



Financial Economics Letters

Homepage: <https://www.anserpress.org/journal/fel>



African exchange rates amidst the COVID-19 pandemic

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ABSTRACT

The study investigates the impact of COVID-19 on African exchange rates, employing a panel dataset over the period 2016-2022 from 13 African economies and employing pooled OLS estimator. The findings reveal a noteworthy positive correlation between COVID-19 levels and exchange rates within the region. However, this association necessitates deeper exploration due to its multifaceted implications, including economic disruptions, government interventions, global market interconnections, regional stability perceptions, and investor behavior. Economic indicators, such as DP, inflation rate, real interest rate, and unemployment rate, significantly influence exchange rates. While DP positively impacts exchange rates through economic growth, investor confidence, and trade strength, controlled inflation fosters investor confidence and export competitiveness, positively affecting exchange rates. Moreover, a pronounced positive impact of the real interest rate indicates economic stability, attracting investment and contributing to currency appreciation. Conversely, high unemployment negatively affects exchange rates, signaling economic weaknesses and eroding investor confidence. These findings emphasize nuanced policy responses for managing health crisis-induced economic disruptions and suggest future research directions focusing on specific country-level analyses and multifaceted factors influencing currency valuations within African economies.

KEYWORDS

Exchange Rate; African economies; COVID-19

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ISSN 2972-3426

doi: 10.58567/fel 03010005

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Received date 31 December 2023; Accepted date 11 January 2024; Available online date 17 January 2024; Version of Record 17 January 2024

1. Introduction

The emergence of the Coronavirus (COVID-19) pandemic in late 2019 triggered an unprecedented global crisis, reshaping economic landscapes across continents (Pollard et al., 2020; Saif-Alyousfi, 2023; 2024). In Africa, the virus swiftly permeated borders, presenting multifaceted challenges that reverberated through various sectors, including finance and commerce. The continent, renowned for its economic resilience amidst adversities, found itself grappling with the complexities brought forth by this novel challenge (Anyanwu and Salami, 2021, Njomane and Telukdarie, 2022).

The onset of the pandemic inflicted a profound shock on African economies, fostering an intricate interplay of factors that swiftly influenced exchange rates. The volatility in these rates became a hallmark of the pandemic's economic fallout, as nations endeavored to navigate the turbulent financial terrain. Amidst the uncertainty and unpredictability, exchange rates in several African countries experienced notable fluctuations, reflecting the nuanced impact of the pandemic on local and regional economies (Anyanwu and Salami, 2021; Agyei, et al., 2022; Lakemann et al., 2020).

Governments and financial institutions across Africa faced an arduous task in stabilizing exchange rates amidst the pandemic's upheaval. The influx of global uncertainties, disrupted supply chains, and fluctuating commodity prices exacerbated the challenges. Central banks in various African nations implemented diverse monetary policies and interventions to mitigate the adverse effects on exchange rates, aiming to safeguard their economies from prolonged destabilization (Agyei, et al., 2022).

Furthermore, the correlation between COVID-19 dynamics and exchange rates in African countries was not solely contingent on domestic factors. The global interconnectedness of economies played a pivotal role, as international trade restrictions, travel bans, and shifts in investor sentiments triggered ripple effects that impacted exchange rates. The resultant intricacies underscored the intricate relationship between the pandemic's trajectory and the economic stability of African nations, reflected vividly in their exchange rate dynamics (Kassa, 2020).

The pandemic's toll on key sectors like tourism, manufacturing, and commodities profoundly influenced the exchange rate volatility in African countries. The depreciation or appreciation of currencies in response to these sectoral impacts became an indicator of the vulnerability or resilience of individual economies. Consequently, exchange rate movements emerged as a crucial barometer in assessing the pandemic's economic ramifications, reflecting the adaptability and resilience of African financial systems (Tetteh and ao, 2020; Obayelu et al., 2021).

In this context, analyzing the intricate interplay between COVID-19 and exchange rates in Africa becomes imperative. Understanding the nuanced factors driving these fluctuations provides crucial insights into the economic resilience, policy responses, and adaptive strategies adopted by African nations in navigating the tumultuous financial terrain triggered by the pandemic.

The study of the impact of COVID-19 on African exchange rates holds immense significance in comprehending the intricacies of economic resilience, vulnerabilities, and adaptability within the continent's financial systems. Understanding these impacts provides critical insights into how external shocks, such as a global pandemic, affect the stability and dynamics of African currencies. The examination of these effects is instrumental in unraveling the diverse responses undertaken by African economies amidst a crisis, shedding light on the effectiveness of monetary policies, trade dependencies, and resilience strategies. Moreover, studying the pandemic's impact on African exchange rates contributes to a broader understanding of the interconnectedness of global markets and the differential impacts of such crises on various regions, emphasizing the need for adaptive financial mechanisms and policy frameworks to navigate and recover from unforeseen disruptions.

Amidst the emergence and rapid global spread of COVID-19, a considerable volume of research has surfaced, deeply examining its multifaceted effects on global economies. This extensive research landscape has probed diverse aspects, meticulously evaluating its impact on various financial markets, as showcased in the works of Saif-

Alyousfi (2022), Kotcharin et al. (2023), and Zhao et al. (2023). Additionally, notable investigations have scrutinized the pandemic's influence on energy prices, featuring significant contributions from Saif-Alyousfi et al. (2021). Apart from financial markets, studies have also focused on the implications for international trade, including analyses by Kassa (2020), Obayelu et al. (2021), Nitsch (2022), and Mena et al. (2022), providing insights into these dynamics. Furthermore, substantial attention has been devoted to understanding the pandemic's impact on foreign direct investment, with comprehensive analyses by Tetteh and ao (2020), and Chattopadhyay et al. (2023) shedding light on this critical area. These inquiries extend further, encompassing the broad socioeconomic repercussions of the pandemic, exploring its effects on labor markets, public health, and environmental aspects, as evidenced by studies by Kassa (2020), Njomane and Telukdarie (2022), among others.

A few studies have made progress in exploring the link between the pandemic and exchange rates (Alimi and Adediran, 2023; Narayan, 2022; Baek, 2022; Aloui, 2021; Iqbal et al., 2020, 2023; Iyke and Ho, 2021; Feng et al., 2021; Devpura, 2021). However, a significant gap in research exists, particularly regarding the COVID-19 pandemic's specific impact on exchange rates within African economies. This study aims to fill this gap by examining how the pandemic has affected exchange rates in African regions over the period 2016-2022, providing insights into this less-explored domain of research.

This study significantly contributes to the current literature in several ways. Firstly, it offers a comprehensive analysis of the intricate relationship between the COVID-19 pandemic and exchange rate fluctuations within African economies. By scrutinizing this nexus, the study unveils the nuanced dynamics and crucial factors influencing exchange rates amidst pandemic-induced economic turbulence. Secondly, this research brings forth empirical evidence that fills a critical gap in understanding the specific impacts of the pandemic on African exchange rates. Through meticulous data analysis and robust methodologies, it provides concrete insights into the drivers of exchange rate volatility, shedding light on the diverse economic repercussions stemming from the pandemic's onset. Thirdly, the study's findings offer valuable implications for policymakers, economists, and financial institutions. By delineating the intricate linkages between the pandemic and exchange rates in African nations, it furnishes actionable insights to devise effective monetary policies, bolster financial stability, and fortify economies against future disruptions. Lastly, this research sets the stage for future investigations by highlighting unexplored dimensions and avenues for further inquiry. By addressing the lacuna in the literature concerning the pandemic's impact on African exchange rates, it prompts scholars to delve deeper into these dynamics, fostering a more comprehensive understanding of the continent's economic resilience and adaptability in the face of global crises.

The study shows a clear link between COVID-19 levels and regional exchange rates. Further investigation is essential due to its wide-ranging effects on economies, government actions, global markets, regional stability, and investor behavior. Economic factors like DP, inflation, real interest rates, and unemployment significantly shape exchange rates. Higher DP fosters confidence and trade, boosting exchange rates. Controlled inflation enhances confidence and export competitiveness, positively affecting rates. A strong real interest rate signifies stability, drawing investments and bolstering currency value. Conversely, high unemployment weakens rates, signaling economic instability and reduced investor confidence.

The paper's remainder follows this structure: Section 2 comprises a literature review, Section 3 delineates the database and methodology employed, Section 4 articulates the findings, and finally, Section 5 culminates with policy recommendations.

2. Related literature

The outbreak of the COVID-19 pandemic in late 2019 catalyzed an influx of research endeavors aimed at comprehending its extensive ramifications on global financial markets, particularly the intricate relationship between this crisis and the fluctuation of exchange rates. Numerous studies by esteemed researchers like Alimi and

Adediran (2023), Narayan (2022), Baek (2022), Aloui (2021), Iqbal et al. (2020), Iyke and Ho (2021), Feng et al. (2021), and Devpura (2021) have contributed pivotal insights into this realm, revealing multifaceted implications.

These comprehensive investigations collectively underscore the unprecedented volatility that swept through exchange rates across various countries and regions amidst the pandemic's disruptive global economic landscape. Factors such as abrupt travel restrictions, supply chain disruptions, and evolving investor sentiments emerged as key catalysts driving rapid fluctuations in exchange rates (Aloui, 2021; Iqbal et al., 2020).

Moreover, these studies shed light on how the pandemic's impact on economic stability significantly influenced the dynamics of exchange rates. Sectors pivotal to many economies, including tourism, manufacturing, and commodities, experienced substantial disruptions due to the pandemic-induced crises, resulting in marked fluctuations in exchange rates (Narayan, 2022; Baek, 2022). Currencies in nations heavily reliant on these sectors exhibited notable volatility in response to the pandemic's sectoral impacts.

The intricate interplay between domestic and global factors influencing exchange rates during the pandemic emerged as a critical theme in this body of research. The imposition of international trade restrictions, disrupted supply chains, and shifting investor behaviors reverberated through the global financial landscape, amplifying the vulnerability of exchange rates to external shocks (Feng et al., 2021; Iyke and Ho, 2021).

However, amid these global analyses, a significant research void remains regarding the specific impact of COVID-19 on exchange rates within African economies. While studies from a global perspective offer invaluable insights, focused research scrutinizing how the pandemic has affected exchange rates in African regions is notably limited (Alimi and Adediran, 2023; Devpura, 2021). This research gap presents a critical opportunity for deeper investigations, urging a more concentrated approach to unravel the nuanced effects of the global health crisis on exchange rates within the African context.

Saif-Alyousfi (2023) studies delves into the repercussions of COVID-19 on exchange rates within Arab economies spanning the period from 2017 to 2022. This extensive analysis utilizes a comprehensive panel dataset encompassing 22 Arab countries. Employing the pooled ordinary least square (OLS) estimator, the findings unearth a noteworthy adverse impact of COVID-19 on exchange rates. The study discerns a substantial downward trend in currency values, correlating with heightened COVID-19 prevalence, signifying a significant negative influence on these economies' currency dynamics.

Understanding the specifics of how COVID-19 has influenced exchange rates within African economies holds profound implications. It goes beyond providing insights into economic resilience and vulnerability, offering a nuanced understanding of the diverse challenges faced by African nations amidst this unprecedented global crisis. Moreover, such focused research can facilitate the formulation of targeted policies, adaptive strategies, and robust frameworks necessary to navigate and mitigate the adverse effects of future global crises on African financial systems.

In sum, the body of literature examining the impact of COVID-19 on exchange rates elucidates the complexities of this relationship on a global scale. While substantial progress has been made in understanding broader trends and dynamics, the underexplored domain of the pandemic's influence on exchange rates within African economies remains a critical area for further research. Focused investigations into this aspect are pivotal not only for enhancing academic understanding but also for guiding policy formulation and bolstering economic resilience in African nations amidst ongoing and future global challenges.

3. Data and methodology

3.1. Data

This study strategically selected a diverse set of 13 African countries—Botswana, Cameroon, Comoros, Congo, Guinea, Madagascar, Malawi, Malta, Mauritius, Namibia, Seychelles, Zambia, and Zimbabwe—to ensure a comprehensive representation across various economic, geographic, and developmental spectrums. The inclusion of these nations was guided by the aim to analyze exchange rate dynamics amidst the COVID-19 pandemic. These countries were chosen to encompass different economic structures, offering insights into the responses of mineral-rich economies like Zambia and Congo contrasted with service-oriented nations like Mauritius and Seychelles. Additionally, the selection spans various regions across Africa, considering regional dynamics' potential influence on exchange rates. By encompassing nations at different stages of development, from emerging economies to more established ones like Botswana and Mauritius, the study aims to discern the pandemic's impact on currency values across diverse developmental stages. The utilization of the reliable World Bank database for the chosen countries ensures robust data quality, aiding in a comprehensive analysis with potential policy implications for navigating exchange rate fluctuations induced by the pandemic within the African context.

3.2. Model Specification

To assess the influence of COVID-19 on African exchange rates, the subsequent model is computed:

ExchangeRates_{*j,t*}

$$= \alpha_i + \beta_1 \text{COVID} - 19_t + \beta_2 \text{GDP}_{j,t} + \beta_3 \text{InflationRate}_{j,t} + \beta_4 \text{RealInterestRate}_{j,t} + \beta_4 \text{UnemploymentRate}_{j,t} + \varepsilon_{j,t} \quad (1)$$

where, the notation "*j*" denotes the country at a specific time "*t*" while "*ExchangeRates*" serves as the dependent variable under consideration. The term "COVID-19" designates the pandemic itself. Control variables such as "*DP*," "*InflationRate*," "*RealInterestRate*," and "*UnemploymentRate*" represent the gross domestic product, inflation rate, real interest rate, and unemployment rate, respectively, aiming to account for their potential influence on the dependent variable. The idiosyncratic error term is denoted by $\varepsilon_{j,t}$, signifying unexplained variance or unobserved factors affecting the relationship between the variables in the model.

Building on prior studies conducted by Fu et al. (2021), Fang et al. (2021), Saif-Alyousfi (2023), and Saif-Alyousfi et al. (2020, 2022a, 2022b, 2023), the model (1) is evaluated utilizing the pooled ordinary least squares (OLS) method. OLS is chosen due to its suitability for analyzing relationships between variables when there is a linear relationship between the dependent and independent variables. Additionally, OLS is a widely accepted and robust regression technique, often preferred for its simplicity, interpretability, and efficiency in estimating model parameters. Table 1 outlines the specific measurements and characteristics of the variables employed within this study to provide a comprehensive overview for analysis.

Table 1. Definition of variables

Variables	Description	Source
Dependent variables:		
Exchange rate	The natural logarithm of the twelve-month average exchange rate	WDI
Independent variables:		
COVID-19	COVID-19 is dummy variable that takes 1 if the year 2020 and 0 otherwise	
DP growth	Real DP growth rate	WDI
Inflation rate	Current period inflation rate (consumer prices)	WDI
Real interest rate	The lending interest rate adjusted for inflation	WDI

	as measured by the DP deflator.	
Unemployment rate	The percentage of the labour force that is unemployed is known as the unemployment rate.	WDI

4. Empirical results

4.1. Descriptive analysis

Table 2 provides descriptive statistics of key variables observed over a span of 91 instances. The "Exchange rate" column indicates a mean of 4.57 with a standard deviation of 2.59. The values range between -0.17 and 9.17, showcasing considerable variability in exchange rates across the observed instances. Assessing economic indicators, the "DP growth" demonstrates an average growth rate of 2.46%, fluctuating between a minimum of -14.60% and a maximum of 11.87%. Such fluctuations suggest diverse economic performances among the observed entities. Furthermore, the "Inflation rate" variable displays substantial variability with a mean of 17.77% and a wide range from -1.54% to 557.20%. The "Real interest rate" exhibits a mean of 6.15%, ranging from -81.13% to 52.44%, indicating considerable variations in interest rates. Lastly, the "Unemployment rate" column presents an average rate of 9.35%, with observations fluctuating between 1.80% and 23.35%, reflecting diverse labor market conditions across the observed instances. These statistics underscore the wide-ranging variability and diverse trends across the measured variables within the dataset.

Table 2. Descriptive statistics

Variable	Observation	Mean	SD	Min	Max
Exchange rate	91	4.57	2.59	-0.17	9.17
COVID-19	91	0.14	0.35	0.00	1.00
DP growth	91	2.46	5.00	-14.60	11.87
Inflation rate	91	17.77	67.19	-1.54	557.20
Real interest rate	91	6.15	22.98	-81.13	52.44
Unemployment rate	91	9.35	6.96	1.80	23.35

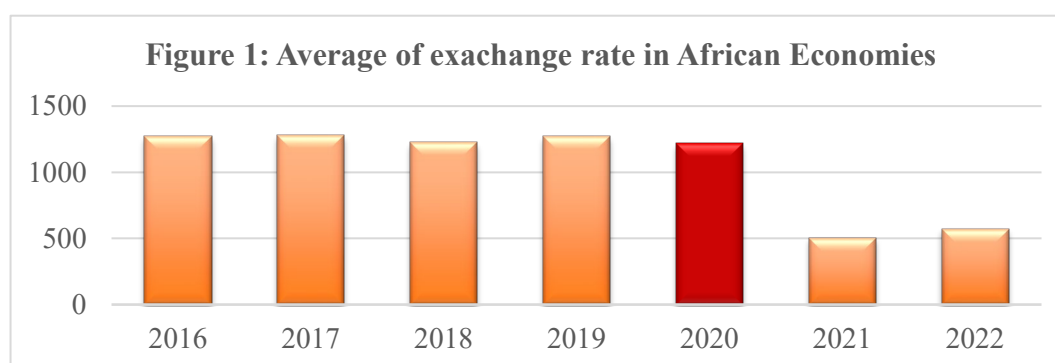


Figure 1 provides a snapshot of the average exchange rates in African economies from 2016 to 2022. From 2016 to 2019, the average exchange rates remained relatively consistent, fluctuating within a relatively narrow range. In 2016, the average exchange rate stood at 1271.383, followed by a slight increase to 1275.731 in 2017. However, by 2018, there was a noticeable decline to 1224.024, before rising slightly again in 2019 to 1270.627. The most significant shift occurred between 2019 and 2020, where there was a notable drop in the average exchange rate to 1218.438. This decline in 2020 could signify various factors such as economic downturns, changes in currency values, or geopolitical events impacting exchange rates in African economies. Moreover, the subsequent years, 2021 and 2022, demonstrate a considerable decrease in the average exchange rate compared to the previous years. In 2021, the average exchange rate dropped to 504.4446, a stark contrast from the averages observed in earlier years. This sharp decline continued into 2022, with the average exchange rate slightly increasing to 571.8947 but still significantly lower compared to the figures before 2021.

The substantial drop-in average exchange rates in 2021 and 2022 could signify economic turbulence, currency devaluation, or structural changes impacting the economies under consideration. These fluctuations highlight the dynamic nature of exchange rates in African economies during the specified years, suggesting potential economic challenges or significant changes influencing currency valuations.

4.2. Correlation analysis

Table 3 presents a correlation analysis among variables in the dataset. The "Exchange rate" demonstrates minimal positive associations with "COVID-19" (0.007) and "Inflation rate" (0.005), while indicating moderate positive correlations with "DP growth" (0.074) and a substantial positive relationship with "Real interest rate" (0.631). Notably, a strong negative correlation is observed between the "Exchange rate" and "Unemployment rate" (-0.734). Additionally, the table unveils other significant relationships, such as a substantial inverse correlation between "DP growth" and "COVID -19" (-0.715), shedding light on potential dynamics between economic growth and the pandemic's impact. These correlations provide valuable insights into potential interdependencies among the variables, offering directions for further exploration or consideration in subsequent analyses.

The correlation coefficients presented in Table 3, all values are below the common threshold of 0.80, indicating a lack of substantial multicollinearity among the variables. This suggests that the independent variables in the dataset do not display strong linear relationships with each other. However, while the correlations do not surpass the 0.80 threshold often associated with multicollinearity concerns, it's essential to consider other factors and perform additional diagnostic tests to ensure the absence of multicollinearity.

Table 3. Correlation analysis

Variables	Exchange rate	COVID-19	DP growth	Inflation rate	Real Interest rate	Unemployment rate
Exchange rate	1					
COVID-19	0.007	1				
DP growth	0.074	-0.715	1			
Inflation rate	0.005	0.313	-0.256	1		
Real interest rate	0.631	-0.225	0.156	-0.585	1	
Unemployment rate	-0.734	-0.015	-0.078	-0.093	-0.381	1

4.3. Results

Table 4 presents the outcomes of a pooled OLS analysis investigating the influence of various factors, including COVID-19 and economic indicators, on the exchange rate within the African region. The high R-squared value of 0.845 indicates that around 84.5% of the variation in the exchange rate can be explained by the included variables. This model exhibits a strong fit, as denoted by the high F-statistic of 87.53, emphasizing the overall significance of the included variables in explaining the variation in the exchange rate.

The coefficient of 1.284 for COVID-19 in Table 4 indicates a statistically significant positive association with the exchange rate within the African region. This coefficient implies that, on average, as the levels of COVID-19 increase within the region, there is a corresponding increase in the exchange rate. However, it's essential to interpret this relationship within the context of the study's scope and the multifaceted nature of this association. Higher levels of COVID-19 might lead to various economic implications, including disruptions in trade, changes in investor sentiment, or alterations in government policies, all of which can influence the exchange rate. Therefore, while the coefficient suggests a positive link between COVID-19 levels and the exchange rate, further exploration might be necessary to discern the specific mechanisms through which the pandemic affects currency valuation within the African region.

These findings diverge from the anticipated outcomes based on prior studies conducted by Saif-Alyousfi (2023), Narayan (2022), Baek (2022), Aloui (2021), Iyke and Ho (2021), Feng et al. (2021), Devpura (2021), and Iqbal et al. (2020). Their research consistently suggests a notable and negative relationship between COVID-19 and exchange rates, which contradicts the observed positive association identified in this study. This deviation from the established findings highlights a discrepancy and prompts further investigation into the potential factors or contextual nuances that might contribute to this contrasting result.

The positive effect of COVID-19 on African exchange rates could potentially stem from several contributing factors: First, heightened levels of COVID-19 might prompt economic disruptions, leading to shifts in investor sentiments and economic uncertainty. These uncertainties could influence currency valuation, potentially resulting in an increased exchange rate as investors seek safe-haven assets or react to changing market conditions. Second, government interventions and policies aimed at mitigating the effects of the pandemic on the economy could inadvertently impact exchange rates. Fiscal or monetary policies implemented to stabilize economies might influence currency values, contributing to an increase in exchange rates. Third, the global interconnectedness of markets means that disruptions caused by COVID-19 in other regions could indirectly affect African economies. Changes in global trade patterns, supply chains, or commodity prices due to the pandemic's impact elsewhere might influence African exchange rates positively. Fourth, paradoxically, in times of crisis, perceived economic stability within a region might attract investment, potentially leading to an increase in the exchange rate. If African economies demonstrate resilience or recovery amidst the pandemic, it could positively impact investor confidence and consequently influence currency valuations. Fifth, during uncertain times like a pandemic, investors may seek safer investments, possibly in assets denominated in stronger currencies. This increased demand for more stable currencies could contribute to an appreciation of exchange rates within African economies.

Additionally, economic indicators such as DP, inflation rate, real interest rate, and unemployment rate display significant impacts on the exchange rate. A one-unit increase in DP is associated with a 0.106 increase in the exchange rate, while similar increments in inflation rate, real interest rate, and unemployment rate correspond to 0.0163, 0.0943, and -0.0822 changes in the exchange rate, respectively. These findings suggest that besides COVID-19, economic factors play a substantial role in influencing the exchange rate within the African region. Indeed, these findings contrast with the results highlighted in Saif-Alyousfi's (2023) study, where a negative relationship between DP and exchange rates was observed in Arab economies. This discrepancy underlines the intricate nature of economic connections, hinting at potential variations in the factors influencing exchange rates between African and

Arab economies. The divergence implies that the dynamics driving currency valuation in these regions might differ significantly. This disparity emphasizes the necessity for a more detailed investigation to understand the nuanced factors contributing to the disparities in study outcomes, enabling a deeper comprehension of the specific.

The positive effect of DP on African exchange rates might be attributed to several underlying factors: First, higher DP often reflects economic growth and stability within a country. A positive outlook on a nation's economic growth could attract foreign investment, leading to increased demand for its currency and consequently higher exchange rates. Second, robust DP growth signals economic health and stability, fostering investor confidence. Investors may view countries with stronger economic performances favorably, leading to an influx of investment and an appreciation of their currencies. Third, countries with higher DP often have robust trade and export sectors. A stronger economy driven by exports can contribute to a higher demand for the nation's currency in international trade, subsequently impacting exchange rates positively. Fourth, higher DP might coincide with better interest rates or investment opportunities within the country. This can attract foreign capital seeking higher returns, increasing demand for the nation's currency and thus elevating exchange rates. Fifth, positive DP growth forecasts or better-than-expected economic performance can lead to market speculation. Traders and investors might anticipate currency appreciation based on optimistic growth prospects, impacting exchange rates positively. These factors collectively contribute to the positive effect of DP on African exchange rates, influencing investor behavior, market dynamics, and currency valuations within the region.

The positive impact of inflation rates on African exchange rates may arise from various interrelated factors. Moderate inflation can reflect a healthy and growing economy, stimulating investor confidence and signaling robust consumer spending. This positive economic sentiment might attract foreign investors seeking profitable opportunities, leading to increased demand for the nation's currency and subsequently impacting exchange rates positively. Moreover, controlled inflation rates can enhance a country's export competitiveness by maintaining reasonable pricing levels, thereby bolstering international trade and augmenting demand for its currency, which can contribute to higher exchange rates. Additionally, stability in inflation rates often fosters predictability in market expectations, attracting traders and investors, which can further positively influence currency valuations. Overall, these factors collectively contribute to the observed positive relationship between inflation rates and African exchange rates, reflecting the multifaceted nature of economic dynamics impacting currency valuation within the region.

Additionally, the real interest rate demonstrates a pronounced and statistically significant positive impact on African exchange rates, noted at the 1% significance level. This effect is likely attributed to various contributing factors. Firstly, higher real interest rates often entice foreign investors seeking superior returns on their investments, fostering increased demand for the nation's assets and subsequently driving up demand for its currency, thus positively affecting exchange rates. Secondly, a higher real interest rate might signify a stronger and more stable economy, encouraging capital inflows that lead to currency appreciation. Effective monetary policies aimed at maintaining positive real interest rates can instill confidence in the country's economic stability, favorably impacting exchange rates. Moreover, positive real interest rates contribute to inflation control, enhancing the currency's purchasing power and bolstering investor confidence. Overall, these combined influences underscore the significant and favorable relationship between the real interest rate and African exchange rates, shaping currency valuations within the region.

Nonetheless, the unemployment rate reveals a substantial and statistically significant negative impact on African exchange rates, noted at the 1% significance level. This adverse effect might be attributed to multiple interrelated factors. Primarily, high unemployment rates often signal economic weaknesses or downturns, eroding investor confidence and casting doubts on a country's economic stability, consequently decreasing demand for its currency and adversely impacting exchange rates. Moreover, elevated unemployment levels tend to curtail

consumer spending, leading to reduced economic growth prospects and influencing investor sentiments, contributing to a depreciation in the country's currency value. Additionally, increased government spending on welfare programs due to high unemployment rates can strain fiscal health, potentially affecting currency values. The potential for social and political unrest arising from prolonged high unemployment levels may further deter foreign investment and negatively impact exchange rates.

Table 4. The impact of COVID-19 on exchange rate in African region

Variables	
COVID-19	1.284*
	(0.646)
DP	0.106**
	(0.0449)
Inflation rate	0.0163***
	(0.00283)
Real interest rate	0.0943***
	(0.0145)
Unemployment rate	-0.0822***
	(0.0279)
Constant	3.564***
	(0.639)
Observations	91
F-Statistic	87.53***
R-squared	0.845

Notes: This table shows the impact of COVID-19 on exchange rate in African region using the pooled OLS. The values in parentheses are robust standard errors. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

5. Conclusion

The main objective of this study is to delve into the impact of COVID-19 on African exchange rates over a significant seven-year period from 2016 to 2022. Employing a comprehensive panel dataset covering 13 African economies, this research rigorously employs the pooled OLS estimator to meticulously analyze the intricate relationship between the pandemic and exchange rates within the region. This investigation marks a pioneering effort, representing the first of its kind to explore and illuminate the intricate interplay between COVID-19 dynamics and exchange rates specifically within African economies. By filling this crucial research gap, this study makes a groundbreaking contribution to the existing body of knowledge in this domain, representing a significant milestone in understanding the nuanced influences of the pandemic on African exchange rates.

The analysis highlights a significant positive association between COVID-19 levels and the exchange rate in African economies. Elevated COVID-19 instances appear to correspond with increased exchange rates, although understanding this link requires deeper exploration due to its multifaceted implications. The pandemic's influence on economic disruptions, investor sentiments, and government policies might contribute to these changes, necessitating a closer examination of how COVID-19 affects currency valuation. Factors contributing to the positive effect of COVID-19 on African exchange rates include economic disruptions, government interventions, global

market interconnectedness, perceptions of regional economic stability, and investor behavior seeking secure assets, all impacting currency valuations within the region. Additionally, economic indicators like DP, inflation rate, real interest rate, and unemployment rate significantly influence exchange rates, showing contrasting patterns from other regional studies. The divergent results underscore the need for a nuanced understanding of economic connections and factors affecting currency valuation in African and Arab economies. The role of DP in boosting exchange rates relates to economic growth, investor confidence, trade strength, better interest rates, and market speculation, collectively contributing to currency appreciation. Similarly, controlled inflation rates encourage investor confidence, export competitiveness, and market predictability, positively influencing exchange rates. The pronounced positive impact of the real interest rate signifies economic stability, attracting foreign investment and contributing to currency appreciation. In contrast, high unemployment rates signal economic weaknesses, deter investor confidence, curtail consumer spending, and potentially strain fiscal health, negatively impacting exchange rates in African economies.

The findings of this study have substantial policy implications that can significantly influence economic strategies within the African region. Firstly, the identified positive association between COVID-19 and exchange rates demands a nuanced and proactive policy response to counteract the economic disruptions caused by pandemics or health crises. Policymakers should prioritize the development and implementation of robust strategies aimed at mitigating the adverse effects of health emergencies on economies. These strategies should encompass diverse aspects, such as bolstering healthcare infrastructure to effectively manage pandemics, ensuring smooth supply chains for essential goods and services, and providing fiscal support to businesses and individuals adversely affected by health-related disruptions. Stabilizing investor sentiments through transparent communication and effective policies is crucial to avoid excessive market volatility, which can negatively impact exchange rates.

Moreover, the study's recognition of the influence of economic indicators—DP, inflation rate, real interest rate, and unemployment rate—on exchange rates underscores the need for targeted policy interventions to enhance economic fundamentals. Policies aimed at fostering sustainable DP growth should be prioritized, focusing on initiatives that promote productivity, innovation, and infrastructural development. Governments can implement structural reforms, invest in education and research, and support industries with growth potential to stimulate economic expansion. Additionally, ensuring moderate and controlled inflation rates is pivotal for maintaining consumer confidence and attracting foreign investment. Policymakers can achieve this by employing prudent monetary policies that balance inflation control with economic growth. Encouraging price stability through effective regulation and transparent policies contributes to favorable currency valuations.

Furthermore, maintaining favorable real interest rates is essential for attracting foreign investment and sustaining economic stability. Central banks and monetary authorities should adopt policies that ensure interest rates are in line with economic objectives while preventing excessive inflation or deflation. Strategies such as adjusting policy rates, managing liquidity, and setting transparent monetary policies can influence real interest rates positively, enhancing the attractiveness of the domestic currency to investors. Additionally, addressing unemployment concerns through comprehensive labor market policies is crucial. Governments should focus on creating job opportunities through investments in key sectors, providing skill development programs, and fostering an environment conducive to entrepreneurship. Lowering unemployment rates not only stimulates economic growth but also enhances investor confidence, positively affecting currency valuation.

In sum, the study's insights suggest the necessity for multifaceted policies that address both short-term exigencies and long-term economic fundamentals. Policymakers should prioritize initiatives that strengthen healthcare systems to mitigate the adverse impacts of health crises on economies. Concurrently, efforts to bolster DP growth, maintain controlled inflation rates, sustain favorable real interest rates, and reduce unemployment

can significantly influence currency valuations within the African region. Collaborative approaches involving governments, central banks, and relevant institutions are essential to effectively design and implement policies that foster economic resilience, stability, and growth, ultimately impacting currency valuations positively. These policy interventions can lay the groundwork for a conducive environment for currency valuation, supporting economic growth and stability across African economies.

Future research in this field should focus on a nuanced exploration of the complex relationship between COVID-19 and exchange rates in African economies. Investigating this connection at a more granular level within specific countries could unveil the divergent impacts of various policy responses, economic structures, and global interconnectedness on currency valuation. Examining the temporal dynamics of this association across different phases of the pandemic and subsequent waves could reveal evolving patterns, aiding in adaptive policy formulation. Furthermore, expanding the scope to consider additional influential factors like geopolitical shifts, regional economic collaborations, and technological advancements may provide a holistic understanding of the multifaceted drivers behind currency fluctuations during health crises. Employing alternative analytical methodologies beyond the pooled OLS used in this study could enhance the robustness of findings, potentially leveraging techniques such as time series analysis or structural equation modeling to gain deeper insights into these intricate relationships. Overall, future research should aim to unravel the complexities surrounding health crises' impacts on exchange rates within African economies, thereby offering vital guidance for economic policy formulation and investment strategies.

Funding Statement

This research received no external funding.

Acknowledgments

Acknowledgments to anonymous referees' comments and editor's effort.

Conflict of interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

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