

Illicit financial outflows, informal sector size and domestic resource mobilization in selected African countries

Illicit outflows
in African
countries

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Received 19 December 2020

Revised 4 July 2021

19 September 2021

Accepted 6 October 2021

Abstract

Purpose – The growth of both the informal sector and illicit financial outflows necessitated this study, in order to investigate how countries in Africa respond to these realities in terms of mobilization of domestic resources. These are the main motivation for the current study to the extant literature in conjunction with the adoption of employing second-generation econometric techniques which take into account cross-sectional dependence and country-specific heterogeneity.

Design/methodology/approach – This study therefore examined the capacity of Africa to mobilize domestic resources amidst rising illicit financial outflows and informal sector size in selected African countries between 2000 and 2018. Second-generation econometric techniques such as cross-sectional dependence tests, slope homogeneity tests, Westerlund (2007) long-run co-integration tests, Eberhardt and Teal (2010) augmented mean group estimations and Kónya (2006) panel causality testing were employed.

Findings – Findings revealed the existence of cross-sectional dependence and slope homogeneity in the data series. Findings also supported the existence of depressing long-run impacts of IFOs and ISS on domestic savings. Causality test results were not uniform across variables among countries. Policy recommendations favour formalizing the largely informal African economies through budgetary policy adjustments and commitment to building stronger institutions.

Practical implications – The fragility of the African countries economy and its macroeconomic indicators is suggestive for more policy construction.

Originality/value – This economic reality about the nature of the informal sector is one that has negated the traditional view which holds that economic reforms would make the informal sector shrink as it transits to formal sector. Experiences from Latin America and Africa in fact indicate that the informal sector is actually on an expansionary path in the wake of adjustment and policy reforms. It is often called the unobserved, unorganized or unprotected economy. With this sector growing in size, the possibility of a reverse may not be in sight, owing to the increasing poverty levels and unemployment prevalent in most African countries. Uncertain foreign investment and aid inflows coupled with lower export revenues and high levels of indebtedness have created new impetus to examine the capacity of Africa's fiscal policy regime to mobilise domestic resources for the development of the region. Surprisingly, the last decade witnessed continued rise in Africa's illicit financial outflows amidst large informal sector size (ISS).

Keywords Illicit financial outflows, Informal sector, Domestic savings

Paper type Research paper



1. Introduction

Many African countries struggle with debt and inability to finance their national budgets as a result of failure to recognise domestic resource mobilization (DRM) as a veritable source of funding. History has established that countries can hardly March out of poverty feeding on aid. The realisation of sustainable development depends, to a large extent, on mobilization and effective use of domestic resources. Domestic resource mobilization (DRM), therefore, refers to the savings and investments generated by households, domestic firms, and governments. This contrasts the mobilization of external resources (through foreign direct investment, aid, trade, and debt relief), which do not offer the advantages of greater domestic policy ownership and greater coherence with domestic needs. [Ndikumana \(2017\)](#) argues that strengthening DRM offers some benefits to African economies. Firstly, it reduces the dependency on external flows thereby reducing volatility in resource availability and minimizing vulnerability to external shocks. 'Secondly, it gives African countries greater policy space by increasing their ownership of the development process as well as strengthening their state capacity.

While the private sector, especially in developing countries, plays a significant role in the process of mobilizing domestic resources, however, the key policy and institutional drivers of DRM are in the hands of the government. Recently, some of the reasons for the growing emphasis on DRM are the quest for sustainable growth and poverty reduction, as well as the need to create "policy space" to accommodate genuine domestic ownership and country diversity. In addition to the reasons for DRM above, there is also a political economy rationale relating to the issues of governance and accountability. This is where informal sector size and illicit financial outflows come into play. [ILO \(2014\)](#) opined that informality is principally a governance issue as the growth of the informal economy can often be attributed to: inappropriate, ineffective, misguided or badly implemented macroeconomic and social policies, frequently developed without tripartite consultation; inappropriate legal and institutional frameworks; lack of good governance for the proper and effective implementation of policies and laws; and a lack of trust in institutions and administrative procedures. Thus, the excessive regulatory system, inefficiency and corruption, bureaucracy, presence of high entry costs into the formal economy, macroeconomic instability, and poor public services make the growth of the informal sector inevitable.

There is no gainsaying the fact that one of the prominent features of developing economies is the prevalence of a large informal sector, which grows day by the day in contrast with the classical accounts of development, which theorized that the resilience of the informal economy in developing economies was attributed to insufficient levels of growth and would vanish with sustained economic growth ([Leandro *et al.*, 2017](#)). Today, the informal economy continues to be a highly persistent and ubiquitous phenomenon in many developing countries despite high growth ([Stuart *et al.*, 2018](#)). Experiences from Latin America and Africa, in fact, indicate that the informal sector is actually on an expansionary path in the wake of adjustment and policy reforms ([Leandro and Fredrick, 2018](#)). It is often called the unobserved, unorganized or unprotected economy. With this sector growing in size, the possibility of a reverse may not be in sight, owing to the increasing poverty levels and unemployment prevalent in many African countries. The informal sector in Africa is a major source of livelihood for majority of the people. It provides employment for the unskilled, the poor, out-of-school youth, and the economically and socially marginalized. The sector is characterized by economic activities such as the production and distribution of goods and services that are neither registered nor regulated by the state or local government ([Adriana, 2017](#)). It is thus dominated by the self-employed and small family firms who significantly contribute to the bulk of employment and production in the African economy.

According to [Neuwirth \(2011\)](#), the informal economy is estimated to be worth US\$10 trillion, employing about 1.8 billion people globally. The [International Monetary Fund \(2017\)](#) opines that within sub-Saharan Africa (SSA) informal employment and the informal sector contribute about 20% (South Africa, Lesotho, Namibia) to 60% (Nigeria, Tanzania, Benin) to the national GDP.

Recent estimates suggest that informal economy in emerging and developing countries accounts for more than 93% of total global informal employment and more than 82% of economic units, with Sub-Saharan Africa and South Asia being the largest contributors (ILO, 2018).

Still on governance and accountability, the Global Financial Integrity (GFI, 2016), Nigeria, South Africa and Egypt are the three largest exporters of illicit finance by volume of outflows. In terms of the largest exporters of illicit finance by regions in Africa, Egypt, Algeria and Libya are the largest from North Africa, Nigeria, Cote d'Ivoire and the Republic of Congo are the largest from Central and West Africa, while South Africa, Angola, Zimbabwe and Sudan are the largest from East and Southern Africa. Government revenue of \$7.4 billion is estimated to have been lost yearly between 2010 and 2014 in South Africa due to trade misinvoicing (GFI, 2015). The United Nations Economic Commission for Africa (UNECA, 2019) similarly estimates IFOs from Egypt to have reached US\$105.2 billion, constituting 14.7% of the total illicit outflows from Africa. According to the 2013 joint report by the African Development Bank (AfDB) and the GFI, Egypt ranked third in Africa for the exportation of illicit capital from 1980 to 2009, following Nigeria and South Africa. It also dominated the North African illicit outflows ranking, followed by Algeria and Libya. Algeria and Egypt alone accounted for about 66% of the illicit financial outflows from North Africa (UNDP, 2011). When resources are diverted from the reach of the domestic economy, mobilization of domestic resources is hampered and sustainable economic growth disrupted (El-Sakka and Al-Mutairi, 2000; Abdelkader, 2017; UNECA, 2019). This adverse effect of IFOs is capable of putting a clog in the realization of SDG target 17.1, which calls for the strengthening of domestic resource mobilisation. Such illicit or illegal financial flows (IFOs) makes it difficult for African countries to finance their growth and development objectives (Fakile *et al.*, 2014), thus, laying more credence to the growth of informal sector.

There have been many theoretical arguments, policy statements and institutional studies that highlight the importance of DRM in Africa. For instance, ILO (2014) argues that excessive regulatory system, inefficiency and corruption in governance structures, high entry costs into the formal economy, macroeconomic instability are still prevalent in most African countries, which prevent the continent from tapping the benefits of their large informal sector, thus reducing DRM. They further argue that more flexible and adaptive tax system, the integration of informal sector participants in the development process as well as representation in the decision making process, through trade organizations, and a better supply of public goods could encourage the informal sector to help fund productive public services. Other theoretical arguments, policy statements and institutional studies that highlight the importance of DRM in Africa include the United Nations Conference on Trade and Development Geneva (2007), United Nations Economic Commission for Africa (2019), Ministry of Finance, Planning, and Economic Development, Uganda (2019). Jonathan *et al.* (2014) also investigated the capacity of the informal sector in contributing to revenue mobilization in Nigeria, using descriptive statistical analysis. The body of literature in this area is largely theoretical and descriptive while neglecting the large growth in the informal sector in Africa. Therefore, this present study sets out a framework to consider whether DRM may be enhanced in sub-Saharan Africa through: growth in the informal sector and measures to constrain growth in illicit financial outflows. This study also contributes to the existing body of literature by employing second-generation econometric techniques, which takes into account that due to globalization shock in one country may affect another country as opposed by the first-generation econometric techniques that argues that shock in one country may not affect another country. More so, the second-generation econometrics techniques are robust enough to allow for cross-sectoral dependency, and they have the significant power to avoid issues like endogeneity between dependent and independent variables, as well as autocorrelation between co-integrated panels. Hence, in a study like this the second-generation econometrics techniques become appropriate. The selection criteria for African

countries used in the study are based on the first three African countries with the largest IFOs (Nigeria, Egypt and South Africa); African countries with largest IFOs by region (Democratic Republic of Congo from Central Africa, Angola from Southern Africa; Egypt from Eastern region of Africa, Nigeria from Western Region of Africa) (UNDP, 2011); and IMF (2017) informal sector size distribution according to low size – 0–20% (Botswana, South Africa), middle size- 20–40% (Egypt), high size - >40% (Nigeria, Angola, Democratic Republic of Congo). Some of the high index countries in terms of IFOs fall into the category of high informal sector size while others fall into middle and low informal sector size. Therefore, the selection of these countries with substantial outflow of illicit finance is done with a view to comparing them with the size of informal sector and how they impact on DRM. This will help determine whether countries with high IFOs and high or low informal sector size make the most or less impact on DRM or vice versa.

This paper takes the following structure; section one which is the introduction exposes the background, problem and objective of the study. Section two reviews the theoretical and empirical evidences linking IFOs and the informal sector to DRM. Section three describes the methods and procedure of analysing data for the study. Section four presents and discusses the results of the analyses. Section five concludes the study with suggested recommendations and policy implication of findings.

2. Review of related literature

There is a consensus among the international community that illicit financial outflows are a major problem facing the world economy. This phenomenon has led to massive leakage of financial resources outside developing countries, which has weakened the capacity of these countries to mobilize domestic financial resources for economic development. Hamdiya *et al.* (2021) observed that developing countries lost about 7.8 trillion dollars in illicit financial flows between 2004 and 2013, with official reports confirming that these losses increase at a rate of 6.5% annually, almost twice the rate of global economic growth. The negative consequences of illicit financial outflows arising from outflows due to crimes (money laundering, stolen assets, criminal offenses), corruption (illegal capital smuggling, abuse of public office) or irregularities associated with foreign trade (external transfer, non-disclosure of real data for tariff purposes) are overwhelming for Africa in her bid to mobilize substantial resources for development.

Khan (2010) argued that enhanced domestic resource mobilization (DRM) in Sub-Saharan Africa is critical for state-building and government accountability while observing that there is significant untapped DRM potential in Africa. Mubiri (2010) agreeing with Khan (2010) noted that the trend of tax revenues for increased DRM in African is positive and progressive with increasing taxes per capita over large differences in the tax mix pattern. He further observed that while some countries obtain their tax revenue from direct taxation (South Africa), others obtain their tax revenue from indirect taxation (Senegal, Uganda etc.) or both direct and indirect taxation (Kenya, Mauritania etc.). However, countries like Algeria, Angola, Equatorial Guinea, Libya and Nigeria, rely almost entirely on one single type of tax. UNECA (2016) who could not agree any less with Mubiri (2010) also noted that domestic revenue has been on the rise, with variations arising from income and natural resource-based grouping. The study also noted that relatively diversified and industrialized African countries are also performing well in mobilizing tax revenue. However, they were quick to observe that despite significant tax reforms, the performance of tax revenue mobilization has been mixed, limited by structural factors such as large informal sector, low per capita income, small manufacturing and modern services and large peasant agriculture. These factors combine to keep effective tax bases very low despite growth profiles in Africa. They concluded that domestic revenue losses arise from excessive tax incentives and large drains through illicit financial flows.

Economic agents always try to make sequential decisions to achieve a coherent (and “stable”) goal using currently available information as best as they can. Saving is one of the decisions economic agents make including nations. In order to save, individuals and nations must be able to abstain from present consumption and devote some of their income to savings. A nation’s domestic savings go a long way to determining how they are able to cushion the effects of dwindling fortunes or sudden economic downturns. [Holzmann *et al.* \(2019\)](#) highlight the role of shocks and incomplete financial markets in initiating or accelerating decumulation or accumulation. Domestic mobilization of resources reflects in the ability of a nation to save substantially against the rainy days. A number of factors determine the saving behaviour of an economy. They include, but are not limited to, the following: macroeconomic stability, income, interest rate, demographic structures, the extent of financial sector development and external variables. The life-cycle framework, according to [Martin and Thomas \(2011\)](#), is a standard way that economists think about the intertemporal allocation of time, effort and money. It is a framework both in breadth, depth and coherence that provides a guide to thinking about the modelling of life-cycle choices such as consumption, saving, education, human capital, marriage, fertility and labour supply while taking account of uncertainty in a rigorous way.

This study adopts the life-cycle hypothesis developed by Franco Modigliani in 1957. The theory states that individuals seek to smoothen consumption over the course of a lifetime through borrowing in times of low-income and saving during periods of high income. [Ando and Modigliani \(1963\)](#) hypothesized that consumption is a function of the expected lifetime income of the consumer, the spending plan, resources available to him, the rate of return on capital and the age at which the plan is made. [Figure 1](#) below paints a visual picture of the life cycle hypothesis.

[Figure 1](#) indicates that individuals save from the age of 20–65. DRM likewise is boosted if everyone who has ability and willingness to work finds work. As a student, it is rational to borrow to fund education, thereafter, during working life, the student pays off the loans and begin saving for retirement, which enables the worker to maintain similar levels of income during retirement or during economic downturns. This is further buttressed in [Eqn \(1\)](#) below:

$$C = aW + bY \tag{1}$$

where C = consumption, W = wealth, Y = income.

The implication of [Eqn \(1\)](#) above is that if there is more of a working population, then wealth/savings in the economy will increase. This is where harnessing the ever growing informal sector in developing countries for DRM comes to bear. This study, therefore, is an

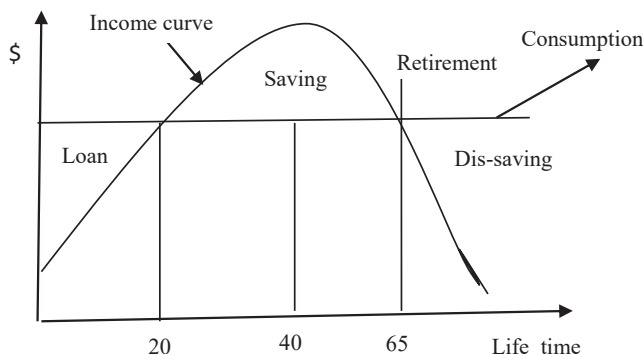


Figure 1.
Adopted by authors
from [Holzmann
et al. \(2019\)](#).

attempt to unravel the impact of illicit financial outflows and the large size of excluded informal sector prevalent in most African countries on Africa's ability to mobilize domestic resources.

Some recent empirical works have also employed this life-cycle hypothesis in verifying the determinants of domestic savings, with most settling for financial development, inflation, growth in income, fiscal policy, interest rate, external variables, demographic factors and macroeconomic uncertainty. The empirical studies reviewed below either used descriptive analysis or first generation econometric techniques in their analysis. Many of the studies are institutional that investigated the role of DRM in meeting the developmental needs of Africa. This study is therefore a complete departure from current related literature because it specifically focused on verifying whether growth in the informal sector can salvage the shortfall in DRM despite the prevalence of illicit financial outflows. [Touny \(2008\)](#) analysed the factors that determine domestic savings in Egypt in a study spanning from 1975 to 2017. Conducting a co-integration test on the selected variables, the author found that the ratio of budget deficit, per capita income growth, real interest rate, development of financial market (ratio of M2/GNP) and rate of inflation determined domestic savings in Egypt. The study and indeed other reviewed empirical studies did not foresee the possibility of the large size of the excluded informal economy prevalent in most African countries as a major determinant of domestic savings and an unharnessed tool for domestic resource mobilization.

[Rahman et al. \(2019\)](#) examined 60 developing countries with a view to understanding how illicit financial outflows could be reduced in order to boost economic development. IFO data generated from Global Financial Integrity website for the period 2003–2014 was utilized. Pedroni's heterogeneous panel analysis was adopted, and it was found that only political stability has the potency to reduce illicit financial outflow significantly. The result supports the findings of [Orkoh et al. \(2017\)](#). It implies that other variables used in the study such as gross domestic savings, globalization, corruption perception index and macroeconomic vulnerability did not affect IFOs significantly. The striking point here is that IFO is not determined by domestic savings.

[Abayomi \(2018\)](#) compared upper-middle-income African countries with low-income African countries with a view to determining and understanding the extent of the impact of illicit financial outflows on the development of African countries. The study selected seven African countries from the two groups and thereafter generated IFO data for the period 2005–2015 using the World Bank residual model. The findings of the study indicated that the ability of both the upper-middle-income countries and the low-income countries to mobilize domestic resources for development was severely affected by IFOs. It was further observed that in terms of the volume of funds carted away, IFOs are more in upper-middle-income African countries, but low-income African countries have higher proportions of IFOs to GDP. Improvement on regulatory controls was thus recommended to reduce IFOs to the barest minimum, especially in the low-income category. Similarly, [Nerea \(2017\)](#) investigated the effect of IFOs on the economic growth of Ethiopia, using secondary data, particularly from 2000 to 2015. Various internationally recognized estimation models (trade misinvoicing) were utilized to get the magnitude of illicit financial flow in Ethiopia. Error correction mechanism was also employed to determine the velocity, magnitude and effect of IFOs on GDP. Results of the study indicated that IFOs have negative but significant effect on the GDP of Ethiopia. Based on the findings, establishing control and audit mechanisms for trans-boundary trade activities, creating effective institution and building collaborative approach were recommended to curb the magnitude, velocity and effect of IFOs on the growth of Ethiopia.

[Liu and Stengos \(2019\)](#) explored the drivers of illicit financial flows proxied by trade misinvoicing. They also compared illicit financial outflows to gross capital outflows (by domestic agents) and argued that the former is closely related to both domestic "pull" and global "push" factors, but the latter is mainly driven by push factors. The study found out

that the identified associations between capital outflows and pull-push factors are only significant in the low-reserves regime.

Jonathan *et al.* (2014) investigated the capacity of the informal sector in contributing to revenue mobilization in Nigeria, using descriptive analysis. The study made a strong case for tax evasion, multiple tax regime and bottlenecks of tax administration as factors hindering the informal sector from performing the desired role of contributing to domestic resource mobilization in Nigeria. The establishment of community taxation framework through partnership with tax authorities and various associations in the informal sector was therefore recommended to develop transparent and comprehensive tax administration in Nigeria.

Ndikumana *et al.* (2015) examined the IFO-investment relationship in developing African countries with a view to ascertaining if IFOs have inhibiting effect on economic growth. The specific objective of the study was to determine the quantum of growth achievable by Africa had IFOs not existed. The panel study covered 39 African countries from 2000 to 2010 and adopted econometric simulation. Results indicated that an average of 3% more economic growth would have been achieved without IFOs and 3.9% in oil-exporting countries. The result of this study aligned with those of Ndikumana and Boyce (2010) and Ndikumana *et al.* (2015). Ndikumana and Sarr (2016) carried out a dynamic panel analysis of 32 African countries, aimed at establishing the nexus between capital flight and FDI inflows in Africa between 1970 and 2013. Results indicated that no nexus exists between inflow of FDI and IFOs. However, a positive relationship was found to exist between capital flight and stock of FDI. Other variables in the study found to have significant and positive relationships with IFOs are institutional quality and natural resource endowments (oil).

The review of related empirical literature has shed light on the justification for this study. The only country-specific study that investigated the impact of the informal sector on domestic resource mobilization employed descriptive method of analysis. Studies such as Hamdiya *et al.* (2021), that investigated the impact of illicit financial outflows on domestic resource mobilization in Arab region used correlational analysis. The objective of this study, therefore, is to investigate whether the large growth recorded in the informal sector can make positive impact on domestic resource mobilization in the face of rising illicit financial outflows in selected African countries. This study takes cognizance of countries with large volume of illicit financial outflows (IFOs) as well as countries with high, middle and low-size informal sector. This is also a big point of departure from previous studies as it helps to determine the mix between IFOs and informal sector size that enhances DRM.

3. Materials and methods

The study sample is made up of 6 African countries, namely Nigeria, Egypt, Angola, Botswana, the Democratic Republic of Congo and South Africa. The study period is from 2000 to 2018. The variables of interest include: domestic savings, illicit financial flow, informal sector size, interest rate, consumer price index, government revenue and GDP per capita. Data on the illicit financial outflows was sourced from IMF direction of trade statistics. Data on informal sector size was sourced from the 2019 United Nations Development Report. Data on domestic savings, interest rate, consumer price index and per capita income are obtainable from <https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/download.aspx> of World Economic Outlook (2019).

3.1 Model specification

In order to examine the effect of illicit financial outflow and size of informal sector on domestic savings, we specify the following model:

$$DSM = f(IFO, ISS, PCY, INTR, GRE, CPI, GE) \quad (2)$$

where DSM is domestic Savings, IFO represents illicit financial outflows, ISS stands for informal sector size, PCY represents per capita income, INTR is interest rate, GRE is acronym for government revenue, CPI is consumer price index while GE is government effectiveness used as a proxy for institutional quality. Although, the paper seeks to investigate the issue of illicit financial outflow and size of informal sector on domestic savings, per capita income, interest rate, government revenue and consumer price index are added as control variables as supported by [Ogbuebor *et al.* \(2013\)](#), [Touny \(2008\)](#) and [Elon-Obed *et al.* \(2016\)](#). [Ogbuebor *et al.* \(2013\)](#) supported informal sector Eqn (2) is transformed into an econometric form as specified below:

$$DSM_{it} = \alpha_0 + \alpha_1 IFO_{it} + \alpha_2 ISS_{it} + \alpha_3 PCY_{it} + \alpha_4 INTR_{it} + \alpha_5 GRE_{it} + \alpha_6 CPI_{it} + \alpha_7 GE_{it} + \varepsilon_{it} \quad (3)$$

Eqn (3) is re-specified in the logarithm form as:

$$\begin{aligned} \log DSM_{it} = & \alpha_0 + \alpha_1 \log IFO_{it} + \alpha_2 \log ISS_{it} + \alpha_3 \log PCY_{it} + \alpha_4 \log INTR_{it} + \alpha_5 \log GRE_{it} \\ & + \alpha_6 \log CPI_{it} + \alpha_7 \log GE_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

A priori, we expect $\alpha_1 < 0$, $\alpha_2 < 0$, $\alpha_3 > 0$, $\alpha_4 < 0$, $\alpha_5 > 0$, $\alpha_6 < 0$ and $\alpha_7 > 0$.

In Eqn (4), CPI and INTR were also in log form as supported by [Ogbokor \(2014\)](#). The equation is estimated using the Average Mean Group (AMG) estimator developed by [Eberhardt and Teal \(2010\)](#). This is because it has the ability to reduce bias and squares errors in panels with cross-sectional dependence.

3.2 Estimation techniques

3.2.1 Cross-sectional dependence. According to a growing corpus of panel-data literature, panel-data models are expected to exhibit significant cross-sectional dependence in errors, which may develop as a result of presence of common shocks and unknown components that eventually developed to part of the disturbance term, longitudinal dependence, and idiosyncratic pairwise dependence in the error with no specific pattern of shared components or spatial dependence. The situation of whether a shock coming from one country economic variable affects the economic variables of other countries are relevant to economic analysis. As a result, before performing a panel data analysis in any study, cross-sectional dependence is one of the most important diagnostics that should be investigated. Countries are said to be cross-sectionally dependent on one another if an m series of individual countries in our sample are no longer independently drawn observations but depend on each other's outcomes. Failure to address this problem may lead to misleading result. Hence, for this study, the [Breusch and Pagan \(1980\)](#) LM test, [Pesaran \(2021\)](#) scaled LM test, [Pesaran \(2021\)](#) CD test, and [Baltagi *et al.* \(2012\)](#) bias-corrected scaled LM test were utilized. The four tests were utilized under the null hypothesis of no cross-sectional dependence.

The null hypotheses for the four cross-sectional dependence test statistics is set against the alternative as:

$$H_0 : \hat{\gamma}_{ij} = cor(\omega_{it}, \omega_{jt}) = 0 \text{ for } i \neq j \quad (5)$$

$$H_1 : \hat{\gamma}_{ij} = cor(\omega_{it}, \omega_{jt}) \neq 0 \text{ for } i \neq j \quad (6)$$

These tests are used in order to determine whether there exist a strong co – movement among the economic variables used in the selected countries. The presence of cross-sectional dependence among the variables will necessitate the use of the second-generation

econometrics' technique (Shariff and Hamzah, 2015). This is because the first generation test relied upon the assumption that all cross sectional unit are independent.

3.2.2 *Slope homogeneity test.* The heterogeneity of the slope is another key issue in panel data analysis. The proof that significant economic shocks found in one country do not automatically reflect the existence of heterogeneity of slopes in another country is important because failure to correct for this when it exists may also lead to biased result. In order to address the issue, we employ the Pesaran and Yamagata (2008) slope heterogeneity test based on the standardized version of the Swamy (1970) homogeneity test. The modify test is calculated as follows:

$$\widehat{S}_{ht} = \sum_{i=1}^N (\widehat{\rho}_i - \widehat{\rho}_{sw})' Z_i' \frac{G_T Z_i}{Q_i^2} (\widehat{\rho}_i - \widehat{\rho}_{sw}) \quad (7)$$

From Eqn (7), the pooled estimated Ordinary Least Square is represented by $\widehat{\rho}_i$. The pooled estimator for weighted fixed effect = $\widehat{\rho}_{sw}$ while the estimator symbol in the equation is Q_i^2 .

The regular dispersion statistics of Eqn (7) is calculated in the form set out in Eqns (8) and (9) below:

$$\widehat{\Delta} = N^{\frac{1}{2}} = \left(\frac{N^{-1} \widehat{S}_{ht} - \kappa}{2\kappa} \right). \quad (8)$$

The bias adjusted version of the standard dispersion statistics is stated in the form below:

$$\widehat{\Delta}_{adj} = N^{\frac{1}{2}} \left(\frac{N^{-1} \widehat{S}_{ht} - E(\widetilde{X}_{it})}{\text{var}^{\frac{1}{2}}(\widetilde{X}_{it})} \right) \quad (9)$$

3.2.3 *Panel unit root test.* In order to avoid spurious regression arising from regressing a non-stationary series on another non-stationary series, we employ the cross-sectionally augmented Dickey-Fuller (CADF) panel unit root test of Pesaran (2007) and the cross-sectionally augmented of Im *et al.* (2003) (CIPS) panel unit root test in determining the stationarity property of the variables employed in this study. The test statistics for CADF based on Pesaran (2007) is derived from an error correction model as:

$$\Delta h_{it} = \beta_i + a_i h_{i,t-1} + b_i \bar{h}_{t-1} + c_i \Delta \bar{h}_t + e_{it} \quad (10)$$

where \bar{h} is the cross-sectional averages of lagged levels and $\Delta \bar{h}$ is the first difference at period T for the entire panel. Following Pesaran (2007), the CADF is computed as:

$$\text{CADF}_i = t_i(N, T) = \frac{\Delta h_i' G_w h_{i,-1}}{\widehat{\pi}_i \left(h_{i,-1}' G_w h_{i,-1} \right)^{\frac{1}{2}}} \quad (11)$$

The CIPS statistic is computed from Eqn (14) and specified as:

$$\text{CIPS} = \frac{1}{N} \sum_{i=1}^N \text{CADF}_i \quad (12)$$

3.2.4 *Westerlund cointegration test.* We further test for the existence of a long-run relationship among the variables. To achieve this, we employ Westerlund (2007) panel cointegration test

that is robust to challenges associated with cross-sectionally dependent panel data collections. The test is conducted under the null hypothesis of no cointegration. This study carried out a total of two panel tests (p -tau and p -alpha) and two group-mean tests (g -tau, g -alpha) respectively. The test is computed from error correction model as:

$$\Delta Z_{it} = \varphi_i' m_t + n_i (Z_{i,t-1} - \alpha_i' y_{i,t-1}) + \sum_{j=1}^{pi} n_{ij} \Delta Z_{i,t-j} + \sum_{q=1}^{qi} \gamma_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad (13)$$

From the equation, φ_i is the deterministic component, while pi and qi denote the lag lengths and lead orders in the equation and vary across the individual cross-sections in the panel. The mean group test statistics and panel statistics are computed as:

$$g_{-\tau} = \frac{1}{N} \sum_{i=1}^N \frac{\widehat{\varepsilon}_i}{SE(\widehat{\varepsilon}_i)} \quad (14)$$

$$g_{-\alpha} = \frac{1}{N} \sum_{i=1}^N \frac{T\widehat{\varepsilon}_i}{\widehat{\varepsilon}_i(1)} \quad (15)$$

In Eqn (14), $\widehat{\varepsilon}_i$ is the error correction estimates, while $SE(\widehat{\varepsilon}_i)$ represents the standard error of $\widehat{\varepsilon}_i$.

The panel statistics are also computed thus:

$$p_{-\tau} = \frac{\widehat{\varepsilon}}{SE(\widehat{\varepsilon})} \quad (16)$$

$$p_{-\alpha} = T\widehat{\varepsilon} \quad (17)$$

3.2.5 Granger causality test. Another important aspect of this study is to investigate the direction of causality between domestic savings, illicit financial outflows and informal sector size. This is important so as to detect whether domestic savings is what engender illicit financial outflow and informal sector size or vice versa. This becomes necessary so as to guide policy makers on the direction to focus so as to save the African countries policy makers of being at the crossroad. For all the countries used, the sample set is between 2000 and 2018. Adopting the procedure laid down by Kónya (2006) for detecting the presence of country-specific granger causality, the following bivariate finite-order vector autoregressive (VAR) model is proposed:

$$DSM_{1,t} = \alpha_{1,l} + \sum_{l=1}^{m/DSM_i} \beta_{1,1,l} DSM_{1,t-l} + \sum_{l=1}^{m/IFO_i} \gamma_{1,1,l} IFO_{1,t-l} + \varepsilon_{1,i,t} \quad (18)$$

$$IFO_{1,t} = \alpha_{2,l} + \sum_{l=1}^{m/DSM_i} \beta_{1,1,l} DSM_{1,t-l} + \sum_{l=1}^{m/IFO_i} \gamma_{1,1,l} IFO_{1,t-l} + \varepsilon_{2,i,t} \quad (19)$$

$$DSM_{1,t} = \alpha_{1,l} + \sum_{l=1}^{m/DSM_i} \beta_{1,1,l} DSM_{1,t-l} + \sum_{l=1}^{m/ISS_i} \gamma_{1,1,l} ISS_{1,t-l} + \varepsilon_{1,i,t} \quad (20)$$

$$ISS_{1,t} = \alpha_{1,l} + \sum_{l=1}^{m/DSM_i} \beta_{1,1,l} DSM_{1,t-l} + \sum_{l=1}^{m/ISS_i} \gamma_{1,1,l} ISS_{1,t-l} + \varepsilon_{2,i,t} \quad (21)$$

Furthermore, Kónya's (2006) procedure is based on the seemingly unrelated regressions (SUR) systems and Wald tests with bootstrap critical values for a specific country. This procedure enables the management of country-specific heterogeneity and cross-sectional dependence amongst countries. Note that from Eqns (18) to (21), the following could be deduced;

The index i = country ($i = 1, \dots, 6$), t = time period ($t = 2000$ to 2018), l = the lag of the variable, $\varepsilon_{1,i,t}$ and $\varepsilon_{2,i,t}$ = white-noise errors (which may be correlated for a given country, but not across countries).

From Eqns (18) and (19), we state that there is a unidirectional causality running from IFO to DSM if in Eqn (18), not all $\gamma_{1,i}$'s are zero and all $\beta_{2,i}$'s are zero in Eqn (19) in country i . Similarly, there is a unidirectional causality running from DSM to IFO if in Eqn (18), all $\gamma_{1,i}$'s are zero and if not all $\beta_{2,i}$'s are zero in Eqn (19) in country i . Conversely, a bi-directional causality exists between DMS and IFO if neither all $\beta_{2,i}$'s nor all $\gamma_{1,i}$'s are zero, while no causality exists between DMS and IFO if all $\beta_{2,i}$'s and all $\gamma_{1,i}$'s are zero in country i .

Furthermore, still with respect to this system from Eqns (20) and (21), a one-way causality running from ISS to DSM exists if not all $\gamma_{1,i}$'s are zero in Eqn (20) but all $\beta_{2,i}$'s are zero in Eqn (21), while a unidirectional causality running from DSM to ISS exists if all $\gamma_{1,i}$'s are zero in Eqn (20) but not all $\beta_{2,i}$'s are zero in Eqn (21). In the same vein, a bidirectional causality exists between DMS and ISS if neither all $\beta_{2,i}$'s nor all $\gamma_{1,i}$'s are zero in Eqns (20) and (21) but there will be no causality existing between DMS and ISS if all $\beta_{2,i}$'s and all $\gamma_{1,i}$'s are zero.

4. Results and discussion of findings

4.1 Descriptive analysis of variables

The descriptive analysis of data for the study as shown in Table 1 below indicates that the mean values for domestic savings, illicit financial outflows, informal sector contribution, GDP per capita, interest rate, consumer price index and government revenue are \$24.85 billion, \$5992.64 billion, \$27.24 billion, \$3174.52 billion, \$20.37 billion, \$23.49 billion and \$9519.76 billion respectively. These mean values reveal that IFOs have the second highest mean value after government revenue, while informal sector contribution is in the 4th position after GDP per capita. These characteristics imply that IFOs and informal sector contribution matter are essential to domestic resource mobilization.

As can be further observed from Table 1 below, Angola has the highest mean value for domestic savings (\$42.15 billion), followed by Botswana (\$35.79 billion), while Egypt has the least mean value (\$11.37 billion). For illicit financial outflows, South Africa has the highest mean outflow of illicit finance (\$14,170.55 billion), followed by Nigeria (\$14,148.3 billion), while the Democratic Republic of Congo has the least mean outflow of illicit finance (\$129.33 billion). Surprisingly, South Africa and Nigeria maintain the lead in the list of countries ravaged by IFOs. The country with the highest mean value of informal sector contribution is the Democratic Republic of Congo (54.93%), followed by Angola (50.66%), while the country with the least mean value is South Africa (5.32%).

In terms of government effectiveness for all the African countries selected. Government effectiveness has been weak in their performance. However, Botswana and South Africa government performed averagely with 1.58 and 0.73 respectively. Angola Dem. Rep of Congo, Egypt and Nigeria performance very weak with -0.96 , -1.45 , -0.22 and -0.39 .

The informal sector continues to play a major part in the economy of most African countries as observed. Botswana records the highest mean value for GDP per capita (\$6019 billion), followed by South Africa (\$5532.01), while the Democratic Republic of Congo has the least mean value (\$346.1 billion). Angola records the highest mean value for interest rate (40.39%) within the study period, followed by the Democratic Republic of Congo (26.36%), while South Africa has the least interest rate (11.45%). The country with the highest mean

Country	Mean	SD	Min	Max
<i>Domestic savings</i>				
Angola	42.15	9.64	29.67	57.32
Botswana	35.79	5.60	27.40	44.23
Dem. Rep of Congo	11.85	6.15	3.49	22.11
Egypt	11.37	4.72	1.79	17.11
Nigeria	28.21	11.28	13.08	57.16
South Africa	19.72	0.90	18.50	21.33
Panel	24.85	13.62	1.79	57.32
<i>Illicit financial outflow</i>				
Angola	2383.67	2344.77	0	7416.9
Botswana	1870.36	1081.93	152.2	3456
Dem. Rep of Congo	129.33	196.36	0	582.84
Egypt	3253.63	2633.48	841.68	9328.5
Nigeria	14148.3	11144.52	26.74	43638
South Africa	14170.55	9531.32	975.2	29589.47
Panel	5992.64	8422.96	0	43638
<i>Informal sector contribution</i>				
Angola	50.66	77.63	7.28	7416.9
Botswana	7.03	2.72	2.81	12.70
Dem. Rep of Congo	54.93	137.27	0.74	513.91
Egypt	33.13	1.91	28.88	35.7
Nigeria	12.38	3.95	5.39	18.87
South Africa	5.32	2.39	-0.69	10.06
Panel	27.24	66.18	-0.69	513.91
<i>GDP per capita</i>				
Angola	3062.68	1623.89	527.33	5408.41
Botswana	6019.20	1634.37	3190.62	8258.64
Dem. Rep of Congo	346.10	127.66	153.59	561.78
Egypt	2227.70	900.14	1063.00	3598.97
Nigeria	1859.45	829.68	567.93	3222.69
South Africa	5532.01	1576.19	2502.28	8007.41
Panel	3174.52	2359.34	153.59	8258.64
<i>Interest rate</i>				
Angola	40.39	35.67	12.53	103.16
Botswana	12.61	3.77	6.5	16.54
Dem. Rep of Congo	26.36	18.43	7.4	65.42
Egypt	13.13	1.99	11.01	18.32
Nigeria	18.27	2.56	15.14	24.77
South Africa	11.45	2.37	8.5	15.75
Panel	20.37	19.19	6.5	103.16
<i>Government effectiveness</i>				
Angola	-1.15	0.14	-1.46	-0.96
Botswana	0.57	0.26	0.33	1.58
Dem. Rep of Congo	-1.64	-0.12	-1.88	-1.45
Egypt	-0.50	-0.21	-0.88	-0.22
Nigeria	-0.99	0.19	-1.21	-0.39
South Africa	-0.48	0.16	0.29	0.73
Panel	-0.54	0.84	-1.88	1.58
<i>Consumer price index</i>				
Angola	50.09	77.82	7.28	324.99

Table 1.
Descriptive analysis of
variables

(continued)

Country	Mean	SD	Min	Max	Illicit outflows in African countries
Botswana	6.99	2.76	2.81	12.70	
Dem. Rep of Congo	54.68	137.37	0.74	513.91	
Egypt	11.70	10.25	2.27	45.20	
Nigeria	12.10	3.76	5.39	18.87	
South Africa	5.36	2.37	-0.69	10.06	
Panel	23.49	66.49	-0.69	513.91	
<i>Government revenue</i>					
Angola	2608.75	1873.83	48.05	5859.96	
Botswana	935.70	464.24	354.16	1745.87	
Dem. Rep of Congo	2804.84	2724.58	8.39	8844.04	
Egypt	284.02	192.81	91.81	755.11	
Nigeria	47753.7	16471.89	23688.28	70536.35	
South Africa	731.58	377.34	223.94	1414.42	
Panel	9519.76	19301.63	8.39	70536.35	

Table 1.

value for consumer price index is the Democratic Republic of Congo (54.68%), followed by Angola (50.09%), while South Africa has the least CPI (5.36%). Nigeria's maximum mean revenue is the highest of all the countries investigated (\$70,536.35 billion), followed by the Democratic Republic of Congo (\$8844.04 billion), while Egypt comes last (\$755.11 billion).

4.2 Cross-sectional dependence test

Table 2 reports the result of the cross-sectional dependence test carried out. The result reveals that the four cross-sectional test statistics were significant at 1% and 5% respectively. We therefore conclude that cross-sectional dependence exists among the variables used. Hence, any shock to any of the economic variable used in the study in one of the countries will automatically have effect on the economic variables of other African countries. This therefore warrant the rejection of the null hypothesis of no cross-sectional dependence and hence support the use of the second-generation econometric techniques.

4.3 Slope homogeneity

Table 3 reports the result of slope homogeneity, which shows that the null hypothesis of no slope homogeneity is rejected with the delta test statistics significant at both 1% and 5% respectively.

	Test statistics and probability							
	DMS	IFO	ISS	PCY	CPI	INTR	GR	GE
Breusch - Pagan LM	62.77*	34.74*	25.05*	198.24*	38.54*	100.65*	118.37*	54.85*
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pesaran scaled LM	7.62*	2.51**	0.74	32.36*	3.20*	14.54*	17.78*	7.09*
	0.00	-0.012	-0.46	0.00	-0.001	0.00	0.00	0.00
Bias-corrected scaled LM	7.46*	2.34**	0.57	32.19*	3.04*	14.38*	17.61*	6.93*
	0.00	-0.019	-0.567	0.00	-0.002	0.00	0.00	0.00
Pesaran CD	2.34**	0.92	2.32**	13.97*	-0.33	4.53*	8.14*	1.19
	-0.019	-0.359	-0.02	0.00	-0.743	0.00	0.00	0.23

Note(s): (1) *and **denote rejection of the null hypothesis of no cross-sectional dependence at the 1% and 5% levels respectively. (2) The optimal lags are based on Schwarz Information Criterion (SIC). (3) Values reported in parentheses are the probabilities

Table 2.
Cross-sectional
dependence test results

4.4 Panel unit root test result

Since there exist the presence of cross – sectional dependence among the economic variables used, the panel unit root test that can take account of cross – sectional dependence and slope homogeneity is therefore necessary. Tables 4 and 5 present the Cross sectional augmented Dickey Fuller (CADF) unit root test result that is able to take account of both situation for all the variables. Table 4 shows that none of the variables are stationary at levels.

Table 5 shows that all the variables became stationary after first difference.

4.5 Cointegration test

One of the objectives of the study is to test for the presence of a long-run relationship among the variables. To achieve this, Westerlund (2007) long-run cointegration test was employed, and the result is reported in Table 6. The result reveals that the four tests' statistics are significant. We thus accept the alternative hypothesis of presence of co-integration among the variables while rejecting its null hypothesis.

4.6 Regression result

Table 7 presents the augmented mean group estimation results. From the findings, illicit financial outflow has a significant negative impact on domestic savings. The result is in line with theoretical postulation, which suggests that massive capital outflows through IFOs cause reduction in public sector investments and stifle private capital formation, leading to low income and national savings. The results specifically show that 1% increase in illicit financial outflows reduces domestic savings by 0.055%. This indicates that the continuous outflow of illicit finance in the selected countries may hinder their quest for effective development as this will hinder domestic savings and hence hamper development. The significance of the result at 5% indicates that illicit financial outflows are an important determinant of domestic savings among the selected countries. The finding is in line with study by Herkenrath (2014) on illicit financial flows and their developmental impact who argued that illicit financial outflow deprived the countries concerned of urgency need resources for public and private investment. Abofsi (2018) also concluded that illicit finance hamper economic growth in developing countries and hence, reduces the incentive to save.

Informal sector size is also significant and impacts negatively on domestic savings from the result presented. 1% increase in informal sector size reduces domestic savings by 0.786%, indicating that the economy is negatively affected by a large informal sector. It is however not surprising, since this sector of the economy is unobserved, unorganized and unprotected, suffering exclusion from statistical coverage, GDP estimation, social security, traditional trade unionism, and productive resources typically available to larger firms. Furthermore, the informal sector serves as a major life sustaining system in Africa for majority of the poor, unskilled, socially and economically marginalized and unbackable. A vibrant informal sector such as found in developed economies could affect domestic savings positively, but in developing economies where the bigger proportion of the informal sector is made up of poor

Delta tests	Test statistics and probability							GE
	DS	IFO	ISC	PCY	CPI	INTR	GR	
Delta tilde	2.15**	2.165**	3.43*	1.64**	2.67*	4.15*	6.84*	2.98
	-0.016	-0.013	0	-0.048	0	0	0	0
Delta tilde adj	2.34**	2.21**	4.52*	1.711**	2.93*	4.28*	7.45*	6.32
	-0.01	-0.011	0	-0.044	0	0	0	0

Table 3.
Slope homogeneity results

Note(s): (1) *and **denote rejection of the null hypothesis of no slope homogeneity at the 1% and 5% levels respectively. (2) Values reported in parentheses are the probabilities

Country	Test statistics							Critical values			
	DS	IFO	ISC	PCY	GR	INTR	CPI	GE	1%	5%	10%
Angola	0.02	-0.81	-1.65	-2.45	-1.85	-2.95	-0.99	-1.08	-5.41	-4.17	-3.64
Botswana	-1.16	-4.29	-2.08	-1.89	-3.14	-0.94	-0.13	-1.43	-5.41	-4.17	-3.64
DR Congo	-0.07	-2.79	-2.34	2.58	-3.68	-0.64	-3.43	-1.67	-5.41	-4.17	-3.64
Egypt	-0.07	-2.72	-1.87	-2.83	-1.43	-1.68	-1.65	-2.12	-5.41	-4.17	-3.64
Nigeria	-0.94	-1.55	-2.55	-1.63	-1.7	-3.13	-2.63	-1.34	-5.41	-4.17	-3.64
South Africa	-3.45	-3.48	-3.48	-4.18	-1.41	-2.69	-3.42	-2.11	-5.41	-4.17	-3.64
CIPS	-0.94	-2.61	-2.33	-1.73	-2.2	-2.01	-2.04	-2.306	-2.71	-2.67	-2.56

Illicit outflows
in African
countries

Table 4.
Result for panel unit
root test (intercept and
trend) at levels

Table 5.
Result for panel unit root test (intercept and trend) after first difference

Country	Test statistics										Critical values		
	DS	IFO	ISC	PCY	GR	INTR	CPI	GE	1%	5%	10%		
Angola	-2.16	-2.49	-3.22	-4.95*	-5.36*	-3.82*	-1.99	-3.65	-5.41	-4.17	-3.64		
Botswana	-2.76	-4.85*	-2.08	-4.45*	-4.56*	-2.92	-1.62	-2.79	-5.41	-4.17	-3.64		
DR Congo	-3.18	-3.14	-3.3	-0.6	-4.76*	-2.11	-2.88	-3.11	-5.41	-4.17	-3.64		
Egypt	-3.18	-2.3	-2.48	-2.31	-3.13	-3.92	-2.51	-2.86	-5.41	-4.17	-3.64		
Nigeria	-3.67	-1.86	-4.54	-4.49*	-1.66	-2.8	-3.4	-3.99	-5.41	-4.17	-3.64		
South Africa	-3.56	-4.03	-3.08	-3.25	-2.3	-3.3	-3.07	-4.12	-5.41	-4.17	-3.64		
CIPS	-3.08*	-3.10*	-3.12*	-3.34*	-3.63*	-3.14*	-2.56**	-2.88	-2.71	-2.67	-2.56		

Note(s): * and ** represent significance at 5% and 10% respectively

I/O	Coefficient	asym. ρ -value	Bootstrap ρ -value	Illicit outflows in African countries
<i>g</i> -tau	-4.857*	0.000	0.041	
<i>g</i> -alpha	-1.62	0.053	0.140	
<i>p</i> -tau	-7.489**	0.000	0.024	
<i>p</i> -alpha	-7.489**	0.000	0.039	
<i>ISC</i>				
<i>g</i> -tau	-4.655***	0.000	0.050	
<i>g</i> -alpha	-2.937**	0.002	0.027	
<i>p</i> -tau	-7.374**	0.000	0.015	
<i>p</i> -alpha	-7.374*	0.000	0.006	

Note(s): *, ** and *** indicate rejection of the null hypothesis of no cointegration at 1%, 5% and 10% respectively

Table 6.
Westerlund
cointegration test
result

Dependent var. Domestic savings Variable	Coefficient	ρ -value
I/O	-0.055***	0.094
ISC	-0.786**	0.051
PCY	0.392*	0.006
INTR	-0.511	0.326
GR	-0.940**	0.033
IQ	-0.119**	0/028
CPI	-0.003*	0.002

Note(s): *, ** and *** denote significance at 1% 5% and 10% respectively

Table 7.
AMG estimation result

households, the informal sector will have a negative effect on domestic savings as income earned goes to solve daily consumption needs. The finding is in line with [Ogbuebor et al. \(2013\)](#) work on Informality and domestic savings in Nigeria who concluded that informality hinders the growth of domestic savings in Nigeria. This result therefore indicates that informal sector size is an important factor that determines domestic savings among the selected countries.

A priori economic expectation about the relationship between GDP per capita and domestic savings is positive. This is because the growth of per capita income increases lifetime earnings, which in turn increases aggregate saving rate. Countries with higher GDP per capita would therefore have higher rates of saving than countries with lower GDP per capita. Based on the result, 1% increase in per capita income increases domestic savings by 0.32%. The result is significant at 1%. This shows that GDP per capita is a major determinant of domestic savings. The findings support studies by [Kumar et al. \(2020\)](#), [Joshi et al. \(2019\)](#) and [Kudaisi \(2013\)](#) that concluded in their studies that per capita income drives savings positively.

Government revenue is significant and impacts negatively on domestic savings. This result does not align with economic *a priori* expectation. The negative impact may arise because developing countries operated budget deficits for the past two decades or more. We note that more budget deficit discourages savings while encouraging consumption just as it also shifts the burden of tax from present to future generations. For this reason, national saving will decline following a decline in government savings. Similarly, revenue accruing to government for the past decade does not suggest any addition to national savings but a depletion of same. The significance of the result shows that government revenue is an important determinant of domestic savings among the selected African countries. Both interest rate and consumer price index are however insignificant.

Government effectiveness on apriori is expected to impact positively on domestic savings. This is because strong institutional quality will lead to more income in the economy thereby leading to more incentive to save. African countries have been institutionally weak and this has led to low savings in the economy. Findings from our study also shows an inverse relationship between institutional quality proxied by government effectiveness and domestic savings. The finding is in line with [Freytag and Voll \(2013\)](#) that concluded that poor institutions in developing countries damping their savings behaviour while developed countries with good institutional quality engender their savings behaviour. The quality of institutions stands as a major determining factor affecting the level of domestic savings in the selected countries from the result.

4.7 Granger causality test result

[Tables 8 and 9](#) report the results of the Granger causality tests between domestic savings and illicit financial outflows, while [Tables 10 and 11](#) report the results between domestic savings and informal sector size. Unidirectional causality is found running from domestic savings to

Table 8.
Granger causality test

Country	Test. Stat	Bootstrap critical values		
		1%	5%	10%
Angola	2.015	10.89	6.108	4.085
Botswana	3.162	21.593	12.398	9.427
DR. Congo	1.964	39.361	20.978	16.383
Egypt	5.823***	15.219	7.284	4.923
Nigeria	5.067***	10.308	6.047	4.447
South Africa	0.538	16.803	7.504	4.645

Note(s): *** denotes significance at 10%

Table 9.
Granger causality test

Country	Test. stat	Bootstrap critical values		
		1%	5%	10%
Angola	7.582**	14.515	7.41	5.05
Botswana	1.141	13.132	7.751	5.728
DR. Congo	7.135***	15.995	8.542	6.145
Egypt	0.026	13.839	6.1	4.077
Nigeria	0.115	10430	5.558	3.942
South Africa	3.812***	12.051	5.573	3.304

Note(s): *** denotes significance at 10%

Table 10.
Granger causality test

Country	Test. stat	Bootstrap critical values		
		1%	5%	10%
Angola	0.381	9.121	4.983	3.5
Botswana	6.910	16.47	12.085	8.941
DR. Congo	0.548	16.601	8.597	5.807
Egypt	4.731**	7.421	4.071	3.069
Nigeria	5.032***	12.35	6.122	4.586
South Africa	4.749***	9.109	4.915	3.065

Note(s): ** and *** denote significance at 5% and 10% respectively

illicit financial outflow in Nigeria and Egypt. This implies that the more domestic resources are mobilized, the less the illicit financial outflows. Therefore, the better African countries are at closing all loopholes through which illicit financial outflows happen, the greater their ability to mobilize domestic resources will become. The same unidirectional causality is also registered for Angola, DR. Congo and South Africa but it runs from illicit financial outflows to domestic savings. This implies that if illicit financial outflows are curtailed, domestic resource mobilization will rise.

In Tables 10 and 11, findings reveal a unidirectional causality running from informal sector size to domestic savings in Egypt and South Africa. The same one-way causality is also registered for Angola and Botswana, but it runs from domestic savings to informal sector size while bidirectional causality exists in Nigeria.

H_0 : logDMS does not cause logIFO.

H_0 : logIFO does not cause logDMS.

H_0 : logISS does not cause logDMS

H_0 : logDMS does not cause logISS

5. Conclusion and policy recommendations

We set out to investigate the impact of illicit financial outflows and informal sector size on Africa's ability to mobilize domestic resources within the period 2000–2018. The results confirmed the presence of cross-sectional dependency and slope heterogeneity among the countries, while the Westerlund Cointegration test revealed the existence of long-run relationship among the variables. It was further confirmed that the informal sector of the African countries with the highest illicit financial outflows is a big factor hurting their ability to mobilize sufficient domestic resources for development. Results also showed that illicit financial outflows have the capacity to derail the mobilization of domestic resources for socially and economically productive investment among African countries.

From the causality test, we found a one-way causality running from domestic savings to illicit financial outflow in Nigeria and Egypt, suggesting that domestic savings drive illicit financial outflows, while in Angola, the Democratic Republic of Congo and South Africa, illicit financial outflow is what drives domestic savings. Both results reinforce the fact that mobilization of domestic resources is capable of shrinking illicit financial outflows; while on the other hand, curbing illicit financial outflows will no doubt raise the size of domestic resources available for development. Similarly, in Egypt and South Africa, the informal sector size engenders domestic savings, suggesting that the larger the size of the informal sector, the smaller the size of domestic resources. For this reason, Africa must create an

Country	Test. stat	Bootstrap critical values		
		1%	5%	10%
Angola	4.053***	9.235	5.015	3.625
Botswana	6.758***	13.189	8.521	5.272
DR. Congo	0.31	18.884	8.908	5.701
Egypt	0.054	5.182	2.939	2.174
Nigeria	3.952***	11.134	5.654	3.855
South Africa	0.759	12.783	6.051	4.142

Note(s): *** denotes significance at 10%

Table 11.
Granger causality test

enabling environment that helps the large informal sector to transit into a formal sector. In Angola and Botswana, domestic savings drive the informal sector size, while in Nigeria both engender one another.

Since low levels of income found in the large informal sector of African countries cause low levels of domestic resource mobilization, we strongly recommend policies that create enabling environments for the informal sector to thrive and transit, such as loan capital, simplified registration process and the provision of incentives for firms to register with the relevant authorities, amongst others. As always, strong institutions are indispensable for curbing the increasing spate of illicit financial outflows in Africa. Overall, our findings favour urgent policy adjustments in terms of how the informal sector is conceived and treated in the national budgets of African countries and the commitment to building strong institutions.

Policy actions to increase total development resource envelope must sufficiently recognize that African countries need to step up efforts at enhancing domestic resource mobilization. Firstly, given the robust population of most African countries, some public finance reforms such as the introduction of broad-based consumption taxes should be implemented to increase domestic resources. Secondly, despite the gains made by a number of African countries in terms of export revenue, thanks to high prices of some major primary commodities, growth is still not inclusive leading to large informal sector in Africa. There is need for policy choices that encourage formalization of the informal sector, including the provision of support for new employment opportunities in the formal sector. Also, African government has been institutionally weak in terms of their effectiveness thereby creating problem to private and public capital formation which in turn affect domestic savings, it is therefore necessary that African government need to go a long mile in their effectiveness in order to surpass a certain threshold for emerging economies since better economic and government institutions drive aggregate savings formation upwards.

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