists of six (06) African stock market indices over the period from February 13, 2020 to March 11, 2021, i.e. 1,620 observations. The results of our study show that the covid 19 pandemic had a significant negative effect on the returns of the African stock market indices. However, the impact of the indirect effect is volatile. This work could help to understand investor behaviour and influence investment decisions in the event of a pandemic situation.

Keywords: Profitability, Stock market index, COVID-19.

JEL classification : C19, G14, G15

Résumé :
Cet article étudie les effets directs et indirects de la crise sanitaire du Covid 19 sur le rendement des principaux indices boursiers africains. L’approche méthodologique porte sur les données de panels dynamiques par la méthode des moments généralisés en système.
L’échantillon se compose de six (06) indices boursiers africains sur la période allant du 13 Février 2020 au 11 Mars 202, soit 1 620 observations. Les résultats de notre étude montrent que la pandémie de covid 19 a eu un effet significatif négatif sur les rendements des indices boursiers africains. Par contre, pour ce qui est de l’effet indirect, l’impact est volatile.Ce travail pourrait permettre de comprendre le comportement des investisseurs et influencer sur les décisions d’investissements en cas de situation de pandémie.

**Mots-clés :** Rentabilité, Indice boursier, COVID-19.

**Classement JEL :** C19, G14, G15
Introduction

The 21st century has already known the occurrence of two epidemics namely SARS-CoV (2002-2003) or coronavirus causing severe acute respiratory syndrome, appeared in China and recorded in 30 countries with a mortality rate of nearly 10% and MERS-CoV (2012-2013) or coronavirus of the Middle East Respiratory Syndrome, because having been detected for the first time in Saudi Arabia with a mortality rate of about 30% (Ibanda 2020). The health crisis of Covid 19 appeared on December 31st, 2019 in Wuhan, China has become a global phenomenon of very large magnitudes contaminating about 120,000,000 people with nearly 2,600,000 in early March 2021. This virus has undermined the health system of the world's most developed countries because of its exponential rate of spread. The COVID-19 virus has not left the international commercial and financial exchanges unaffected, provoking a strong contraction of the economic activity at the world level which, according to the IMF projections, will have a historical recession of about -3%.

The financial markets have not escaped the devastating effect of this pandemic. In the midst of the covid 19 panic, the Dow Jones Industrial Average fell by nearly 13% as of March 16th, 2020; its worst drop since 1987. When it comes for African stock markets, the transport sector index of the regional stock exchange experienced its biggest drop (-29%) since the 2007-2008 crisis, following the closure of production plants at the international level. Most conducted studies have tried to analyse the effects of this pandemic on the American, European or Asian financial system. Few studies have been conducted on the direct and indirect effects of this health crisis on the major African stock markets. Thus, what are the factors of the covid 19 pandemic that impact the performance of African stock market indices? Is the performance of these African stock market indices impacted by the performance of international stock market indices in this pandemic context? Our objective is to analyse the relationship between covid 19 health crisis and the performance of 6 African stock market indices (JSEJ, FTS, NSE all Share, NASI, BRVM C and NASI), but also to show the interdependence of the stock markets in this same health crisis period. To achieve our objective, we rely on a dynamic panel model to take into account the correlation between our variable of interest and the other stock market indices but also to capture all the orthogonality conditions that exist between the endogenous variable and the error term. Our results show first of all that the onset of the pandemic had a direct positive effect on the African stock markets with the increase in the number of cases.
However, this effect is wiped out with the number of deaths that push the authorities to take drastic measures (confinement, curfew, etc.). The indirect effects are most noticeable in the Asian markets with a positive effect of the Japanese index and a negative effect of the Chinese index. This paper will not only enrich the scientific literature on the relationship between pandemic situation and volatility of financial systems, but also provide a solid basis for a pronounced cooperation between policy makers and the research community for a greater synchronization in the different actions at the global level. It could also serve as a benchmark for investment and divestment strategies in pandemic situations.

In order to conduct this study, we will first conduct a theoretical and empirical review of the literature on the covid 19 pandemic and the financial markets, before describing our methodology. This will allow us to conclude with the results that will be discussed.

1. **Review of theoretical and empirical literature**

The effects of the covid 19 pandemic on the stock markets could be explained by several theories, including the theory of information economics. Indeed, in a situation of asymmetric information and uncertainty, the market panics because of the generally sheep-like behaviour of investors. This state of affairs is corroborated by the work of Lyócsa et al (2020), which focuses on the impact of Covid 19 on stock markets. Their work shows that the pandemic caused a sharp decline in stock market indices at the global level. Thus, Pena-Marin et al (2020), believe that this fall in returns is due to the phobia of investors, mainly those who want to make short-term gains. For his part, Assoumou-Ella (2020), addresses the same reflection on the European and American stock markets. His study shows that the Covid 19 pandemic has caused these stock market indices to plummet. This situation can be explained by the adoption of certain measures such as the containment but also by the disagreement between the American federal government and the American governors who showed the incapacity of the great powers to come to end this pandemic. Thus, as soon as there is a situation of uncertainty, the market panics, leading to a sharp drop in stock prices. Akhtaruzzaman et al (2020), analyzed the link between virus contagion and financial contagion. The result of their study shows that the dynamic conditional correlations between Chinese and G7 financial and non-financial stocks increased as the number of Covid 19. Onali (2020), explored the impact of covid 19 cases and deaths on the Dow Jones and S & P 500 indexes. These results show a dichotomy between the GARCH model results which show that there is no impact on the returns of these stock market indexes, while the VAR model result
shows that the number of deaths reported in Italy and France had a negative impact on these stock market returns. However, other studies have shown that covid 19 did not have only negative effects on stock prices. This is the case of the work of Chaudhary et al, (2020b), who found in their comparative study between the Indian stock indices (BSE 500 and BSE Sensex) and the three global indices (S&P 500, Nikkei 225 and FTSE 100), that companies operating in the health sector were the only ones that maintained acceptable levels of performance during the Covid-19 crisis. Pharmaceutical companies experienced an increase in their market capitalization. While some authors have studied the effects of the pandemic of financial markets and the economy as a whole, others have proposed solutions, especially in the banking and financial sectors (Tobias and Aditya, 2020; Wren-Lews, 2020; Cochrane, 2020; Cecchetti and Schoenholtz, 2020; Beck, 2020; Weder, 2020; Boone et al., 2020; Voth, 2020). The latter have proposed several response measures, including budgetary support through flexible taxation, subsidies for companies and employees and support from the international community for the most affected countries. As for the indirect effect of the covid 19 pandemic on African stock market indices, it is based on the theory of financial contagion and market interdependence. In other words, could the impact of covid 19 on stock index A not impact on index B through financial contagion? Kaminsky and Reinhart (1999) conceive of contagion as the extension of disturbances in the financial markets of one country to the financial markets of other countries due to a moonsoon effect, a spillover effect or simply a psychological effect. The moonsoon effect is assimilated to the fact that countries can suffer crises simultaneously due to a common shock (e.g. the fall in oil prices). For the normal interdependence effect, it postulates that a crisis in a given country can contaminate another country because of the commercial and financial links existing between these countries before the crisis.

As for the psychological effect called pure contagion, it postulates that the transmission of a crisis is linked to the behavior of investors. Thus, if a crisis appears in a given country, the behavior of certain investors could influence other investors in other countries, resulting in financial contagion. Moreover, the authors make a distinction between the so-called fundamental contagion theory, which includes the monsoon effect and the interdependence effect, and the so-called pure contagion. They argue that contagion is due to one or the other. From our point of view, it would be difficult to oppose the two. Then, how can we know whether the contagion is due solely to one or the other? Is it not possible to have the combination of the two? Indeed, a crisis in country A can contaminate country B because of
the normal interdependence effect (commercial and financial links between the two), but also because of the behaviour of certain investors. The question one should ask is what is the percentage of fundamental contagion and the percentage of pure contagion? Forbe and Robogon (2000), on the other hand, conceive of contagion as a significant increase in the linkages between financial markets due to a shock specific to a country or group of countries and distinguish between contagion and interdependence. The authors argue that if the shock is between two economies that do not have great similarities, they speak of contagion and not interdependence. For example, an American crisis that affects Senegal is due to contagion and not interdependence. Studies have been conducted on the interdependence of equity markets between European and American stock indices. This is the case of the work of Sanvi Avouyi-Dovi and David Neto (2004), who carried out an analysis between the correlation coefficients and returns of the CAC, DAX and Dow Jones, estimated in t or in t - 1, with opening or closing indices. The results show that the state of the US market at the close in t - 1 has a stronger influence on the state of the European markets at their opening in t. The correlation coefficients between European and American returns are 0.58 (for the CAC and the Dow Jones) and 0.56 (for the DAX and the Dow Jones) respectively. These coefficients show that there is a relatively strong relationship between the European indices at the opening in t and the American indices at the closing in t - 1. For his part, Orlean (1992) argues that financial contagion can be explained rather by asymmetric information between investors. This asymmetric information situation may lead under informed investors to imitate the behavior of informed investors. If this situation becomes widespread, it generates a group effect that favours the transmission of shocks from one market to another. This position of Orlean (1992) is embraced by Edwards (2000), who goes further by arguing that an unanticipated shock from one market appears as a residual shock impacting the variability of returns in another market. These different theories and studies show that there is a direct link between covid 19 and the movement of stock prices. Even if some rare studies take the opposite view, it is necessary to note that most studies underline the misdeeds of the pandemic on the stock exchange indexes thanks to the phobia of the investors and the gloomy climate of the covid 19. From our point of view, the relationship between covid 19 and stock market indices can be approached by exploiting the fundamental contagion and the psychological contagion. Now it would be interesting to analyze the degree of each type of contagion. Returning to our context, what about the direct effects of this pandemic on the major African stock indices?
Couldn't the direct effects of this pandemic on the European, American and Asian stock markets impact the performance of the African stock market indices?

2. **Analysis of stylized facts**

**Graphic: Evolution of the pandemic and stock market profitability**

The evolution of the pandemic and profitability is identical in the 6 exchanges we study. Thus, cases of infection began timidly (1 case) at the beginning of March 2020 before reaching a worrying level (4,006,913 cases) one year later. Africa remains one of the continents least impacted by covid-19, but its evolution has been meteoric since its appearance. Most of the population was under-informed or unaware of the modes of transmission of this disease, which quickly spread rapidly. However, it should be noted that its impact on African financial markets is not automatically felt. These markets have at times positive performances but with situations of misfortune that occur from time to time. Unlike other stock markets, African stock markets are still dominated by the tertiary sector (telecommunication companies, banks etc.). The other companies that evolve the most in the other sectors (that have suffered more from the misdeeds of covid-19) are not listed on the stock exchange. Thus, telecommunication and health companies have taken advantage of the change in the population's behavior to adapt to their new life in cohabitation with the virus.

**Source: authors**

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(consumption of masks, mass medication, as well as connection and telephone credit). This situation highlights the change in behavior of African workers with the spread of the disease, which has prompted telecommuting instead of physical presence. However, if the cases become serious with a large number of deaths, the number of serious cases in hospitals, people's health deteriorates more and more forcing a recourse to confinement, it changes the game and can lower the performance of these companies.

3. Data and methodology

Our study focuses on African stock market indices from February 13th, 2020 to March 11th, 2021. Indeed, the first case of covid 19 in Africa appeared in February 2020 in Egypt. The sample is composed of 5 stock market indices from the largest African stock markets, namely: South Africa, Egypt, Nigeria, Kenya, WAEMU and Morocco. The data related to the number of infections, recoveries and deaths come from the coronavirus-statistics database. Historical data on stock market indexes were collected from the investing.com finance site. This table below summarizes the African stock market indices studied.

Table N°1: African Stock Indices

<table>
<thead>
<tr>
<th>Country</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>JSEJ</td>
</tr>
<tr>
<td>Egypt</td>
<td>FTSE</td>
</tr>
<tr>
<td>Nigeria</td>
<td>NSE All Share</td>
</tr>
<tr>
<td>Kenya</td>
<td>NASI</td>
</tr>
<tr>
<td>UEMOA</td>
<td>BRVM C</td>
</tr>
<tr>
<td>Morocco</td>
<td>MASI</td>
</tr>
</tbody>
</table>

Source: the authors

For analysing the effect of the Covid 19 pandemic on the profitability of African stock markets, we will use dynamic panel data with a regression by the generalized method of moments.

The profitability of the index i that we note (RENT), is equal to the variation of the price of the index i at the period t with:

\[ RENT = \frac{(\text{Course } t - \text{Course } t - 1)}{\text{Course } t - 1} \]
The number of new infections in period i (CONT), the number of new cases cured in period i (GUER) and the containment measures in period i (CONF): 1 if containment; 0 otherwise. As for the indirect effect of Covid 19 on the profitability of African stock markets, it is related to the interdependence of stock markets. Here, we analyze the impact of the variation of international stock market indices on the profitability of African stock market indices during the same period of the Covid 19 pandemic. These measures are as follows:

The growth rate of the DOW JONES index (TIDJ), the growth rate of the CAC 40 index (TIC40), the growth rate of the United Kingdom index (TIROY), the growth rate of the Nikkei index (TINIK) and the growth rate of the China index (TICH).

Thus, our regression model is as follows.

\[
\text{RENT}_{i,t} = \alpha + \beta_1\text{CONT}_{i,t} + \beta_2\text{GUER}_{i,t} + \beta_3\text{CONF}_{i,t} + \beta_4\text{TIDJ}_{i,t} + \beta_5\text{TIC40}_{i,t} + \beta_6\text{TIROY}_{i,t} + \beta_7\text{TINIK}_{i,t} + \beta_8\text{TICH}_{i,t} + \varepsilon_i
\]  

(1)

RENT : Profitability of the African stock index
\(\alpha\) : The constant
\(\beta_1,......\) B8 : The parameters to be estimated
\(\varepsilon_i\) : The error term.

We use the generalized method of moments to perform our estimations (equation 1). The estimation of the model by a linear regression is biased because of the Lagrange Multiplier test performed (linear models by the MOC or quantile regression are skewed). The strong correlation between the contamination variable and the stock returns proves the dynamic character of our equation (check by the Nakamura Nakamura test). Moreover, the presence of a random effect can skew the estimation by generalized least squares. The GLS allows to exploit all the orthogonality conditions that exist between the endogenous variable and the error term. Thus, we use the method by Blundell and Bond (1998) allowing the combination of level and first difference equations commonly called MMG system. We use the number of deaths variable as an instrument because of its strong correlation with the number of contamination but not with the error term.

4. Results and discussions

Table 1: Properties of our variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Average</th>
<th>Standard error</th>
<th>Min</th>
<th>Max</th>
<th>Skew.</th>
<th>Kurt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RENT</td>
<td>0</td>
<td>0.015</td>
<td>-0.174</td>
<td>0.084</td>
<td>-1.826</td>
<td>27.397</td>
</tr>
<tr>
<td>CONT</td>
<td>1400000</td>
<td>1290000</td>
<td>0</td>
<td>4006913</td>
<td>0.584</td>
<td>2.11</td>
</tr>
</tbody>
</table>
The analysis of Table 1, shows us an average return of zero over the period of about 13 months. Its minimum value is noted in NSE AII (Nigeria Stock Exchange Index), is -0.174% while the maximum is 0.08% with MASI index. The number of contaminations is on average 1,399,935.3 had started in mid-February 2020 to reach its maximum value in mid-March 2021 or 4,006,913.

Table 2: Correlation test of our variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) RENT</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) CONT</td>
<td>0.045*</td>
<td>0.072</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) GUER</td>
<td>0.060*</td>
<td>0.621*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) CONF</td>
<td>0.004</td>
<td>-0.308*</td>
<td>-0.202*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) TIDJ</td>
<td>-0.012</td>
<td>0.036</td>
<td>0.022</td>
<td>0.000</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) TIC40</td>
<td>0.025</td>
<td>0.073*</td>
<td>0.088*</td>
<td>-0.023</td>
<td>-0.086*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) TIROY</td>
<td>0.084*</td>
<td>0.057*</td>
<td>0.079*</td>
<td>-0.023</td>
<td>-0.028</td>
<td>0.101*</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) TINIK</td>
<td>0.109*</td>
<td>0.057*</td>
<td>0.001</td>
<td>-0.019</td>
<td>-0.051*</td>
<td>-0.021</td>
<td>0.048*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(9) TICH</td>
<td>-0.035</td>
<td>0.010</td>
<td>0.022</td>
<td>-0.034</td>
<td>0.122*</td>
<td>0.067*</td>
<td>0.007</td>
<td>0.107*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1

Source: authors' construction

The analysis of the second table reveals several observations. First, there is a positive and significant relationship at the 10% level between yields and the number of contaminations. There is a strong correlation between returns and the number of contamination and deaths. This correlation is also noted between the world stock markets, thus underlining the interconnection of the financial markets at the global level.
The result of the ML test shows us that the linearity of our model is rejected. Indeed, the probability associated with this test is relatively low for the six African stock markets studied. Thus, we use a non-linear panel regression.

**Table 4: Generalized method of moments regression in system**

<table>
<thead>
<tr>
<th>Dependent variable RENT</th>
<th>GMM in system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contamination</td>
<td>5.64e-10***</td>
</tr>
<tr>
<td></td>
<td>(1.90e-10)</td>
</tr>
<tr>
<td>Number of healings</td>
<td>7.83e-08***</td>
</tr>
<tr>
<td></td>
<td>(1.71e-08)</td>
</tr>
<tr>
<td>Containment</td>
<td>-0.0344**</td>
</tr>
<tr>
<td></td>
<td>(0.0167)</td>
</tr>
<tr>
<td>Index TIC40</td>
<td>-0.00705</td>
</tr>
<tr>
<td></td>
<td>(0.0212)</td>
</tr>
<tr>
<td>Index TIDJ</td>
<td>-0.0290</td>
</tr>
<tr>
<td></td>
<td>(0.0348)</td>
</tr>
<tr>
<td>Index TIROY</td>
<td>0.00593</td>
</tr>
<tr>
<td></td>
<td>(0.0848)</td>
</tr>
<tr>
<td>Index TINIK</td>
<td>0.0628***</td>
</tr>
<tr>
<td></td>
<td>(0.0226)</td>
</tr>
<tr>
<td>Index TICH</td>
<td>-0.0373**</td>
</tr>
<tr>
<td></td>
<td>(0.0184)</td>
</tr>
<tr>
<td>AR2</td>
<td>0.85</td>
</tr>
<tr>
<td>Sargan test</td>
<td>0.95</td>
</tr>
</tbody>
</table>

**Source: Authors' construction**

Before analyzing the results of the estimates, it is important to check the various validity tests. First, for all estimates, Hansen's tests show that we cannot reject the null hypothesis that the overidentifying restrictions are valid.

Second, the Arellano and Bond tests show that the AR (2) is not significant, which implies the rejection of the null hypothesis, thus confirming the specification of our model. In addition to these tests, the results also show that the stability condition of the estimated models is correctly estimated and statistically significant (P <5%). Therefore, all models are well...
specified and the results can be interpreted with confidence. The analysis of our results (Table 4) shows that the Covid 19 pandemic had direct and indirect effects on the performance of African stock indices. Indeed, the sign of the coefficient associated with the contamination variable (CONT) that explains the direct effect of the Covid 19 pandemic on the profitability of African stock market indices is positive and significant at the 1% level. The NSE All Share index in Nigeria and the JSEJ index in South Africa grew at an average annual rate of 32.49% and 16.11% respectively during the period. The spread of COVID 19 has led to a change in the behavior of workers (the most exposed) and companies, telecommuting is growing rapidly to the benefit of telecommunications companies which represent a significant share in the stock market of African countries. For example, the TELKOM share in the JSEJ index grew by an annual average of 53.19% during the study period, the VODAKOM GROUP share in the JSEJ index also grew by 5.94%, the MTN Group share by 21.10%, the MTN share in Nigeria's NSE All Share index by 32.21%, and the Maroc Telecom share by 2.81% over the same study period. This change in working methods leads to an increase in the consumption of telephone credit and/or connections to compensate for the physical presence in companies. In addition, the increase in contamination also leads to a greater demand for drugs, syringes, pharmaceutical machines, surgical masks among others. This increases the stock market profitability of companies operating in this sector and listed on some African stock exchanges (e.g., Aspen Pharmacare and Ascendis Healthcare on the JSEJ index had an average annual growth of 34.81% and 36.25% respectively during the study period). This shows that the rise in Covid 19 infections positively impacts the profitability of the majority of African stock indices. On the other hand, a less virulent virus, as measured by the number of cured cases, boosts stock market returns with markets welcoming this good news. On the other hand, when the virus spreads rapidly, leading to a high mortality rate and serious cases in hospitals (a situation that pushes leaders to confine the population). Thus, this confinement variable (CONF), has direct and negative effects on the profitability of African stock market indices without any dichotomy in our estimation. This is consistent with the results of Abdullah et al,(2020), who worked on the Hang Seng index and the Shanghai Stock Exchange composite index. This could be due to the death of some managers and officers in strategic positions in the company. Thus, they lose expertise, manpower and thus performance.

On the other hand, the increase in the number of deaths is causing the market to panic, making investors nervous and perplexed. The fear of death and the uncertainty of the future could push some to sell their stock with on the other hand less investors willing to invest again by
buying these stocks. Thus, when there are more bidders than buyers, the market capitalization of the stock falls and consequently has a negative impact on the price of the reference stock index. As for the indirect effect of the Covid 19 pandemic on the performance of African stock market indices, we note that there is volatility in the results. Indeed, the Japanese stock index (TINIK) has a positive effect on the performance of African stock indices. The effect is negative for the stock index of China (TICH). These results partly confirm the theory of contagion in stock markets. The concept of globalization is more materialized through financial markets that remain highly connected. Thus, decisions made on a Chinese, European or English stock market can impact the performance of African stock markets through the accessibility of information combined with a generally sheep-like behavior of investors. Moreover, one should not lose sight of the fact that most of the companies listed on African stock exchanges are not only subsidiaries of large foreign groups, but also there is foreign capital invested in the securities listed on these African stock exchanges.

There is also a growing presence of Japanese venture capital firms investing in Africa. This is the case of Kepple Africa Venture which has invested in several start-ups in Lagos, the commodity trader MITSUI AND CO which has stakes in Google's CSquared fiber optic project in Uganda, Ghana and Liberia, the presence of OHARA Pharmaceutical, producer and distributor of pharmaceutical products, which is part of the first round of financing of HELIUM HEALTH, the Nigerian health services start-up, and the TOYOTA automotive group via its subsidiaries Toyota Tsusho and CFAO, which is listed on the BRVM. Thus, these indirect effects of the covid 19 pandemic on the main stock market indices confirm the combination of fundamental and psychological contagion. How else can we explain that there is no impact of the volatility of the European and American stock indices on the performance of the African stock indices despite the existence of trade and financial exchanges? And how can we explain the positive impact of the Japanese index and the negative impact of the Chinese index on the performance of the African stock indices despite the existence of trade and financial exchanges? This leads us to say that the indirect effects of this pandemic on the performance of stock market indices can be explained on the one hand by the commercial and financial links between European, American, Asian and African countries and on the other hand by the behavior of investors. However, given the neutral effect of certain indices (DJI NYSE, FTSE 100 and CAC 40), a positive effect (NIKKEI 225) and a negative effect (SSE 500) on the performance of these African stock market indices, we could say that the effect is more psychological (investor behavior) than fundamental (commercial and financial links).
Conclusion:

This paper aimed to study the direct and indirect effects of the Covid 19 pandemic on the main African stock markets using a non-linear regression by the method of generalized moments in system on six (06) African stock market indexes over the period from February 13, 2020 to March 20, 2021, i.e., 1,620 observations. Regarding the direct effect, our results show that the increase in Covid 19 contamination positively impacts the profitability of the African stock market indices while the containment variable negatively impacts this profitability. This shows that Covid 19 has positively affected African stock market indices through an increase in the share price of certain companies listed on African stock exchanges (telecommunications and pharmaceutical companies, etc.). However, with the increase in deaths, severe cases materialized by containment wiped out this positive effect and caused a negative effect because of the fear of uncertainty by investors.

For the indirect effect, our results show that our stock markets are sensitive to changes in the Japanese and Chinese stock indices. The effects of the pandemic on the former have a positive impact on the profitability of African stock market indices. On the other hand, for the latter, the impact is negative. This highlights a certain dependence of African stock markets on the major stock markets, particularly in Asia. This study shows the fragility of the world stock markets in the event of a health crisis. This is why, the governments of the whole world must collaborate to eradicate as quickly as possible the occurrence of such a pandemic. Because a health crisis can become a financial crisis and in the long run an existential crisis. For this, the major powers must collaborate in sharing scientific knowledge and involve African countries that are also impacted by crises originating from these major powers. Such a study could be carried out by analyzing the effects of this pandemic on companies listed on African stock exchanges classified sector by sector. This would allow for a more refined analysis.

Bibliography


