Repercussions the Covid-19 Pandemic on the SDGs Achievement: Is it a New Era for the Development?

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Abstract

Using monthly data, this article examines the influence of Covid-19 on poverty, inequality, well-being, and environmental quality for a sample of 14 African economies from 2018 to 2020. To do so, we employ a GMM approach to look at the influence of the pandemic on achieving the SDGs in Africa. According to our empirical findings, the pandemic significantly impacts poverty and pollution levels. The results show also that the pandemic coefficient considerably influences the inequality proxy. Due to social exclusion and inequities, these economies must embrace an integrated socio-economic vision to overcome the multi-faceted pandemic externalities and build more resilient economies..

Résumé

Cet article analyse l'effet de la COVID-19 sur la pauvreté, l'inégalité, le bien-être, et la qualité de l'environnement pour un échantillon de 14 économies Africaines pendant la période 2018–2020, à l'aide de données mensuelles. On utilise la méthode des moments généralisés (en anglais, « generalised method of moments», GMM) afin d'analyser l'effet de la pandémie sur la réalisation des Objectifs de Développement Durable (en anglais, « Sustainable Development Goals», SDG) en Afrique. Selon nos résultats empiriques, la pandémie a entraîné une répercussion significative sur la pauvreté et les niveaux de pollution. Les résultats montrent aussi que le coefficient pandémique influence significativement l'indice d'inégalité. À cause des exclusions sociales et des iniquités, ces économies doivent adopter une vision socio-économique

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intégré, afin de surmonter les externalités multiformes de la pandémie, et pour construire des économies plus résilients.

Introduction

COVID-19 inflicted a heavy toll on the global economy. The various policy responses, including mobility and stay-at-home restrictions, led to unparalleled supply chain disruption and economic downturn. The magnitude of service disruption has exacerbated many existing inequalities and created new ones.

Indeed, based on the World Bank estimates, COVID-19 pandemic slashed the annualized global economic growth rate to about − 3.2% in 2020.. In this context, Sub-Saharan Africa's growth rate will decrease by 2.8%; however, the Middle East and North Africa by 4.2%, Europe and Central Asia by 4.7%, and Latin America by 7.2%. Hence, these downturns negatively affect the achievement of development goals and tip 10 million people back into extreme poverty. Even more, with the persistence of the pandemic, the World Bank's forecasting estimate that the global economy will lose eight percent in 2020.

The majority of public spending is oriented towards supporting the weak health care systems, helping the needy social categories, and the caused technical unemployment, especially in Africa with the almost absence of online working. This additional pressure on the public finance and balance of payments needs emergence plans to face all these threats. This pandemic rends rare several agricultural goods and trade restrictions and supplies chain disruptions with the increase of the uncertainty in exporters of energy, and industrial commodities, which has triggered an unusual collapse in oil demand, a crash in oil prices, as well as food security. Conjointly with the emergence of Sustainable Development Goals (SDGs) as the main challenges in the current millennium with the phenomenal spread of Covid-19, we discuss the repercussions of this pandemic on the achievement of the SDGs. Indeed, poverty, energy, hunger, education, and foreign trade patterns faced profound changes during this pandemic. Also, the panic caused by the pandemic and the strict cross-border restrictions has a prominent role in the economic recession. To support economic activity, the IMF and the World Bank argued for three trillion dollars to stimulate the world economic recovery in accordance with Keynesian thought. In this context, several scenarios have been proposed as outcomes of the potential effect of this pandemic on the world, such as it could be structural changes in the world economy. In other words, the re-polarization of the world will be implemented with the emergence of new economic and geopolitical powers.

Africa as the globe is concerned by the evolution of the pandemic, and the repercussions should be assessed instantly to make the right decisions, policies, and actions at the right moments. Due to the gained momentum of this pandemic, controlling the outcomes will be difficult for the local governments. Moreover, the global lockdowns of movement of foreign trade inflows and the comparative advantage of exporting natural resources, energy, and raw materials seem insufficient to bring additional revenues to stimulate economic growth and public investments and support the national health systems. Motivated by this question, we attempt to assess

the COVID-19 pandemic on the SDGs' achievement in the context of selected African countries. Specifically, we focus on examining the impact of COVID-19 on poverty, environmental quality, well-being, and inequality. This study is the first one that attempts to assess the effects of the pandemic on the macroeconomic sphere, and the SDGs achievement in the case of Africa, which is the most vulnerable with strong population density, leads to improving the pressure on local governments in terms of commitments towards their local community and the international society, rending the SDGs more challenging. For this purpose, we employ the Generalized Method of Moments to analyze the impact of the pandemic on poverty, well-being, inequity, and environmental quality using monthly data for a sample of 14 African economies over the period 2018–2020.

The socio-economic crisis experienced with the COVID-19 pandemic is significantly different from previous economic downturns in that it is more deeply rooted in constrained organization and individual behavior. Currently, it is uncertain how long and deep the crisis will be, what the recovery pathway will look like, and thus how economic conditions will be affected. Therefore empirical evidence on the pandemic impacts on the socio-economic trends may help inform policymakers' responses to mitigate the effects on society and individuals.

The rest of this paper is as follows: "Empirical Background" section portrays the method and material. "Empirical Results" section contains the discussions of the results. Section "Conclusion and Policy Implications" concludes the article and provides some policy implications.

Empirical Background

Model Specification

This analysis aims to assess the impact of the Covid-19 pandemic on achieving the SDGs in Africa. Specifically, our study includes as aspects representing the SDGs the environmental quality (see Tiba and Belaid 2020), poverty (see Azzarri and Signorelli 2020), well-being (see Costantini and Monni, 2008), and inequality (see Aiyar and Ebeke 2020; Bélaïd et al. 2020a), for 14 selected African economies. Besides, we use various control and instrumental variables to ensure our model validity, including the omission bias and some other drawbacks in line with the economic theory requirements. Indeed, we include economic growth (see Tiba and Belaid 2021; Tiba 2019a, 2020), foreign direct investment (see Tiba and Belaid 2020; Tiba and Frikha 2019), stock of capital (see Tiba and Frikha 2020; Tiba 2019b), energy consumption (Belaid and Youssef 2017; Tiba and Belaid 2020), as well as, government health expenditure, and public spending on education (see Tiba and Frikha 2020).

Accordingly, our four structural models are specified as follows:

$$POVERTY_{it} = \alpha_0 + \alpha_{1i}GDP_{it} + \alpha_{2i}K_{it} + \alpha_{3i}FDI_{it} + \alpha_{4i}L_{it} + \alpha_{5i}COVID_{it} + \mu_{it}$$

$$(1)$$

$$HDI_{it} = \beta_0 + \beta_{1i}GDP_{it} + \beta_{2i}K_{it} + \beta_{3i}HEALTHEXP_{it}$$
$$+ \beta_{4i}EDUPUBSPEN_{it} + \beta_{5i}COVID_{it} + \zeta_{it} \tag{2}$$

$$GINI_{it} = \lambda_0 + \lambda_{1i}GDP_{it} + \lambda_{2i}K_{it} + \lambda_{3i}FDI_{it} + \lambda_{4i}COVID_{it} + \pi_{it} \tag{3}$$

$$CO_{2it} = \psi_0 + \psi_{1i}GDP_{it} + \psi_{2i}GDP_{it}^2 + \psi_{3i}EC_{it} + \psi_{4i}FDI_{it} + \psi_{5i}COVID_{it} + \varsigma_{it} \tag{4}$$

where i, t, α_0, β_0, λ_0, ψ_0 μ, ζ, π, and ς portrays country, period, country-specific effect, and the error terms which are supposed to be identically normally distributed, respectively. The parameters α_{1i}, α_{2i}, α_{3i}, α_{4i}, and α_{5i} represent the long-run elasticities of poverty with respect to GDP, gross fixed capital formation, foreign direct investment inflows, labor force, and a dummy variable representing the pandemic, respectively. The parameters β_{1i}, β_{2i}, β_{3i},β_{4i}, and β_{5i} are the elasticities of HDI[1] with respect to GDP, gross fixed capital formation, government health expenditure, and public spending on education, and a dummy variable representing the pandemic, respectively. The parameters λ_{1i},λ_{2i},λ_{3i}, and λ_{4i} reflect the elasticities of inequality (GINI) with respect to GDP, gross fixed capital formation, foreign direct investment inflows, and a dummy variable representing the pandemic, respectively. The parameters ψ_{1i},ψ_{2i},ψ_{3i}, ψ_{4i}, and ψ_{5i} portray the elasticities of the pollutant emissions (CO_2) with respect to GDP, its square, energy consumption, foreign direct investment, a dummy variable representing the pandemic, respectively.

The Estimation Method

The Generalized Method of Moments (GMM) method in our frame is due to a set of reasons, such as using instrumental variables to overcome the endogeneity issue. Hence, the GMM technique gives efficient estimates conjointly with the presence of arbitrary heteroskedasticity. In addition, most of the diagnostic tests applied in our model can be expressed in a GMM framework. Consequently, the GMM method provides efficient estimates.

Data

Our empirical background uses monthly data of 14 African economies from 2018 to 2020. The sample consists of 14 countries as Algeria, Angola, Benin, Botswana, Egypt, Morocco, Mozambique, Senegal, South Africa, Tanzania, Togo, Tunisia, Zambia, and Zimbabwe. The data are obtained from the World Development Indicators (WDI 2021). The availability of data constrained the selection of countries and

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[1] Many works tend to revise the conventional HDI by subtracting the income component from the formula. Thus, the HDI's modified version does not include the income factor to eliminate the multicollinearity problem in the regression analysis. HDI formula will be presented as follows: $HDI = \frac{1}{2}$ ($$Gross enrolment$$+$$Life expectancy$$).

Table 1 The S-GMM estimations

Dependent variable:	Variables	GDP	GFCF	FDI	L	COVID	AR(1)
POVERTY	Coef	0.072	− 0.052	0.208	6.40E−05	11.077*	0.0000
	P-value	0.1939	0.6760	0.0379	0.2326	0.0051	

AR (1) is the first order autocorrelation of residuals. *** Means the significance at 1%. ** Shows the significance at 5%. * Shows the significance at 10%, respectively

the starting period. The present study uses the poverty factor, which is proxied by the poverty headcount index; Per capita GDP is measured using real GDP in constant 2010 US$ (in millions). HDI has been used as a proxy for key dimensions of human development, including education level and life expectancy. Income is not included to avoid the multicollinearity between the index and economic growth. COVID is a dummy variable representing the pandemic. Energy consumption (EC) is measured using energy use in kg of oil equivalent per capita; government health expenditure as a share of GDP (HEALTHEXP), public spending on education as a share of GDP (EDUPUBSPEN), foreign direct investment net inflows (FDI) as a share of GDP; Gini index (GINI) is used as a proxy of income inequality; The labor force (L) in millions of persons; and per capita CO_2 emissions in metric tons.

Empirical Results

The GMM estimation findings of the four structural models are reported in Table 1. The results pertaining to Model 1 reflect that income has no significant impact on poverty, implying that the income level in the short run couldn't reduce the effect of poverty in African society. Regarding the stock of capital, it has no significant effect on reducing poverty during the pandemic period. Indeed, during the pandemic, the stock of capital in the African region seems insufficient to overcome the urgent needs of the society in terms of providing the financial capacity for investing. However, the stock of capital is oriented towards saving for investment, but it is used to finance daily expenses as an emergent response to the pandemic panic and the demand shocks. While the coefficient of foreign direct investment has a significant positive impact on poverty, due to the strong dependence of these economies on foreign actors and investments, even the effect of a pandemic, these economies continue to seek foreign investment as the main element for the economy. However, these investments seem low in terms of value-added and contribute to enhancing poverty and disparities. Besides, the coefficient of the labor force has no significant impact on the poverty level. This implies that the pandemic caused the technical unemployment phenomena in these economies, which leads to an increasing the poverty level, and the majority of labor forces are in temporary jobs and vulnerable works, which justifies the marginal effect of the labor force on reducing poverty in the region as a whole. Finally, the coefficient of the pandemic exerts a significant positive impact on the poverty level. The magnitude of 11.077 means that a 1% increase in the number of Covid cases implies an 11.077% increase in poverty. This

Table 2 The S-GMM estimations

Dependent variable	Variables	GDP	GDP_SQR	EC	FDI	COVID	AR(1)
CO_2	Coef	− 0.001	2.95E−08	5.15E−05	0.015	1.640*	0.0003
	P-value	0.7184	0.5283	0.0277	0.3220	0.0000	

AR (1) is the first order autocorrelation of residuals. *** Means the significance at 1%. ** Shows the significance at 5%. * Shows the significance at 10%, respectively

Table 3 The S-GMM estimations

Dependent variable	Variables	GDP	GFCF	FDI	COVID	AR(1)
GINI	Coef	9.99E−06	0.012	0.004	0.446**	0.0014
	P-value	0.7586	0.1113	0.4113	0.0235	

AR (1) is the first order autocorrelation of residuals. ***Means the significance at 1%. **Shows the significance at 5%. *Shows the significance at 10%, respectively

result is justified by the vulnerable structure of employment and the caused effects of temporary and technical unemployment, as well as the absence of actual design for online working and several inherent issues such as the infrastructure, etc.

The results of the CO2 modeling are recorded in Table 2. The insights reveal that the GDP and its square have no significant impact on the pollution level during the pandemic period. This result is due to the technical unemployment caused by the extensive lockdown designed to stop the spread of Covid-19. Policy actions taken during the COVID-19 pandemic radically reshaped energy demand patterns worldwide. Most international borders were closed, and individuals were constrained to their homes, resulting in reduced transportation and change in consumption patterns. Also, the foreign direct investment coefficient has no significant impact on the pollution level over the pandemic period. Indeed, the pandemic consequences are strongly linked to the loss of several opportunities in terms of investment and job creation. This explains the lack of an effective effect of foreign investment on Africa's environmental quality due to panic and the absence of economic stability and strategic perspectives in short to medium term. Finally, the coefficient of the pandemic has a significant positive impact on the pollution level. Results show that an increase of 1% in the number of cases leads to 1.64% increase in emissions. Indeed, the caused panic of Covid-19 leads to an increase in the use of private cars and online working /learning, which leads to additional energy demand, therefore, an increase in the pollution level, especially with weak ecological regulation in this region as a whole.

The highlights related to the inequality model are displayed in Table 3. The empirical results reveal that the income factor has no significant impact on the inequality proxy. As a result of the pandemic's expansion and the lack of a good strategy to overcome the covid-19's socio-economic effects, social movements will emerge due to poor social and economic choices. In addition, with the looming energy crisis, energy prices may increase and push many households into energy poverty.

Table 4 The S-GMM estimations

Dependent variable	Variables	GDP	GFCF	HEALTHEXP	EDUPUBSPEN	COVID	AR(1)
HDI	Coef	0.0010	0.306	− 0.090	0.049	28.603	0.0003
	P-value	0.6179	0.5289	0.8501	0.2547	0.3580	

AR (1) is the first order autocorrelation of residuals. *** Means the significance at 1%. ** Shows the significance at 5%. * Shows the significance at 10%, respectively

Also, the stock of capital has no significant impact on inequality, implying that the national investment has no socio-economic role to play in the society, and the lack of institutional background and nationalism of the society is the primary justification for the absence of the State spirit. Presumably, inequality and disparities will increase during the pandemic due to Africa's vulnerable socio-economic panorama. Further, foreign direct investment has no significant impact on the inequality phenomenon.

The combination of ineffective measures to reduce inequality and the current geopolitical issue could trigger a wave of political instability. The escalating food and energy costs pressured individuals already frustrated with the government's leadership. Finally, the coefficient of the pandemic exerts a significant positive impact on the inequality proxy. The results show that a 1% increase in the number of cases leads to an increase in inequality by around 0.45%. Hence, the pandemic era leads to increasing inequality and favors inequity, and the most vulnerable social class suffered more from lockdowns and the resulted economic downturn. Many studies show that containment measures and stimulus packages adopted in response to the COVID-19 pandemic and the associated economic crisis have affected income and production distribution within and between countries (Ben Amar et al., 2020, 2021; Belaid et al., 2022).

The empirical findings of the HDI model are shown in Table 4. The results point out that the income factor, stock of capital, public spending on health, education expenditure, and the pandemic variable have no significant impact on the HDI. Consequently, the income level, health expenditure, education, public spending, and national investment lead to social exclusion and disparities. These economies are characterized by the absence of an integrated socio-economic vision for a better society. With the caused effects of the pandemic, social exclusion and disparities are more prominent. An emergent investment in national health systems, schooling is an emergent to overcome the disastrous impact of the spread of Covid19. A fiscal stimulus policy is recommended to stimulate economic growth, and also it will have a serious repercussion on the social stream. Since the investment in the human factor is already weak, the pandemic will empower inequality, social exclusion, and disparities, the main challenge for the decision-makers is how to ensure efficient and oriented investment towards equal access to the national wealth, investment, and basic needs for an integrated society for sustainable future.

Conclusion and Policy Implications

Due to the heavy impacts of the pandemic on the global economy, international trade, investment movements, and health systems, we attempt to assess the impact of the pandemic on the economic, social, and ecological streams in the case of Africa. Specifically, we use the Generalized Method of Moments method to examine the impact of the pandemic on poverty, well-being, inequity, and environmental quality, representing the sustainable development facets using monthly data for a sample of 14 African economies over the period 2018–2020.

Our empirical findings reveal that the pandemic exerts a significant positive impact on the poverty level. This can be explained by the vulnerability of the employment situation and the effects of temporary and technical unemployment, as well as by the lack of solid structures for online work and several inherent problems such as physical infrastructures.

Moreover, the results show that the pandemic has a significant positive impact on the pollution level. This implies that the caused panic the Covid-19 leads to an increase in the use of private cars and online working /learning, which leads to additional energy demand, therefore, an increase in the pollution level, especially with weak ecological regulation in this region as a whole. The highlights related to the inequality model reveal that the coefficient of the pandemic exerts a significant positive impact on the inequality proxy. Thus, the pandemic era increased inequality, and the most vulnerable social classes were strongly affected by the rigorous responses designed to stop the spread of the pandemic. The results of the lockdowns in several countries are inefficient and lead to aggravated inequalities. Furthermore, the results highlight that the income level, health expenditure, education, public spending, and national investment lead to social exclusion and disparities.

To respond and mitigate the extreme effects of the pandemic in Africa, investment in national health systems and schooling are urgent solutions to overcome the disastrous impact of the spread of Covid-19. A fiscal stimulus policy is recommended to stimulate economic growth, and also it will have a serious repercussion on the social stream. Since the investment in the human factor is already weak, the pandemic will empower inequality, social exclusion, and disparities. The critical challenge for policymakers is how to ensure efficient and equal access to national wealth, investment, and basic needs to ensure an integrated society and a sustainable future.

It is vital to have proper policy measures in place to improve social welfare and advancement of SGDs. As a result of the higher unemployment rates and projected problems in repaying debt, long-standing issues such as poverty, insufficient food supply, restricted access to health care, and poor roadways, among others, would become even more entrenched. These might endanger the vision of 2030 for Sustainable Development. As a result, the current crisis threatens Africa's growth potential, as recovery may take longer. As a result, it is essential to comprehend the necessity of ensuring a solid institutional regulatory system as well as the resources required to support long-term economic development. In particular, any plan should take a conflict-sensitive approach, incorporating risk and opportunity assessment as a significant component of ensuring that public policies do not amplify current instability.

Sustainable development faced challenges before Covid-19, but the Covid-19 pandemic has exacerbated those challenges. Covid-19 has generated substantial hurdles for many sustainability initiatives and sustainable future development. As a result, governments, organizations, practitioners, and legislators must work together to minimize the pandemic's adverse effects on sustainable development.

It is also crucial to build on the lessons learned from the COVID-19 pandemic, as it can serve as a starting point for technological and socio-economic transformation to enhance long-term economic and environmental sustainability (Mongo et al., 2021a, b).

Declarations

Conflict of interest We attest that in submitting our paper for your journal for publication, there is no potential conflict of Interest including financial, personal or other relationships with other people, or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work.

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