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**Article**

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# Globalization and shadow economy: a panel analysis for Africa

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## Abstract

**Purpose** – The study's objective is to examine the relevance of globalization in affecting the size of the shadow economy in selected African nations.

**Design/methodology/approach** – To do this, the authors employ the KOF globalization index and implement both static and dynamic common correlated mean group estimators on a panel of 24 African nations from 1995–2017. This technique accommodates the issue of cross-sectional dependence, sample bias and endogenous regressors. Panel threshold analysis is also conducted to establish the nonlinearity between globalization and the shadow economy. To examine the causality between the variables, the study employs Dumitrescu and Hurlin's panel causality test.

**Findings** – The results show that globalization reduces the size of the shadow economy. The results of the nonlinear analysis suggest a U-shaped relationship. Overall globalization has a threshold impact of 48.837%, economic globalization has 45.615% and political globalization has 66.661% while social globalization has a threshold value of 35.744%. The results of the panel causality show that there is a bidirectional causality between the two variables.

**Practical implications** – The results suggest that the government and other relevant authorities need to introduce capital controls and other policy measures to moderate the degree of social, political and cultural diffusion. Appropriate policies should be formulated to monitor the extent of African economic openness to other continents to maximize the gains from globalization.

**Originality/value** – Apart from being the first study in the African region that evaluates the relevance of globalization in controlling the shadow economy, it also analyzes the dynamics and threshold analysis between the two variables using advanced panel econometrics which makes the study unique. The study suggests that globalization tools are useful for affecting the size of the shadow economy in Africa. This study provides fresh empirical evidence on the impact of globalization on the shadow economy in the case of Africa.

**Keywords** Africa, Informal economy, Globalization, Spatial dependence

**Paper type** Research paper

## 1. Introduction

African countries begin to integrate their economies in the mid-1980s with the adoption of the Structural Adjustment Program (SAP). Various policies, reforms and cross-border agreements are reached by African governments and have led to the significant integration of the regional economies. This action, further, improves the share of their exports, imports and other cross-border relationships in terms of international politics, security and social services (Nissanke and Thorbecke, 2006). Globalization policy has



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strengthened cross-border interaction in Africa. It has increased global interdependence and, further enhances transnational culture and cross-border political dispensation. It influences the consumers' preferences, and lifestyle of economic actors, and promotes regional interconnection and social equity (Ajide *et al.*, 2021; Coulibaly *et al.*, 2017).

Theoretical explanations provide that globalization has important effects on the size of the shadow economy (Pham, 2017; Canh *et al.*, 2020b). Melitz (2003) analyzes that global integration promotes productivity and efficiency in the reallocation of resources (Esaku, 2021). Economic openness intensifies the competitive efforts of domestic firms to share their customer base with international firms. However, the less efficient firms may be forced out to operate in the shadow economy and continue serving the domestic markets. In addition, domestic firms may also downsize the staff strength while informal employment may grow due to this action. This implies that globalization has positive and negative consequences for the economy. Further, it may distort the cost-benefit structure of operating in the formal and informal economy. It mitigates the size of the shadow economy by strengthening or weakening the institutional quality (Friedman *et al.*, 2000; Bonaglia *et al.*, 2001). It may fast-track global integration toward institutional diffusion by eradicating national boundary tools and facilitating the learning of other countries cultures, technologies, political institutions and governance (De Soto, 1989; Norris, 2000; Berdiev and Saunoris, 2017).

Several empirical arguments have been proposed on the nexus between the shadow economy and globalization (Pham, 2017; Farzanegan *et al.*, 2019). The recent study by Berdiev and Saunoris (2017) provides empirical evidence on the multidimensional analysis of globalization and how it influences the size of shadow economic activities. To our surprise, none of the studies focuses on developing nations, especially Africa where the size of the shadow economy is very high. To the best of the authors' knowledge, this study might be one of the few, traceable to African regions in this debate. We react to this lacuna found in the literature and provide an empirical analysis of the impact of globalization on the shadow economy in Africa. The contributions of the study are highlighted as follows. First, unlike previous studies, we examine the impact of globalization on shadow economic activities within the framework of a dynamic common correlated mean group estimator proposed by Chudik and Pesaran (2015). This technique accommodates a situation of interconnection among nations that leads to the issue of cross-sectional dependence and, corrects for sample bias and endogenous regressors (Ditzen, 2016). It supports both homogeneous and heterogeneous coefficients.

Second, we examine the nonlinear relationship between globalization and the shadow economy in Africa. Studies suggest that the shadow economy may be a source of livelihood for the poor and provide a learning ground for young entrepreneurs before formalization to avoid overregulation which may kill entrepreneurial intentions (de Soto, 2000; Ajide and Dada, 2023). While the larger size of the shadow economy may have negative effects on economic planning and development, previous studies also suggest that in a period of financial or economic crisis, the informal economy may serve as a source of income buffer and safety net for the low-income group (Medina and Schneider, 2019). Wu and Schneider (2019), Read (2004) and Stiglitz (2002) believe that there is a need to showcase the appropriate balance between the challenges and the cost of globalization and other socioeconomic factors within a nation. Accordingly, this requires the knowledge of a suitable threshold that would enhance economic prosperity. This notion has been subjected to academic debates in recent times (Surdej, 2017; Bolarinwa and Simatele, 2023). Surdej (2017) establish that 30% could be the appropriate threshold for striking balances between the shadow economy and the official economy for smooth economic development. Yu and Ohnsorge (2019) document that a 35% threshold would be appropriate to harness the positive impact of the shadow economy. This implies that a moderate level of shadow economic activities could benefit the country's growth process and, any nations with sustained growth over time have some thriving

presence of shadow economy, thus reporting low poverty level. In this manner, our study sets out to establish the nonlinearity between the shadow economy and globalization in developing economies.

In conjunction with heterogeneous panel causality proposed by Dumitrescu and Hurlin (2012), the results show that globalization reduces the shadow economy in the first instance and later increases it after reaching a threshold value of 48.837%. This demonstrates a U-shaped relationship in the case of Africa. The results of the panel causality show that there is a bidirectional causality between the two variables. Our findings suggest a policy that expands the size of the official economy by the formalization of shadow economic operations. It proposes a sizable level of globalization that can help policymakers in maximizing the opportunities present and mitigate the negative results of the shadow economy on economic prospects and well-being. The rest of the paper is organized as follows. Section 2 discusses the stylized facts on the shadow economy in Africa. In section 3, we discuss the study's hypothesis and existing literature. In section 4, we present the method and materials of the paper. Section 5 interprets the results while section 6 concludes the paper.

## 2. Stylized fact on shadow economy in Africa

Shadow economy [1] also known as the informal economy, parallel market, and black market, among others refer to all economic activities not reported to the authorities especially, the tax administrator. In other words, the shadow economy can be seen as unreported and unrecorded economic activities taking place outside the official economic settings (Hart, 2008; Ajide, 2021; Dada *et al.*, 2022). Generally, the shadow economy is always regarded as illegal economic activity. Based on this, the shadow economy is always difficult to measure because the perpetrators normally hide it (Bitzenis *et al.*, 2018; Medina and Schneider, 2018; Ajide *et al.*, 2021). The shadow economy has become part of the economic activities of both developed and developing countries, with developing countries having a larger percentage. For instance, a study conducted by Medina and Schneider (2018) shows that the shadow economy is more than 36% (as a percentage of GDP) in developing countries between 2002 and 2015. In Africa, the size of the shadow economy is growing at an increasing rate. Figure 1 shows the average value of the shadow economy in African countries between 1991 and 2017. The trend analysis reveals that virtually all the countries have the presence of a shadow economy that is more than one-third of the GDP. Specifically, Nigeria, Zimbabwe, Gabon and Congo Democratic Republic top the list of countries with the highest size of shadow economy with 55.9, 53.3, 50.6 and 50.1%, respectively. However, Zambia (21.9%), South Africa (26.3%), Namibia (27.3%) and Botswana (28.9%) have the lowest size of the informal economy in Africa.

Shadow economy in Africa usually involves activities such as transportation, automotive repairs, artisanal mining, brick and tile making, and metal works, among others (Cervero, 2000), which has developmental and environmental implications (Farzanegan *et al.*, 2019; Biswas *et al.*, 2012; Dada and Ajide, 2021; Dada *et al.*, 2022). Activities in the shadow economy are usually associated with lower wage rates, poor working conditions with high hazards, and lower or no social security such as pension schemes and health insurance. Further, the shadow economy increases environmental pollution and affects the development process of the country in integrating into the global economy (Bacchetta *et al.*, 2009; Biswas *et al.*, 2012; Dada *et al.*, 2022).

## 3. Literature review and hypothesis development

### 3.1 Theoretical underpinning

Harris and Todaro (1970)'s dual-economy theory provides a solid foundation to study the nexus between globalization and the shadow economy. According to Pham (2017) and,



Source(s): Authors based on data from Medina and Schneider (2019)

**Figure 1.**  
Average value of  
shadow economy  
(1991–2017)

Berdiev and Saunoris (2017), globalization influences the formal and the informal economy which reflects some of the elements of the standard two-sector growth model where economic agents have the opportunity to escape the formal economy by migrating to the shadow economic sector if the regulatory and other governmental activities are not conducive in the official economy (Rauch, 1991; Loayza, 2016). Before the movement, the economic actors weigh the cost and benefits of operations (legal and illegal) in the shadow and official economy as discussed in the rational choice theory of crime by Becker (1968), Berdiev and Saunoris (2017), Ajide and Dada (2022). This implies that the incentive to operate in the shadow economy is based on the cost-benefit differentials in association with the formal economy. The transaction costs including minimum wages, and cost of capital among others may induce economic actors to operate in the shadow economy (Schneider, 2011; Schneider and Enste, 2000).

The scholarly debates on globalization have elicited the dark and bright sides of the major outcomes of global integration of the economy (Aïssaoui and Fabian, 2022). Globalization is said to improve economic progress, support national industrialization and encourage foreign direct investment. It contributes significantly to economic and sustainable growth in developing countries. Globalization facilitates technological innovation and promotes trade and economic activities through increased technologically advanced transactions and foreign direct investment, thus serving as an external source of financing the domestic economy (Habib and Zurawicki, 2002; Firebaugh and Goesling, 2004). On the other hands, scholars also posit that globalization may have negative repercussions on the local economy. This includes impoverishing the developing economies and allow the multinational firms to influence the national policies to their favor (Carr and Chen, 2001; Lorenzen *et al.*, 2020). These two positions have been widely critiqued theoretically and empirically, and jointly determine the net impact of globalization on shadow economy (Bhagwati, 2004; Firebaugh and Goesling, 2004; Witt, 2019). The advocates of globalization also admit that economic prospect does not necessarily follow an increase in economic integration due to differences in institutional quality of developing economies (Krugman, 2008; Bryant and Javalgi, 2016). Accordingly, shadow economy has been a notable factor and, represents one of those factors affecting effectiveness of economic policies (Ajide *et al.*, 2023). The presence of these dark and bright sides of global integration present the possibility of nonlinear relationship between shadow economy and globalization, and implying that there could be a threshold level of overall globalization that may promote and/or derail shadow economic operation in the economy.

Also, an economy featured by productive expansion and technology advancement emerged through globalization may support expansion of shadow economy because this development means an improvement in human capital which may assist in improving living standards (Wu and Schneider, 2019). In an environment with less financial pressure, citizens would prefer informal employment for flexibility purpose and, to balance work and better life, most importantly to catch up the wage differences that exist in the official economy and shadow economy. Contrarily, globalization may help downscale the shadow economy by providing quality public goods or services through the inflows of foreign capital stocks. Furthermore, globalization can help to build strong institutional capacity and good social infrastructures which help in reducing size of firms and individuals operating in shadow economy (Wu and Schneider, 2019).

### *3.2 Previous empirical studies and study's hypotheses*

The literature on shadow economy has mainly focused on its determinants such as income per capita and institutional factors (Tanzi, 1982, 1999; Friedman *et al.*, 2000; Schneider and Enste, 2000; Choi and Thum, 2005; Canh *et al.*, 2020a; Ajide and Ojeyinka, 2023). Though role of globalization in an economy has been well discussed in the literature, the relationship between

globalization and the shadow economy is relatively scanty. The few available studies have focused on the variant of globalization (such as foreign direct investment, trade openness, trade liberalization, etc.) on shadow economy (Bayar and Öztürk, 2019; Berdiev *et al.*, 2018; Berdiev and Saunoris, 2017; Canh *et al.*, 2020a). These studies suggest that determinants such as FDI, trade openness, and trade liberalization are potential tools to increase official activities, with detrimental influence on the shadow (informal) economy. The spillover impact of these factors, i.e. transfer of environmentally friendly technology and equipment, capital inflow, R&D, knowledge sharing, etc., boost production in the domestic economy, thereby absorbing those in the shadow to the limelight of the economy (Lin and Kwan, 2016; Geronazzo, 2016). Furthermore, labour conditions (employment opportunities, increase wage rate, etc.) in the formal economy also increase through globalization, which in turn reduces the size of labour in the shadow economy. To participate in international trade, those in the shadow economy need to officially register with the relevant government authorities, thus, globalization through trade openness lessens the size of informality in the economy.

Kearney (2006) investigates the relationship between the globalization index and informality using a global sample. The author concludes that globalization has a negative influence on informality. Bayar and Öztürk (2019) found that economic freedom reduces the size of the shadow economy in the European Union transition countries. Similarly, Farzanegan *et al.* (2019) document that trade liberalization which measures the economic component of globalization reduces the size of the shadow economy in Egypt. Minsoo *et al.* (2018) submit that foreign direct investment reduces the size of the shadow economy in developing countries when it is conditioned on the policies protecting intellectual property rights. Similarly, Esaku (2021) found that foreign trade significantly reduces the size of the shadow economy in Uganda. Berdiev *et al.* (2018) submit that economic freedom and its components have a significant negative influence on the shadow economy in a panel of 100 countries, thus suggesting that international trade reduces the size of the shadow economy. In another related study, Berdiev and Saunoris (2017) examine the relationship between globalization and the shadow economy in 119 countries. The outcomes of the study reveal that globalization, especially political globalization reduces the size of the informal sector activities.

Canh *et al.* (2020a, b) examine the effect of institutional quality and economic integration on the shadow economy of 112 countries using batteries of economic techniques. The results show that institutional quality and foreign direct investment have a strong negative influence on the shadow economy while trade openness exacts a weak negative impact on the shadow economy. Zarra-Nezhad *et al.* (2014) submit that globalization reduces the presence of a shadow economy for a panel of developing countries between 1999 and 2009. Nguyen *et al.* (2020) examine the relationship between the shadow economy and economic fluctuation in 133 economies between 1991 and 2015. The outcome of the study suggests that shadow economy influences economic fluctuation. Focusing on the direction of causality, Nikopour *et al.* (2009) found a bidirectional causality between FDI and shadow economy for a panel of 145 countries. From the review, it is evident that no known study has examined the impact of globalization on the shadow economy, particularly in developing countries like Africa which has a high presence of informal activities. This study addresses this perceived gap in the literature. We propose that.

*H1.* Globalization significantly reduces the size of the shadow economy in Africa.

Furthermore, globalization could increase the size of the shadow economy through an increase in regulations in the official economy and other elements of capital controls usually associated with economic and financial globalization. This might make firms seek tax-free or move their production to the unofficial economy and stimulate illicit trade activities. Furthermore, “pricing transfer” which is one of the attributes of inward FDI could make domestic firms move to the shadow economy since they cannot compete favorably with the foreign firms who have taken advantage of tax differentials to earn big profits (Canh *et al.*, 2020a, b). Moreover,



the low-skill labor in developing countries compared to the global labor could put them at a disadvantage in globalization since they could not easily move and integrate with the international markets (Farzanegan and Hassan, 2017). In addition, some studies reveal that there is a non-linear relationship between globalization and the shadow economy. For instance, Farzanegan and Hassan (2017) document that economic globalization reduces the shadow economy in a developing economy in the first three years, however, turns positive afterward. The author concludes with the need to reduce the cost of doing business to reduce the presence of a shadow economy. Birinci (2013) submits that the relationship between trade openness and shadow economy is inconclusive in 12 developed countries between 1964 and 2010. Equally, Fliess and Fugazza's (2012)'s study suggests a mixed relationship between openness to trade and informal economy across a cross-section of countries. In the case of Brazil and Colombia, Goldberg and Pavcnik (2003) found no relationship between trade and the shadow economy. The recent study by Wu and Schneider (2019) also concludes that it is possible to have a U-shaped relationship pattern between the shadow economy and economic factors such as income per capita and globalization. Based on this, we propose the second hypothesis.

*H2.* There is a nonlinear relationship between globalization and the shadow economy in African environment.

The first and second hypotheses are therefore tested in the subsections using African data. The knowledge of the influence of globalization on the shadow economy with other determinants is important to gain better insight into how globalization can serve as a veritable tool to reduce the spread of the shadow economy in Africa.

#### 4. Data and methodology

##### 4.1 Empirical model

The main focus of the study is to examine the impact of globalization on the shadow economy in the case of Africa. The empirical model of the study is hereby specified:

$$SE_{it} = \beta_0 + \beta_1 GI_{it} + \beta_2 LGDP_{it} + \beta_3 URB_{it} + \beta_4 INS_{it} + \beta_5 POVG_{it} + \varepsilon_{it} \quad (1)$$

In equation (1),  $SE_{it}$  is the Dependent variable representing the shadow economy,  $GI_{it}$  represents the overall globalization index which can be decomposed into Social Globalization (SOG), Political Globalization (POG) and Economic Globalization (ECG). Our choice of control variables is informed by the extant literature. The control variables are:  $LGDP_{it}$ ,  $URB_{it}$ ,  $INS_{it}$  and  $POVG_{it}$  representing income per capita, urbanization, institutional quality, and poverty gap respectively. The literature suggests that income per capita, the extent of urbanization and the level of institutional quality are major factors affecting the size of the shadow economy in developing economies (Berdiev and Saunoris, 2017; Keneck-Massil and Noah, 2019; Ajide, 2021; Dada *et al.*, 2021a, b). It is expected that income per capita and institutional quality will reduce the size of the shadow economy while the higher the level of urban population the higher the size of the shadow economy. Furthermore, previous studies reveal that poverty is one of the causes of the shadow economy. As the poverty gap increases, the size of the shadow economy expands (Berdiev *et al.*, 2020).  $\beta_0, \dots, \beta_5$  are the parameters to be estimated.  $\varepsilon_{it}$  is the residual term,  $t$  and  $i$  represent time and country dimensions respectively.

To examine the nonlinear impact of globalization on the shadow economy in Africa, the study specifies equation (2):

$$SE_{it} = \beta_0 + \beta_1 GI_{it} + \beta_2 GI_{it}^2 + \beta_3 LGDP_{it} + \beta_4 URB_{it} + \beta_5 INS_{it} + \beta_6 POVG_{it} + \varepsilon_{it} \quad (2)$$

$GI_{it}^2$  is the square of overall globalization which is used to measure the nonlinear impact of globalization. Other parameters and variables are the same as explained earlier



#### 4.2 Estimating techniques

This study conducts several preliminary tests before estimating the model. First, [Pesaran \(2015\)](#) on weak cross-sectional dependence is examined to analyze the extent of spatial correlation in the panel of African countries by assuming that the null hypothesis of errors is weakly cross-sectional dependent. After, the panel unit root test is conducted via first-generation panel units tests such as Im, Pesaran & Shin (IPS) and Augmented Dickey-Fuller (ADF) unit root tests and the second-generation panel unit root tests, namely, Cross-section Augmented Dickey-Fuller (CADF) unit root test proposed by [Pesaran \(2007\)](#). The strength of second-generation unit root tests over the first generation is that it controls for cross-sectional dependence common in panel structure. We also test for slope heterogeneity using [Pesaran and Yamagata's \(2008\)](#)'s approach based delta and adjusted delta. Furthermore, panel co-integration is conducted to ascertain the long-run relation among the variables via the Kao test, Pedroni's test and Westerlund test for Panel Cointegration.

For estimation, the study employs dynamic common correlated mean group (Dynamic CCEMG) in the first instance over the first generation estimation like Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) because it accounts for cross-sectional dependence, endogeneity and heterogeneity. Dynamic CCEMG is hereby specified as:

$$SE_{it} = \partial_i SE_{it-1} + \vartheta_i X_{it} + \sum_{p=0}^{P_T} \gamma_{xip} \bar{X}_{t-p} + \sum_{p=0}^{P_T} \gamma_{sip} \bar{SE}_{t-p} + u_{it} \quad (3)$$

Where  $i$  and  $t$  are the country and time identities, respectively. The dependent variable remains  $SE_{it}$  while  $SE_{it-1}$  is its lag and is treated as the independent variable.  $X_{it}$  is the set of explanatory variables including the globalization variable and the control variables.  $\gamma_{xip}$  and  $\gamma_{sip}$  are the unobserved common factors.  $P_T$  and  $u_{it}$  denote the number lag of the cross-sectional average and the error term, respectively. The study also utilizes Panel Spatial Correlation Consistent based on Driscoll and Kraay (DK)'s (1998) for robustness checks, and finally, it employs [Dumitrescu and Hurlin \(2012\)](#) to ascertain the causality among the variables of interest under the null-hypothesis of homogeneous non-causality-versus-alternative-hypothesis-of heterogeneous non-causality ([Ajide and Dada, 2022](#)).

Furthermore, the study attempts to establish the threshold effect of globalization on the shadow economy by applying the panel sample splitting estimation technique proposed by [Hansen \(2000\)](#). This technique is reliable in handling and tracing the turning point or the threshold in a regression analysis. The mere introduction of quadratic terms may not be sufficient in the analysis of the nonlinearity between the two variables due to the possibility of multicollinearity issues and the inability to handle structure breaks ([Huang et al., 2018](#); [Liu et al., 2020](#)). Threshold regression by [Hansen \(2000\)](#) is specified in equation (4):

$$SE_{it} = \begin{cases} \alpha_i + \beta_1 X_{it} + \theta_1 q_{i,t} + \varepsilon_{it} & q_{i,t} < \gamma \\ \alpha_i + \beta_2 X_{it} + \theta_2 q_{i,t} + \varepsilon_{it} & q_{i,t} \geq \gamma \end{cases} \quad (4)$$

All identities are the same as described above, except that  $\alpha_i$  signifies the country fixed effects,  $q_{i,t}$  is the threshold variable, and  $\gamma$  is the threshold value.  $\theta_1$  is the threshold coefficient if the threshold value is lower than  $\gamma$ , otherwise  $\theta_2$ .

#### 4.3 Data and measurement of variables

The study utilized data of 24 African countries (see [Appendix for the list](#)) for 1995–2017. The period of data is based on data available to have a balanced panel.

The data used for the study are sourced from various sources. Shadow economy data are sourced from [Medina and Schneider \(2019\)](#). Data on the Globalization index are obtained from the KOF globalization database while the institutional data are obtained from International Country Risk Guide (ICRG). [Table 1](#) discloses the sources of data, measurement and their various sources.

[Table 2](#) presents the descriptive statistics of the variables. The [Table 2](#) reveals that, on average, the size of the shadow economy in the selected countries is 36.9 (as a % of GDP) which falls between the minimum (21.9%) and maximum values (61.40%). The mean value of the globalization index is approximately 50.1 on a scale of 100 points while the maximum value is 70.47. This depicts that African economies are open for interconnection across countries for economic transactions within the regions and at global markets. Furthermore, the mean value of institutional quality is 3.7 on a scale of 0–10. With this figure, it can be seen that the institutional factors in Africa remain low compared to the developed countries ([Olaniyi and Oladeji, 2021](#); [Ajide and Soyemi, 2022](#)).

The mean value of the poverty gap is \$14.13 with a maximum value of \$50.20. Also, the level of urban population is about 43.9%, on average with a maximum value of 88.97%; implying that the urban population is growing in most African nations and there is a tendency that it will continue to increase the size of the shadow economy as reflected in the correlation analysis of data (see [Table 3](#)).

In [Table 3](#), the pairwise correlation shows that all the variables are within the toleration rate and there is no potential evidence of multicollinearity. Finally, the coefficients of correlation show that globalization reduces the size of the shadow economy while the poverty

Variable	Acronyms	Expected sign	Measurements	Sources of data
Shadow economy	SE	Not applicable	The size of the shadow economy is expressed as a percentage of GDP after employing the multiple indicators multiple causes (MIMIC) model	<a href="#">Medina and Schneider (2019)</a>
Overall globalization	GI	Negative	It is an index that ranges between 1 (lowest degree of globalization) and 100 (higher degree of globalization). The disaggregated index includes: economic globalization ( <i>ECG</i> ), social globalization ( <i>SOG</i> ) and political globalization ( <i>POG</i> )	KOF globalization index
Economic growth	LGDP	Negative	Natural Log of Gross domestic product per Capita (constant 2010 US\$)	Word development indicators
Poverty gap	POVG	Positive	Poverty gap at \$1.90 a day (2011 PPP) (%)	Word development indicators
Institutions	INS	Negative	The average ordinal scores of law and order, control of corruption, government stability, democratic accountability, and bureaucracy quality. However, before doing so, we re-scale each ordinal score to read 0 (weak quality) to 10 (strong quality). This follows the extant literature ( <a href="#">Olaniyi and Oladeji, 2021</a> ; <a href="#">Ajide, 2022</a> ; <a href="#">Kose et al., 2011</a> )	International Country Risk Guide (ICRG)
Urbanization	URB	Positive	Urban Population expressed as a percentage of the Total Population	Word development indicators

**Table 1.**  
Sources of data and measurement of variables

**Source(s):** Compiled by authors

Table 2.

Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
SE	552	36.942	7.980	21.9	61.40
GI	552	50.141	8.618	29.576	70.479
ECG	552	46.162	8.108	24.305	62.589
SOG	552	38.818	12.861	12.622	67.516
POG	552	65.148	14.509	27.144	91.570
LGDP	552	3.188	0.419	2.239	4.076
POVG	552	14.131	11.844	0.20	50.20
INS	552	3.699	0.624	1.60	5.583
URB	552	43.968	17.029	12.846	88.976

Source(s): Computed by authors

	SE	GI	ECG	SOG	POG	LGDP	POVG	INS	URB
SE	1.000								
GI	-0.358*	1.000							
ECG	-0.080	0.585*	1.000						
SOG	-0.483*	0.811*	0.462*	1.000					
POG	-0.166*	0.748*	0.095*	0.317*	1.000				
LGDP	-0.092*	0.564*	0.405*	0.707*	0.165*	1.000			
POVG	0.176*	-0.429*	-0.171*	-0.420*	-0.298*	-0.613*	1.000		
INS	-0.302*	0.173*	0.152*	0.201*	0.050	0.165*	-0.028	1.000	
URB	0.030	0.474*	0.353*	0.568*	0.152*	0.848*	-0.592*	-0.034	1.000

Source(s): Computed by authors. \*denotes significant at 5%

Table 3.

Pairwise correlation

level increases in size. However, the true picture can be better reflected in the regression to be undertaken in the next section.

## 5. Empirical results and discussion

### 5.1 Preliminary tests

Before estimation, the study conducts a number of preliminary tests to ascertain the appropriate estimation techniques to be employed. The first test conducted is the cross-sectional independence (CD) due to interdependence among the African nations. This is because the shocks to one country may have an important impact on other countries in the region. Therefore, ignoring the CD may have a significant impact on the residual, leading to an inefficient estimate's validity (Pesaran, 2021; Ajide and Dada, 2022). Table 4 reveals Pesaran's cross-sectional dependence test conducted on the variables to determine whether there is an interconnection among the countries in Africa. The results suggest the presence of CD among the variables.

Due to the presence of CD, we employ both traditional and non-traditional methods of testing the stationarity properties of the variables including IPS, fisher-type augmented Dicker-Fuller and the cross-sectionally augmented Dicker-Fuller (CADF) as revealed in Table 5. The IPS and ADF reveal that all the variables are not stationary at level, but stationary at first difference. This is consistent with the results of cross-sectional augmented Dicker-Fuller (CADF) which is more reliable in handling the stationarity tests in the presence of CD and heterogeneity in the dataset.

In testing for long-run equilibrium among the variables, the study employs the Kao and Pedroni cointegration tests. Pedroni's test assumes that there is a parenthesis lag length with inter-and intra-dimensional cointegration via ADF and PP statistics. In addition, it also

REPS  
9,2

showcases the results via v-statistic and rho-statistic. In addition, the Westerlund test for panel cointegration is employed to re-confirm the results of Kao and Pedroni’s tests. As shown in Tables 6 and 7, all tests confirm that there is a cointegration among the variables. In Table 8, we present the results of the test for slope heterogeneity. The null hypothesis is that slope coefficients are homogenous as against the alternative hypothesis of slope

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Variables	CD-statistic	p-value
SE	61.568***	0.000
GI	68.344***	0.000
ECG	8.786***	0.000
SOG	77.000***	0.000
POG	57.812***	0.000
LGDP	50.079***	0.000
URB	73.229***	0.000
INS	31.426***	0.000
POVG	1.107	0.269

**Table 4.**  
Pesaran’s cross-sectional dependence (CD) test

Source(s): Computed by authors. \*\*\*denotes significant at 1%

Variables	IPS	ADF(Fisher-type)	CADF	Remarks
SE	−1.214	−1.816	−1.537	
Δ(SE)	−4.682***	−26.555***	−2.632***	I(1)
GI	−1.423	0.4073	−1.368	
Δ(GI)	−4.761***	−28.348***	−2.600***	I(1)
ECG	−1.674	−1.546	−1.690	
Δ(ECG)	−5.213***	−8.635***	−2.446***	I(1)
SOG	−0.718	3.409	−1.778	
Δ(SOG)	−3.955***	−3.544***	−2.234***	I(1)
POG	−1.692	0.079	−2.068	
Δ(POG)	−4.746***	−7.373***	−3.096***	I(1)
LGDP	−0.896	3.812	−1.431	
Δ(LGDP)	−3.747***	−5.894***	−2.334***	I(1)
URB	1.160	1.759	−1.371	
Δ(URB)	−4.773***	−8.855***	−2.227***	I(1)
INS	−1.529	0.837	−1.918	
Δ(INS)	−4.264***	−4.138***	−2.499***	I(1)
POVG	−1.733	−1.323	−1.537	
Δ(POVG)	−3.349***	−13.261***	−2.173**	I(1)

**Table 5.**  
Panel unit root test

Source(s): Computed by authors. \*\*\*, \*\*, \*imply significant at 1, 5 and 10% respectively

	Statistic	p-value
Modified Dickey–Fuller t	−3.340***	0.000
Dickey–Fuller t	−2.743***	0.003
Augmented Dickey–Fuller t	−2.014**	0.022
Unadjusted modified Dickey–Fuller t	−5.479***	0.000
Unadjusted Dickey–Fuller t	−3.650***	0.000

**Table 6.**  
KAO test for panel cointegration

Note(s): H<sub>0</sub>: No cointegration  
Source(s): Computed by authors, augmented lags = 1, \*\*\*, \*\*, \*imply significance at 1, 5 and 10% respectively

heterogeneity. The test follows the procedures of [Pesaran and Yamagata \(2008\)](#). In addition, [Breitung \(2005\)](#) suggests that an estimation based on homogeneity assumption in the face of heterogeneity may produce erroneous estimated results. The Table shows that the slope coefficients are heterogeneous.

Since all the tests confirm the possibility of cointegration among the variables, the presence of slope coefficient heterogeneity and cross-sectional dependence, the study estimates the model using Dynamic CCEMG.

## 5.2 Empirical results and discussion

**5.2.1 Baseline results.** After confirming that there is a co-integration among the variable, this study estimates the long-run coefficients by employing CCEMG and Dynamic CCEMG. Fully modified ordinary least square (FMOLS) and the dynamic ordinary least square (DOLS) are also employed. The results of FMOLS and DOLS are based on the first differences with leads and lags, and, often classified as the first generation estimator along with the traditional ordinary least square. The study prefers and reports the results of CCEMG and Dynamic CCEMG because they can handle slope heterogeneity, endogeneity and spatial dependence among the variables, hence, superior to FMOLS and DOLS [2].

**Table 9** presents the estimated coefficients of CCEMG and Dynamic CCEMG. The coefficients of globalization are negative and significant. The coefficient ranged from  $-0.094$  to  $-3.568$ , implying that globalization is an effective tool to control the size of the shadow economy in Africa. This is consistent with the submission of [Berdiev and Saunoris \(2017\)](#). Their findings show that globalization reduces the activities in the shadow economy. However, the study of [Pham \(2017\)](#) reveals that trade integration is the most effective aspect of globalization that affects the size of the shadow economy. The results based on dynamic

Pedroni test	Statistic	<i>p</i> -value
Modified Phillips–Perron t	3.504***	0.000
Phillips–Perron t	−4.201***	0.000
Augmented Dickey–Fuller t	−3.754***	0.000
<i>Westerlund test for panel cointegration</i>		
Variance ratio	−1.862**	0.031

**Note(s):**  $H_0$ : No cointegration  
**Source(s):** Computed by authors, augmented lags = 1, \*\*\*, \*\*, \*imply significance at 1, 5 and 10% respectively

**Table 7.**  
Pedroni and  
Westerlund test for  
panel cointegration

Variables	$\Delta$	$\Delta_{adj}$
SE	12.155***(0.000)	14.573***(0.000)
GI	6.766***(0.000)	7.373***(0.000)
ECG	7.222***(0.000)	7.870***(0.000)
SOG	4.596***(0.000)	5.008***(0.000)
POG	4.128***(0.000)	4.498***(0.000)
LGDP	8.841***(0.000)	9.634***(0.000)
URB	9.667***(0.000)	10.535***(0.000)
INS	4.019***(0.000)	4.380***(0.000)
POVG	4.528***(0.000)	4.935***(0.000)

**Source(s):** Computed by authors, Figures in ( ) are *p*-values. \*implies significance at 1%

**Table 8.**  
Testing for slope  
heterogeneity

**Table 9.**  
Estimated results

Variable	Dynamic CCEMG	Dynamic CCEMG	CCEMG	CCEMG
GI	−0.0948* (0.059)	−3.568*** (0.004)	−0.131** (0.032)	−0.637* (0.059)
GI^2		0.036*** (0.008)		0.006* (0.064)
LGDP	−31.646*** (0.002)	−47.270** (0.041)	−54.026*** (0.000)	−61.655*** (0.000)
URB	−2.239 (0.474)	2.852 (0.508)	3.803*** (0.019)	6.651*** (0.007)
INS	1.323 (0.275)	1.200 (0.449)	1.015 (0.174)	0.768 (0.283)
POVG	−0.247 (0.299)	−0.458 (0.111)	−0.125 (0.317)	−0.201 (0.126)
SE (lagged)	−0.308*** (0.000)	−0.300*** (0.000)	n/a	n/a
R-square	0.45	0.32	n/a	n/a
Root MSE	1.45	1.41	0.752	0.630
Number of groups	24	24	24	24

**Source(s):** Computed by authors, Figures in ( ) are *p*-values. Dependent variable: SE, \*\*\*, \*\*, \* imply significance at 1, 5 and 10% respectively. n/a denotes not available

CCEMG reveal that overall globalization has a negative impact on the shadow economy which is consistent with our earlier results. However, the squared coefficient of overall globalization is positive and significant, implying that there is a turning point at which globalization increases the size of the shadow economy in Africa. In addition, the results imply that the competitive pressures from multinational companies and the motive to survive by local firms push them to operate in the shadow economy as documented by [Ajide et al. \(2022\)](#). [Das and DiRienzo \(2009\)](#) argue that although globalization reduces illegal practices, it tends to encourage corruption and illegal deals occurring in the shadow economy due to competitive pressure of economic openness and, in an attempt by the entity to have sustainable profits and stay aggressive in the global trade, commerce and social integration. Similarly, [Jreisat \(1997\)](#) and [Gould \(1991\)](#) explain that globalization may increase the opportunity for corrupt practice and, further increases the size of the shadow economy. Avoiding higher tax and labour costs (such as minimum wages) pushes the economic actors to shadow the economy to increase returns on investment after a certain level of globalization influences the economy. The taxes and weak regulatory burden imposed via the formal economy may encourage economic agents to move into shadow economic operations in Africa. This outcome suggests that there is a U-shaped relationship between globalization and the shadow economy in Africa. Our results join the few existing studies that predict that there is a nonlinear relationship between the shadow economy and socioeconomic factors ([Elgin and Birinci, 2016](#); [Wu and Schneider, 2019](#)). That is, the shadow economy reduces with the increase in overall globalization until it reaches a threshold; after which it has a positive relationship with globalization.

The coefficient of poverty is negative and insignificant. Although studies suggest that poverty pushes citizens to operate in a shadow economy, our results do not support this finding. [Berdiev et al. \(2020\)](#) empirically suggest that nations with a higher level of poverty would have a larger size of the shadow economy. The shadow economy offers economic opportunities for the poor especially where there is a high level of income disparities ([Amuedo-Dorantes, 2004](#)). It is an escape route to avoid high tax payments associated with welfare loss. Furthermore, the coefficients of urbanization in CCEMG are positive and significant, implying urbanization increases the level of the shadow economy in Africa. This is consistent with the previous studies ([Berdiev et al., 2020](#); [Ajide, 2021](#); [Ajide et al., 2022](#)).

The coefficient of institutional quality is positive and insignificant, implying that institutional quality is ineffective in reducing the size of the shadow economy over the period of study. This is due to the weak institutional quality of most African nations. Studies have shown that high-quality institutions may enhance the benefit of operating in a formal economy. It may open opportunities for the citizens and further reduce transaction costs

(Torgler and Schneider, 2011; Berdiev and Saunoris, 2018; Berdiev *et al.*, 2018). Improvement in African institutional quality would control the size of the shadow economy (Schneider, 2010). The study of Berdiev *et al.* (2018) further enriches our understanding that an effective legal system and protection of property rights may support the operation of the official economy and discourage economic activities in the shadow economy of a country.

**5.2.2 Robustness check.** As a robustness check, this study decomposes the globalization index into Economic globalization (ECG), Social globalization (SOG) and Political globalization (POG) to reflect the multidimensional aspects of the variable of interest. The results are presented in Table 10.

The table shows that the coefficients of economic, social and political globalization are negative and statistically significant, implying they are effective in reducing the size of the shadow economy in Africa after controlling for the poverty gap, urbanization, institutional quality and the level of the official economy. This is also in line with the results of Berdiev and Saunoris (2017) who use panel data of 119 countries to show that only political globalization is effective in driving the size of the shadow economy. The coefficient of all the dimensions of globalization is robustly significant in mitigating the size of the shadow economy in the African region.

### 5.3 Further analysis

**5.3.1 Panel threshold regression.** The existing studies on the impact of globalization on the shadow economy document conflicting results (Berdiev and Saunoris, 2017; Pham, 2017). For instance, Berdiev and Saunoris (2017) show that the relationship is linearly negative while Pham (2017) empirically shows that trade diversification and social globalization are effective in affecting the size of the shadow economy. In Table 11, we present the nonlinear impact of globalization on the shadow economy in Africa. We first examine whether the relationship is monotonic, and hypothesize a threshold effect of globalization on the shadow economy. Consequently, we conduct a linearity test via the bootstrap method with about 2,000 replications on each estimation. The results show a  $p$ -value of 0.000, implying that there is a nonlinearity between the variables. These findings suggest that the sample size should be split into low and higher regimes based on the appropriate threshold values.

The results of Hansen's (2000) panel threshold analysis further reveals that for each proxy of globalization, the shadow economy is reduced at a low regime and increased at a high

Variable	(1)	(2)	(3)
ECG	-0.007** (0.009)		
SOG		-0.236** (0.041)	
POG			-0.205* (0.076)
LGDP	-51.043*** (0.000)	-62.132*** (0.000)	-73.395*** (0.001)
URB	2.153 (0.239)	-1.907 (0.505)	3.339 (0.217)
INS	0.808 (0.265)	0.558 (0.485)	0.6563 (0.402)
POVG	-0.224 (0.281)	-0.338 (0.214)	-0.361 (0.267)
SE (lagged)	0.075** (0.029)	0.103** (0.015)	-0.014* (0.087)
R-square	0.42	0.42	0.42
Root MSE	1.03	1.04	1.03
Number of groups	24	24	24

**Note(s):** Disaggregated globalization index

**Source(s):** Computed by authors, Figures in ( ) are  $p$ -values. Dependent variable: SE, \*\*\*, \*\*, \* imply significance at 1, 5 and 10%, respectively

**Table 10.**  
Estimated results from  
dynamic CCEMG



**Table 11.**  
Threshold of the  
impact of globalization  
on the shadow  
economy

Variable	Overall globalization		Economic globalization		Political globalization		Social globalization	
	Low (<48.837)	High (>48.837)	Low (<45.615)	High (>45.615)	Low (<66.661)	High (>66.661)	Low (<35.744)	High (>35.744)
Constant	124.69*** (0.000)	162.41*** (0.000)	143.332*** (0.000)	162.001*** (0.000)	113.406*** (0.000)	83.482*** (0.000)	79.638*** (0.000)	125.807*** (0.000)
Globalization	-0.057** (0.024)	0.097* (0.077)	-0.088* (0.057)	0.043 (0.386)	0.020 (0.472)	-0.070** (0.017)	-0.181*** (0.000)	0.129*** (0.004)
LGDP	-24.292*** (0.000)	-33.538*** (0.000)	-31.644*** (0.000)	-33.334*** (0.000)	-19.295*** (0.000)	-9.640*** (0.001)	-9.112*** (0.003)	-21.451*** (0.000)
URB	-0.515*** (0.000)	-0.103 (0.158)	-0.220*** (0.007)	-0.337*** (0.000)	-0.419*** (0.000)	-0.318*** (0.000)	-0.257*** (0.002)	-0.881 (0.116)
INS	0.985** (0.013)	-0.738 (0.158)	0.617 (0.151)	0.189 (0.715)	0.532 (0.229)	0.724 (0.139)	0.349 (0.314)	-0.881 (0.116)
POVG	0.003 (0.846)	-0.093** (0.012)	0.011 (0.573)	-0.131*** (0.000)	-0.038** (0.041)	-0.033 (0.109)	0.009 (0.513)	-0.064* (0.074)
R-square	0.627	0.541	0.654	0.648	0.569	0.540	0.595	0.449
Threshold value	48.837		45.615		66.661		35.744	
Conf. Interval	[47.7924, 48.9026]		[45.142, 45.703]		[66.422, 66.971]		[35.227, 36.013]	
Linearity test/ <i>p</i> -value	0.000***		0.000***		0.000***		0.000***	

**Source(s):** Computed by authors, Figures in ( ) are *p*-values. Dependent variable: SF, \*\*\*, \*\*, \* imply significance at 1, 5 and 10% respectively

regime. In specific, we document threshold values of 48.837, 45.615, 66.661 and 35.744 for the overall globalization index, economic globalization index, political globalization index and social globalization index respectively. For the overall globalization index, the study finds a negative coefficient of  $-0.057$  at a 5% significance level below the threshold value and a positive coefficient of  $0.097$  at a 10% significance level above the threshold value. We also report a negative coefficient for economic globalization ( $-0.088$ ) at a 10% significance level below the threshold value, but the positive coefficient above the threshold value is insignificant. For political globalization, there is a negative coefficient of  $-0.07$  which is significant at 5% above the threshold value. In addition, the coefficient of social globalization is negative at a low regime ( $-0.181$ ) and significant at a 1% level while at a high regime, it is a positive coefficient ( $0.129$ ) at the significance level of 5%. This implies that globalization is effective in downsizing the shadow economy below the threshold value and increasing the shadow economy above the threshold value.

The results show that the impact of globalization on the shadow economy depends on the level of globalization of the individual economy. In other words, the globalization impact on the shadow economy is nonlinear. The implication is that the effect of globalization on the shadow economy is conditioned on the level of globalization attaining a unique threshold value. Therefore, in the case of Africa, higher openness of the economy may not be beneficial for possible control of the shadow economy. Some levels of capital control policies should be introduced to mitigate and moderate the level of globalization in the African continent. This supports the view of [Read \(2004\)](#) the degree and distributive impact of globalization are conditioned on the level of readiness of each country to maximize the benefits and minimize the costs. Consequences of globalization include a higher level inflow of remittances and technological diffusion. It may also increase the level of smuggling, shadow banking, money laundering, illicit funds and crime-related activities. However, some level of measures or controls should be introduced to reduce its negative impact increasing the level of the shadow economy, thereby confirming the assertion of [Stiglitz \(2002\)](#) who posits that globalization has both positive and negative impacts, and may not resolve all socioeconomic issues of developing countries.

**5.3.2 Panel causality tests.** This study also examines the causality between the variables using the technique of [Dumitrescu and Hurlin \(2012\)](#)'s procedures. [Table 12](#) shows that there is a causality between overall globalization and the size of the shadow economy in Africa.

Furthermore, there is a two-causal direction between political globalization and the shadow economy, social globalization and the shadow economy, and economic globalization and the shadow economy. The results also reveal that the poverty gap causes the shadow economy, and the shadow economy granger causes the poverty gap. This applies to

Direction	<i>W</i> -stat	<i>Zbar</i> -stat	<i>p</i> -value	Optimal lags	Remarks
SE → GI	1.586	2.031	0.042	1	Yes
GI → SE	3.602	9.014	0.000	1	Yes
SE → LGDP	2.458	5.052	0.000	1	Yes
LGDP → SE	3.198	7.616	0.000	1	Yes
SE → INS	3.296	7.956	0.000	1	Yes
INS → SE	1.851	2.948	0.003	1	Yes
SE → POVG	7.022	20.861	0.000	1	Yes
POVG → SE	2.200	4.156	0.000	1	Yes
SE → URB	3.124	2.754	0.005	1	Yes
URB → SE	2.780	6.168	0.000	1	Yes

**Source(s):** Authors' computation. The lags' length is based on BIC

**Table 12.**  
Dumitrescu–Hurlin  
panel causality tests

institutional quality and the shadow economy, urbanization and shadow economy. The analysis reveals that there is a two-way causal interaction between the shadow economy and its determinants in Africa over the period of study.

## 6. Conclusion and policy implications

In this study, we examine the impact of globalization on the shadow economy in 24 African economies within the period 1995–2017. Although many studies have enquired about the impact and significance of globalization in developing economies, the main contribution of the present study is based on the assessment of both linear and nonlinear globalization's impact on the shadow economy. Another interesting aspect of the study is the use of African data; a region with a higher level of shadow economy compared to other continents. To achieve the objective of the study, the authors employ static and dynamic common correlated mean group, after confirming the presence of correlation dependence and slope heterogeneity. The method also handles endogeneity and reversed causality and can be used even when all the variables are nonstationary. The author examines the robustness of the results by employing the panel threshold estimation technique and Panel Spatial Correlation Consistent based on Driscoll and Kraay (DK)'s (1998). We also conduct panel causality tests based on Dumitrescu and Hurlin's (2012) approach.

The empirical results, by and large, are robust to suggest that the overall measure of globalization is a veritable tool for combating the shadow economy in Africa. We decompose the measure of globalization into economic globalization, political globalization and social globalization in the analysis to confirm that economic and social globalization is effective in reducing the size of the shadow economy. Though political globalization reduces the shadow economy not as significantly as economic and social globalization after controlling for urbanization, the official economy, the poverty gap and institutional factors. The economies that are considered to be more socially globalized are likely to have the presence of multidimensional culture and may seek to maintain their stance by involving in global treaties to increase the visibility of their culture. Globalization involves the movement of information, ideas and images of people. It also includes transnational cultural proximity and exchanges of social ideas via social media and diffusion. Globalization shrinks the size of the shadow economy because it strengthens the institutional framework in a country. It exposes the participants in the shadow economy in Africa. The spread of knowledge of the danger of operation in a shadow economy may increase the citizen's agitation to mitigate the size of the shadow economy in Africa.

Additional findings from the panel threshold estimation and quadratic terms introduced into the Dynamic CCEMG analysis demonstrate a U-shaped relationship between shadow economy and globalization in African economies, implying that globalization reduces shadow economy in the first instance and later increases it after meeting a threshold value. The reasons for this, are as follows. Global value chains and outsourcing of production and services to developing economies that emerged in the globalization era have increased the opportunities in the official African economies. However, while this is good for the local economies, African workers are still exposed to various exploitations including cheap wages and other exploitative demands from workers. In reacting to this, African citizens may seek additional income by operating in a shadow economy. As confirmed by Ajide *et al.* (2022), the shadow economy shrinks due to openness for foreign participants in African economies. Contrarily, the size of the shadow economy may increase after a certain level due to an increase in transition costs and other regulatory activities in the official economy (involving defraying taxes, signing and hiring contracts with new firms or partners, securing customer base). Although, an economy may have a robust economic expansion using globalization instruments, financial and trade integration, and large-scale liberation instrumented by the

comparative advantage principle may increase international competition intensity between countries and further deepen domestic firms to operate in a shadow economy. These issues may collectively lead to the rise of the U-shaped relationship observed in this study. Therefore, caution is necessary on the part of governments by introducing some selective controls across the border to sustain the gain of globalization in reducing the size of the shadow economy.

Overall, our findings in this study show the benefits of globalization in shrinking the size of shadow economic activities in Africa. Therefore, policies aiming at promoting cross borders activities through social globalization would do well in mitigating the size of the shadow economy in Africa. Additionally, policymakers in the region should embrace the benefit of globalization by moderately opening up their economy to the rest of the world. Globalization, especially economic globalization, helps reduce the cost of doing business, enhances import and export, expands investment opportunities in the official economy, and thus lessens the growth rate in the shadow economy. Furthermore, through globalization, those in the shadow (informal) economy could acquire more skills that could make them relevant in the formal economy. However, it is almost difficult to eliminate the existence of the shadow economy since both the official and shadow economy coexist. Thus, globalization in the area of trade liberalization could encourage firms (especially those in the shadow) to formalize their business activities to take advantage of international trade, which leads to a decline in the presence of shadow activities.

However, since findings from this study show that beyond the certain thresholds, globalization contributes to the presence of shadow economy; policymakers in Africa must recognize this threshold to mitigate its adverse effect. Our study findings are based on 24 African countries, a region of about 54 countries. This gives room for future studies whenever the data are available. Future studies may consider single country analysis which may provide insights on the implications of globalization in an economy. The use of micro-level data to investigate the nonlinearity between informal economy and global integration may further enrich our understanding.

## Notes

1. For details, explanation of the shadow economy, see [Ajide \*et al.\* \(2022\)](#), [Dada and Ajide \(2021\)](#) and [Dada \*et al.\* \(2021a, b\)](#).
2. see [Tables A2 and A3 in Appendix](#) for the results of FMOLS and DOLS.

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## Appendix

The Supplementary Material for this article can be found online.

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