INCLUSIVE GROWTH IN SUB-SAHARAN AFRICA: DOES SECTORAL FOREIGN AID MATTER?

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Abstract
The aim of this study is two folds. One is to investigate the extent of inclusive growth in sub-Saharan Africa and two is to examine the effects of sectoral foreign aid on inclusive growth in sub-Saharan Africa from 2000 to 2019. The study utilised the Asian Development Bank Framework for Inclusive Growth (FIGI) to generate an index for inclusive growth. The index was employed to investigate the effects of inclusive growth on sectoral foreign aid in sub-Saharan Africa. The first objective revealed that inclusive growth in sub-Saharan Africa is low and declining. This is in stark contrast with what is obtainable in other regions of the world. The second objective employed a Two-Step Instrumental Variable General Method of Moment and Method of Moment Quantile Regression and showed that sectoral foreign aid is positive and significant to inclusive growth. Contrary to expectation, the study observed that foreign aid is not detrimental to economic and social progress in sub-Saharan Africa and that causality exists between the various sectoral foreign aid and inclusive growth. Thus, in sub-Saharan Africa, foreign aid and local investment in health, education, and other socioeconomic infrastructure that aids inclusion and underpins shared prosperity must be pursued.

Keywords: Inclusive Growth, Sectoral Foreign Aid, Shared Prosperity, Framework for Inclusive Growth Index, sub-Saharan Africa

JEL Classifications: F35, I31, I32, I38

Article history-Received: August 10, 2022. Revised: October 10, 2022, Accepted: October 14, 2022.

Introduction

The rising aspiration of contemporary societies seems to be predicated on the need to effectively appropriate growing economic potentials to meet societal demands. This has become an increasingly discussed problem in extant literature due to the process of increasing socioeconomic inequalities and poverty (Stawska & Jabłonska, 2021). Scholars have argued that socioeconomic inequalities are fallouts of the imperfection that underlies state intervention in market mechanisms and thus breeds socioeconomic exclusion (Piketty, 2014).

If rising income inequality and poverty are associated with social and economic exclusion, efforts to eliminate inequalities and poverty will require public intervention while relegating market fundamentals. This gave birth to the concept of inclusive development, conceptualised as the capacity to integrate a society by ensuring that every member of society enjoys socioeconomic participatory opportunities. It ensures effective use of economic growth and aids nondiscriminatory and responsible decisions making and implementation (United Nations Development Program, 2013). It seems to be effective in abating poverty by ensuring that the socially excluded group benefits from the process of growth (World Bank, 2008; Ianchovichina & Lundstrom, 2009).

Global growth has recently attained an unprecedented height (Figure 1). Advancement in cutting-edge technology and productivity has decimated the possibilities of fulfilling the Malthusian prediction that population growth will override food production over time. The income per person in both global and sub-

Saharan Africa has risen (Figure 1). This is made possible by the spike in economic growth recorded by various economies of the world. The impact of rising economic growth has had far-reaching effects on average living standards globally. An average of 19 out of 20 people living in extreme poverty in the 19th century had significantly reduced to 2 out of 20 people by 2015 (Cerra et al, 2021). World Bank estimates showed that global poverty declined from 56 per cent in 1990 to 40 per cent in 2018. More than a billion people had scaled poverty since 1990. This seems to have slightly abated income inequality across nations of the world thereby reducing global interpersonal inequality. This laudable achievement has been ascribed mainly to economic growth recorded by China and a few other countries in Asia.

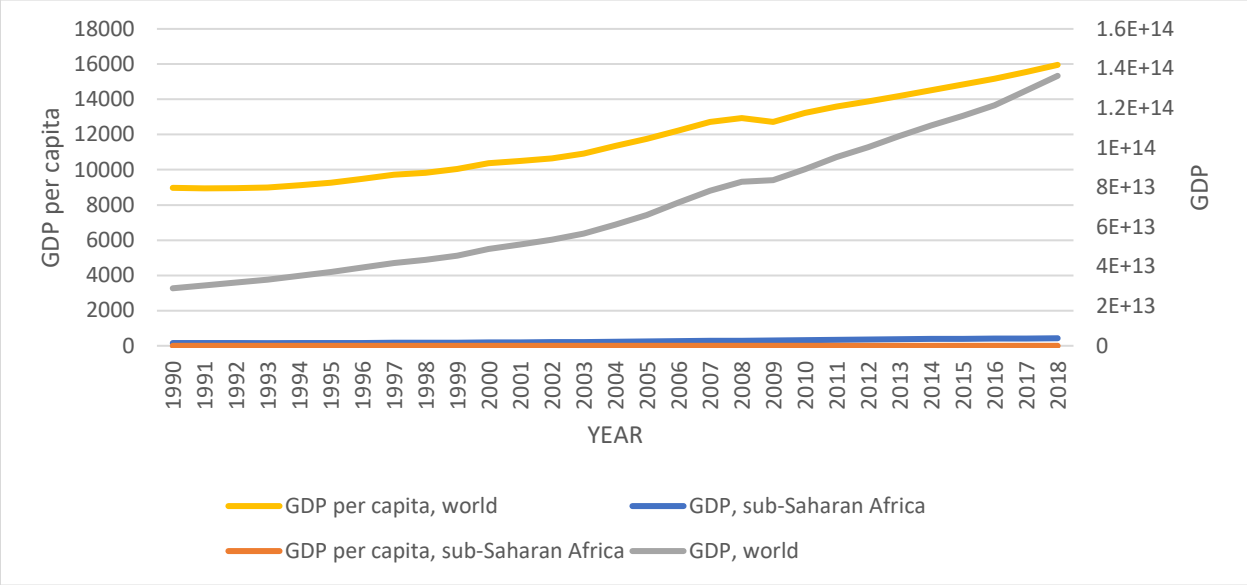


Figure 1: GDP/GDP per capita, 1990 to 2018 (adjusted for inflation and expressed in international $ in 2011)
Source: World Development Indicator, 2020

Despite rising growth recorded by most sub-Saharan African countries in recent decades, the menace of poverty and inequality persists. World Bank (2020) estimated that about 689 million people wallowed in poverty globally in 2017 and sub-Saharan Africa is replete with a large percentage of these extremely poor (Figure 2). An average of 40 per cent of the world population is estimated to live below $1.90/day in 2018 of which sub-Saharan Africa alone accounted for two-thirds of the figure. Sub-Saharan Africa mostly accounts for the slow pace continually experienced in the global fight against poverty. World Bank estimated that global poverty declined by 1.6 per cent between 2015 and 2018. This is not the narrative in sub-Saharan Africa as the number of poor in the region continues to rise. This is attributable to the slow pace of efforts targeted at poverty reduction in sub-Saharan Africa which is not at par with her population growth rate where 433 million people lived in extreme poverty in 2018, a rise from 284 million in 1990 (world bank, 2020).

Poverty exposes the poor to a wide range of risks. Most poor rely on informal jobs with no safety nets, live in vulnerable environments, and are exposed to an array of risks, dangers, and conflicts (World Bank, 2020). In most economies, living condition is largely influenced by prevailing socio-economic realities and income depends on the economic status of individuals as access to health, education, and essential services influence income distribution. Varying income across sub-Saharan Africa has successively trapped millions of people in the poverty net. Also, uneven income distribution has considerately skewed available resources to labour market participation and earnings, access to political power, health, education, and finance which are not readily accessible to the poor and structural changes influenced by technological change expropriate individuals with low or no education and with less opportunity for migration (Cerra, et al, 2021).

A combination of poverty and inequality aggravates social ills. The global financial crisis and COVID-19 pandemic have worsened unemployment, poverty, inequality, and health hazard. Also, rising economic growth recorded in sub-Saharan Africa seem to correlate with rising poverty and income inequality. Nexus amongst these issues have motivated concerns among policymakers and economists alike (Shin, 2012; Risso & Carrera, 2012; Risso, Punzo & Carrera, 2013; Piketty, 2014) as national growth does not seem sufficient to spur improved welfare for all. This has raised questions on the adequacy of economic growth in abating the twin problems of income inequality and poverty confronting sub-Saharan Africa. Inequality between Main Street and Wall Street in developed countries, the three-speed world economy, and the Arab Spring have repositioned the relevance of inclusive growth in addressing the twin problems of poverty and income inequality (Anand, Mishra & Peiris, 2013) and has engendered a conflicting result about the strategy for pro-poor.

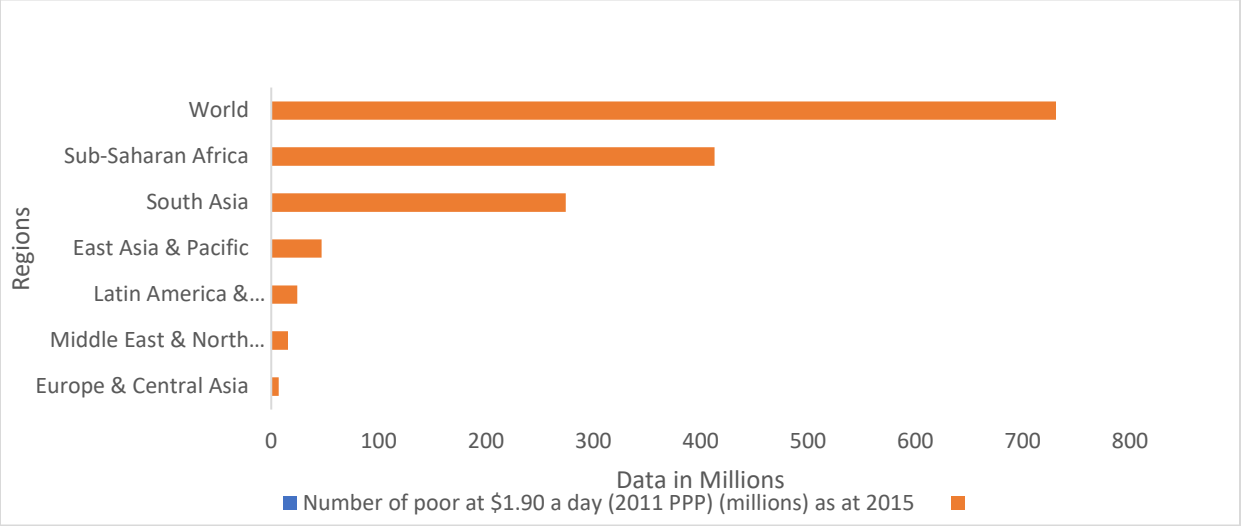


Figure 2: Population of the Poor living below $1.90 per Day (Millions) as of 2015.
Source: World Development Indicator, 2020

The continuous rise in the number of poor situated in sub-Saharan Africa has made international organisations find appropriate policies to reduce the menace. This is the first agenda on the United Nations Sustainable Development Goals [no poverty] (Abdullahi 2019; Fagbemi and Olufolahan 2019). Policymakers and academics are also concerned with the level of poverty and uneven income distribution ravaging sub-Saharan Africa (Dollar & Kraay, 2002; Rashid & Intartaglia, 2017; Doumbia, 2018). In academic circles, this is particularly worrisome considering the trend of rising economic growth recorded in recent decades in sub-Saharan Africa (UNECA, 2019) which was expected to birth a substantial reduction in poverty and close the income inequality gap since the substantial reduction in global poverty by about 50 per cent between 1990 and 2010 was attributed to sustained economic growth. The peculiarity of sub-Saharan Africa is critical to reducing poverty and inequality which have obscured the benefits of growth in the region.

Inclusive growth is relatively a new concept and seems relevant in the fight against poverty and income inequality. It is a source of general prosperity and seeks to protect the underprivileged from macroeconomic shocks (AfDB, 2012). It is multidimensional with complex interlinkages. It entails growth that is both inclusive and sustainable. It is distinct from the traditional pro-poor growth model which seeks to migrate underprivileged poor in the process of wealth distribution to wealth creation margin via poverty alleviation measures. Inclusive growth on the other hand, through productive employment, captures the pace and pattern of growth (Ali & Son, 2007; Anand, Mishra & Peiris, 2013). It is indeed crucial to address issues of poverty and income inequality in sub-Saharan Africa. Its importance spreads across global, regional, and

national economies. It is long-term in perspective with a specific focus on decent employment generation for the excluded group (Ianchovichina & Lundstrom 2009; Berg & Ostry, 2017). It captures access to opportunities (Raheem, Isah & Adedeji, 2018) and the extent to which industrial production meant to promote growth is enhanced by utilising endowed natural resources (Mesagan & Bello, 2018). It attains growth with optimal utilisation of human and natural resources. United Kingdom's Department for International Development (DFID) termed it vital to its core plan and strategy while IMF identified it as the core of its 2014 research agenda (IMF, 2007).

Studies have attempted to investigate the role of foreign aid in inclusiveness. Scholars have argued that countries that had succeeded with foreign aid do not exist (Stubbs et al, 2016; Galiani et al, 2017). They argued that foreign aid exerts damaging effects on developing countries (Moyo, 2010). On the contrary, foreign aid seems necessary to sustain growth (Sachs, 2014). The Millennium Development Goals (MDGs) blueprint recognised its role in meeting the needs of most developing nations and most Sustainable Development Goals (SDGs) targets seem only achievable with foreign aid which is estimated to require $4 trillion per year (Simpson, 2016). Foreign aid is a source of assistance to various countries (Niyonkuru, 2016; Yiew & Lau, 2018). It spread across economic, social, production, infrastructure, etc. Foreign aid enhances growth and development with support to physical and human capital and also enhances the capability to import capital goods and technology transfer (Morrissey, 2001). United Nation in 1970 targeted a 0.7 per cent Official development assistance (ODA)/Gross National Income (GNI) goal which though not met, increasingly extended the volume of foreign aid to sub-Saharan Africa (Figure 3). The benefits span through a reduction in extreme poverty, about 91 per cent increase in children's school enrolment, about 91 per cent (2015) increases in literacy rates from 83 per cent (1990), a reduction in disparities between female-male school enrolment, improvement in global health issues, such as Human immunodeficiency virus infection and acquired immunodeficiency syndrome (HIV/AIDS), malaria and other diseases, enhancement of environmental sustainability between 1990 and 2015, and reduction in child mortality from 90 to 43 deaths per 1000 live births (United Nations, 2015).

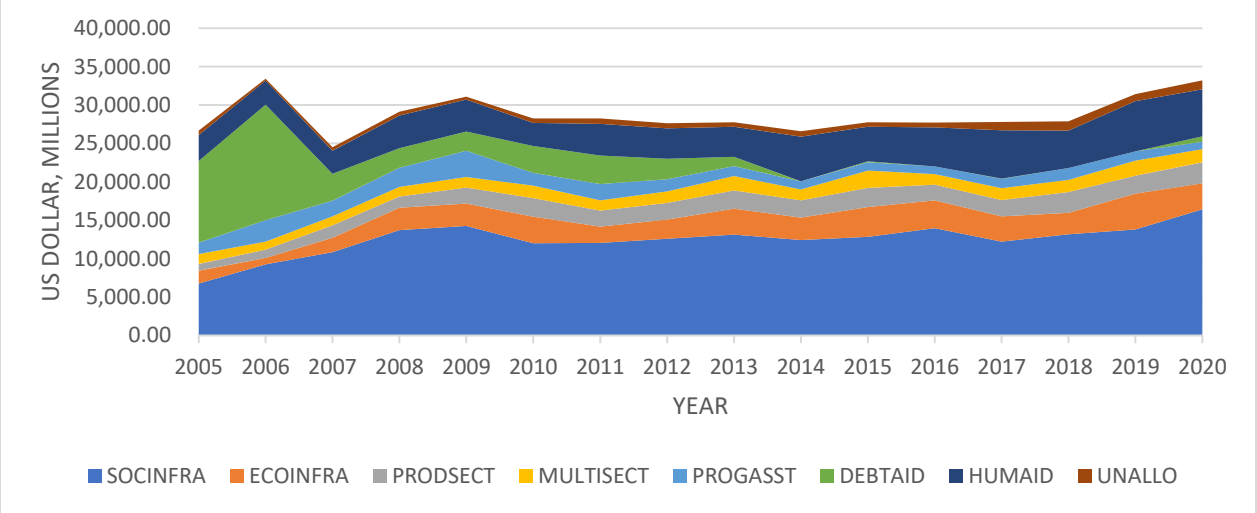


Figure 3: Foreign aid to different sectors in sub-Saharan Africa between 2005 and 2020.
Source: Organisation for Economic Cooperation and Development (OECD), 2020.

Furthermore, while studies have tried to explain the role of socioeconomic inclusion in addressing the twin problems of poverty and inequality, their theoretical and empirical conclusions seem unresolved (Moyo, 2010; Amponsah, Agbola, & Mahmood, 2021). This has been attributed to measurement issues (Rauniyar & Kanbur, 2010; McKinley, 2010; Ranieri & Ramos, 2013). Scholars, governments, and policymakers have called for a broad-based measure of inclusion that addresses social inclusion, income distribution,

educational attainment, and gender equality among others (Mckinley, 2010; Mitra & Das, 2018; Gyamfi et al, 2019). ADB's (2007) strategy for growth contributes immensely to the rising attention on inclusive growth by adopting inclusive growth in her critical strategic agenda for 2020 (Klasen 2010). European Commission outlined new indicators such as measures of overall sustainability and social issues including income, health, education, environmental quality distribution, and environmental protection and quality of life. UN adopted three (3) basic metrics of human development indicators such as standard of living, education, and life expectancy. OECD launches Better Life Index while ADB recommended a Framework for Inclusive Growth Index (FIGI).

Previous studies have attempted to evaluate the benefits of inclusive growth on socioeconomic issues with no attempt to evaluate the extent of inclusion in sub-Saharan Africa (Gyamfi et al, 2019). This study seeks to evaluate the extent of inclusion in sub-Saharan Africa, relative to other regions of the world. This study also attempts to ascertain the depth of inclusion in the various income clusters in sub-Saharan Africa. This is necessary as the extent of inclusion could influence the effectiveness of inclusive growth in abating income inequality and poverty. While a growing number of studies have attempted to evaluate the role of foreign aid on economic growth (Moyo, 2010; Pham & Pham, 2020; Maruta, Banerjee & Cavoli, 2020), studies that have investigated the role of foreign aid on inclusion in sub-Saharan Africa is limited. The few studies on foreign aid and economic growth nexus adopted the aggregate net Official Development Assistant (ODA). These studies also employed GDP per person employed as a proxy for inclusive growth (Nketiaa, et al, 2021; Afolabi-Ibikunle, et al, 2022).

This study rather disaggregates aid by considering the effectiveness of sectoral aid on inclusion while adopting a robust measure of inclusive growth since the outcome of inclusive growth on socioeconomic issues is influenced by the robustness of the measure adopted for inclusiveness (McKinley, 2010; Ranieri & Ramos, 2013). This study address calls by scholars to account for types and sectors of foreign aid which gives a holistic view of the role of foreign aid in development outcomes (Asiedu & Nandwa, 2007; Quartey & Afful-Mensah, 2014). This enables this study to account for the heterogeneity in development assistance which is lacking in previous studies.

The study is further structured as follows: section two discusses the literature review; section three presents the methodology employed and section 4 presents the empirical results and discussion. The conclusion is contained in the last section.

Review of Literature

Theoretical review

The term inclusive growth originated from the works of Kakwani and Pernia (2000). They adopted the concept to describe pro-poor growth which enables the poor to participate in the growth process. The debate around inclusive growth is evolving and largely championed in emerging economies through public policy debates. Several organisations are also pushing the frontiers, and promoting the concept (OECD, 2014; ADB, 2014; AfDB, 2015). It is aimed at income redistribution and poverty reduction. It is relevant in abating poverty via sustainable growth that is inclusive and spread across sectors. It is a disadvantage in reducing growth (Klasen, 2010). Commission on Growth and Development Growth Report (2008) described it to encompass employment transitions, market protection, equal access to opportunities, and equity while Ianchovichina and Lundstrom (2009) outlined infrastructure, geography, cost of capital, and employability as necessary in inclusive growth framework. It births sustainable growth which stimulates economic opportunities and ensures access to such opportunities, thereby spreading the benefits of growth (McKinley, 2010).

The role of foreign aid in sustained economic growth has been a course for debate since the 1960s. Incidentally, development economics captures foreign aid theories as part of general theories of growth (Panjak, 2005). It explains foreign aid as a logical development of various theories of growth. Several theories have tried to explain factors that drive economic growth. Notable among them are Harrod (1939)

and Domar (1946). This theory argued for a certain percentage of national income to be saved and invested to accelerate economic growth through capital accumulation. Thus, economic growth is seen to be endogenous rather than exogenous. Nonetheless, less developed countries are limited in various ways. They experience low-level income, extreme poverty, high population growth rate, high unemployment, etc. These features are sufficient to limit the capability of poor countries to save and invest. As a result, these countries are faced with a shortfall in domestic savings therefore slower growth rates persist. This is described as the saving gap theory which limits developing countries (Adelman et al, 1966; Levy, 1988; Moreira, 2005; Rotarou & Ueta, 2009). Foreign aid is seen to be effective in closing this gap (Albiman et al, 2014).

Besides the saving gap, Adelman et al, (1966) spotted additional constraints faced by developing countries. They argued that in addition to the saving gap, developing countries are also limited by both the foreign exchange gap and the human capital accumulation gap. The foreign exchange gap is otherwise termed the two-gap theory. The two-gap theory exerts that developing countries are constrained by the foreign exchange which limits their capability to import capital goods. That is, foreign currency obtained by developing countries from the export of primary goods is insufficient for the import of investment goods. The human capital accumulation gap on the other hand argued that developing countries are confronted with a scarcity of technological and necessary managerial skills essential for efficiently operating production activities. Thus, foreign capital (aid) and foreign technical aid bridge such gaps (Burke & Estafahami, 2006).

Lastly, Bacha (1990) and Taylor (1990) added the three-gap model. This model exerted that developing countries lack an efficient source of revenue necessary to operate public investment. This is otherwise termed fiscal deficit. This deficit can also be addressed via foreign aid. Thus, in general, these theories propose a strong argument that foreign aid contributes to economic growth in the receiving countries. Critics of aid rather argue against the motive of the donors. They argue that foreign donors extend aid to receiving countries in line with their political desire in the receiving countries. Foreign aid may be a political decision no doubt, nonetheless, its contribution to sustained growth and hence social-economic inclusion cannot be overemphasised.

Empirical review

A significant question that is yet to be addressed in the extant literature is how sectorial foreign aid drives inclusiveness in sub-Saharan Africa. Several studies have empirically investigated the determinants of inclusive growth in various regions of the world (Tella & Alimi, 2016; Jalles & Mello, 2019; Hidayat et al, 2020; Alekhina & Ganelli, 2021). These studies did not fail to identify the various socioeconomic, institutional, and macroeconomic factors that underpin inclusive growth. However, most of these studies employed GDP per person employed as a proxy for inclusive growth and did not strive to evaluate the extent of inclusiveness in various regions of the world.

On the nexus between inclusive growth and foreign aid, Nketiaa et al, (2021); Abate (2022) supported the notion that foreign aid does not support inclusive growth while Adamu (2013); Afolabi-Ibikunle et al, (2022); Asongu, & Nwachukwu (2017); Jena & Sethi (2019); Tefera & Odhiambo (2022) documented that foreign aid enhances inclusive growth. Rajan and Subramanian (2005) documented an inconclusive relationship between foreign aid and economic growth across periods regardless of the source of the aid and features of the receiving nation. Although, the role of foreign aid in enhancing inclusiveness seems inconclusive in the literature, specifically investigating the role of sectorial foreign aid in socioeconomic inclusion is critical to support the hypothesis that foreign aid enhances (or does not enhance) inclusive growth.

Tella and Alimi (2016); Jalles and Mello (2019); Satrio, Amar, and Aimon (2019); Oyinlola and Adedeji (2019) specifically showed that human capital accumulation, the redistributive potential of tax-benefit systems, increase in multifactor productivity, labour force participation, trade openness and institutional drives inclusive growth. Alekhina and Ganelli (2021) also concluded that fiscal redistribution, female

labour force participation, productivity growth, FDI inflows, digitalisation, and savings significantly determine inclusive growth in ASEAN countries.

Hidayat et al, (2020) revealed a positive impact of household consumption, export of goods and services, foreign investment, domestic investment, per capita income, and average year of study on inclusive growth and a negative impact of unemployment and imports of goods and services on inclusive growth. While Mir Jalili and Cheraghlou (2018) argued that GDP growth is important for inclusiveness, the study further revealed that inflation control, human capital improvement, investment, government consumption, and trade openness positively affect inclusive growth while the ratio of bank credits to GDP and foreign direct investment has negative effects on inclusion in Islamic countries. Ibukun and Aremo (2017) showed that education expenditure and government consumption negatively affect inclusive growth while initial capital, FDI inflow, and population growth spur inclusive growth in Nigeria.

Khan, Khan, Safdar, Munir, and Andleeb (2016); Munir and Ullah (2018) further revealed that macroeconomic stability, financial deepening, external sector, and structural changes are necessary to achieve inclusiveness. Nketiaa et al, (2021) exerted that income inequality and foreign aid have a negative influence on inclusive growth while institutional quality positively influences inclusive growth. On the contrary, Afolabi-Ibikunle et al, (2022) reported that foreign aid and FDI have a positive and significant effect on inclusive growth in middle-lower-income West African countries. The outcome of foreign aid on inclusiveness may not be distant from the measure of inclusive growth adopted. Scholars have argued that the robustness of the proxy adopted for inclusive growth influences the outcome of the nexus between inclusive growth and other variables.

Gaps in the literature

To the extent of the above review, various studies have investigated the determinants of inclusive growth in sub-Saharan Africa and the world at large. Specifically, several studies have considered the influence of foreign aid on economic growth while limited studies have considered the influence of foreign aid on inclusive growth in sub-Saharan Africa. Exclusive study on the extent of inclusive growth in the world and by extension sub-Saharan Africa is limited. To achieve inclusive growth, growth must be broad-based and equitable (Berg & Ostry, 2017; (Mir Jalili & Cheraghlou, 2018). Incidentally, most determinants of growth established in the literature such as education, openness, and financial depth are associated with higher inequality (Barro & Lee 2001; Dollar & Kraay 2002; Levine 2005).

The extent of inclusion in an economy could be the missing link in the ability of growth to abate income inequality and poverty. Also, studies have considered the various socioeconomic determinants of inclusive growth and limited studies have investigated the role of foreign aid and the extent of inclusiveness in sub-Saharan Africa. Nketiaa et al, (2021) and Afolabi-Ibikunle et al, (2022) have investigated the nexus between foreign aid and inclusive growth. They employed GDP per person employed as a proxy for inclusiveness and also limited their studies to the aggregate net ODA. This study adopts a robust measure for inclusive growth and also contributes to the literature by investigating the influence of foreign aid on different sectors of the economy on inclusive growth in sub-Saharan Africa.

Methodology

Data

Following ADB (2011, 2014) the Framework for Inclusive Growth Index (FIGI) was used to construct an index for inclusive growth to evaluate the extent of inclusive growth in sub-Saharan Africa. FIGI identified three pillars of inclusive growth which are high, efficient, and sustained growth; social inclusion; and social safety nets (ADB, 2011, 2014). High, efficient, and sustained growth seeks the possibility of accessing productive jobs and economic opportunities, social inclusion seeks to achieve equal access to economic opportunity while social safety nets seek to ensure the protection of the underprivileged and vulnerable groups from various life risks and shocks such as transitory livelihood and health shocks (ADB, 2011). Added to the aforementioned pillars, the study further adopts institutions as the fourth pillar. Institutions

play a crucial role in achieving inclusiveness (Tebaldi & Mohan, 2010; Olanrewaju, Tella & Adesoye, 2019; Gyamfi et al, 2019; Botchuin, 2021). Institutions ensure economic opportunities are evenly distributed, but lack of it hinders inclusiveness which births significant disparities that affect the appropriation of benefits of economic progress (Klasen, 2010).

The FIGI approach accommodates various indicators sufficient to generate an index for inclusive growth. However, data availability hinders the possibility of estimating an index with the proposed 35 indicators as conceptualised in the FIGI framework. An empirical study on Asia by ADB could only boast of about 57 per cent of the variables (Gyamfi et al, 2019). Consequently, this study adopts nine (9) indicators across the various policy pillars as proposed by FIGI due to data availability. Productive jobs and economic opportunities are captured by employment to population ratio (15-24) total per cent (%) and GDP per person employed (annual %) (ADB, 2011, 2014; Raheem et al., 2016; Oyinlola & Adedeji, 2017; Ibukun & Aremo, 2017; Mitra & Das, 2018; Oyinlola et al, 2019; Gyamfi et al, 2019). Social inclusion is proxied by access to electricity (% of the population), the female-male ratio of labour force participation rate per cent (%), and the pupil-to-teacher ratio (primary) (ADB, 2011, 2014; Mitra & Das, 2018; Gyamfi et al, 2019) while the social safety net will be proxied by domestic general government health expenditure (ADB, 2011, 2014; Mitra & Das, 2018). Institutions are proxied by government effectiveness, and control of corruption (ADB, 2011, 2014; Asongu & Kodila-Tedika, 2018; Mitra & Das, 2018; Oyinlola, Adedeji, Bolarinwa & Olabisi, 2019; Gyamfi et al, 2019). Since economic growth is considered a benchmark and an important factor for measuring inclusive growth, the growth rate of GDP per capita (annual %) is added to the variables.

Thus, the study generated a robust index for inclusive growth using the Principal Component Analysis (PCA). Indicators representing the various pillars of inclusive growth as proposed by ADB (2011; 2014) FIGI were employed for both sub-Saharan Africa and other regions of the world. The ADB's FIGI approach is considered one of the best frameworks for estimating an inclusive growth index (Anand et al., 2013; Gyamfi et al, 2019). This study adopts the strategy of Mesagan and Adenuga (2019) and Lenka and Barik (2018) to compute an index for inclusive growth with necessary modifications. The model is presented thus;

$$IG_j = w_{j1}X_1 + w_{j2}X_2 + w_{j3}X_{j3} + \ldots\ldots\ldots\ldots + w_{jp}X_p \quad (1)$$

Where IG is the inclusive growth, w_j is the weight on the factor score coefficient, X is the original value of the components, and p is the number of variables in the equation.

Specifically, from the foregoing, equation 1 is transformed into the following equation.

$$IGROWTH_{it} = w_1 EMPR_{it} + w_2 EMPL_{it} + w_3 GDPG_{it} + w_4 SSN_{it} + w_5 ELE_{it} + w_6 PTR_{it} + w_7 GDR_{it} + w_8 CC_{it} + w_9 GE_{it} \quad (2)$$

Where IGROWTH is the inclusive growth, w_j where j is between 1 and 10 is the weight on the factor score coefficient. EMPR, EMPL, GDPG, SSN, ELE, PTR, GDR, CC, and GE are respectively employment to population ratio, GDP per person employed, GDP per capita growth rate, domestic general government health expenditure, access to electricity, pupil-to-teacher ratio, the female-male ratio of labour force participation rate, control of corruption, and government effectiveness. The resultant error of aggregation is corrected by taking the logs of the adopted proxies (Asteriou & Hall, 2007; Raheem et al, 2016).

Institutions as captured by Kaufmann, Kraay, and Mastruzzi (2010) range from -2.5 to +2.5. The closer the value to +2.5, the stronger the institution while the closer value to -2.5 indicates weaker institutions. Since most countries in sub-Saharan Africa are known for weak institutions, the study follows Delavallade (2006), Adedokun (2017), and Ajide (2021) to rescale institutions to range between 0 and 10 as against -2.5 to +2.5. This is necessary to avoid issues of missing data when the variables are logged. Also, this study in line with the World Bank Atlas method year 2020 GNI per capita classifies sub-Saharan Africa into income clusters such as high and middle-upper-income, middle-lower-income, and low-income sub-Saharan Africa. Due to

data availability, thirty-seven (37) sub-Saharan African countries are considered in the study. The limited number of countries available in both the high-income and middle-upper-income clusters necessitated the merger of both groups. Also, countries of other regions of the world selected in the study are mainly based on data availability. The list of countries for each income group and other regions of the world is listed at the back of this paper.

Variables employed to generate an index for inclusive growth were sourced from both the World Bank Development Indicators (WDI, 2022) database. Also, due to data availability, this study adopted five (5) of the eight (8) sectoral foreign aid to sub-Saharan Africa. This is contrary to previous studies which adopted net foreign ODA (Nketiaa et al, 2021; Ibikunle, et al, 2022). The data on sectoral foreign aid were sourced from the Organisation of Economic Co-operation and Development (OECD, 2022) database. Following Yiew & Lau (2018) and Amponsah et al (2021), this study adopted foreign direct investment (FDI) and population (POPN) as control variables. The data for both FDI and POPN were sourced from the World Bank Development Indicators (WDI, 2022) database. The selected sectoral foreign aid and the control variables are presented in Table (1) along with their definition and sources.

Table 1: Variable measurement and source

Variable	Definition	Sources
Aid to social infrastructure (SINFR)	Foreign aid aimed at driving human development such as education, water supply, and sanitation	OECD, 2022
Aid to economic infrastructure (EINFR)	Foreign aid aimed at infrastructures like transport, communication, and energy	OECD, 2022
Aid to the productive sector (PSEC)	Foreign aid that is aimed at a productive sector like agriculture, industry, mining, construction, trade, and tourism	OECD, 2022
Aid to the multi-sector (MSEC)	Foreign aid aimed at other sectorial development like rural development	OECD, 2022
Aids to unspecified sector	Foreign aid aimed at unspecified sectors	OECD, 2022
Foreign Direct Investment (FDI)	Net FDI inflows (% of GDP)	WDI, 2022
Population (POPN)	Population, total	WDI, 2022

Source: Authors' computation, 2022.

Empirical model and estimation technique

Foreign aid helps in closing the saving gap, the exchange rate gap, the human capital gap, and the revenue gap (Albiman et al, 2014; Abate, 2022). Closure of these gaps helps sustained growth and enhances inclusiveness. Thus, this study draws from these theories and relays foreign aid to various sectors to inclusiveness in sub-Saharan Africa. To this end, the empirical construct of Asongu and Nwachukwu (2017), Raheem, Isah & Adedeji (2018), and Afolabi-Ibikunle et al (2022) are modified to determine the empirical effect of sectoral foreign aid on inclusive growth in sub-Saharan Africa. The study, therefore, adopts the hypothesis that foreign aid to different sectors individually at a given time impacts inclusion such that inclusive growth (IGROWTH) is expressed as a linear function of foreign aid to different sectors and a vector of control variables. That is,

$$IGROWTH_{it} = f(SINFR_{it}, EINFR_{it}, PSEC_{it}, MSEC_{it}, UNALLO_{it}, FDI_{it}, POPN_{it}) \quad (3)$$

Where $SINFR_{it}$ is an aid to social infrastructure, $EINFR_{it}$ is an aid to economic infrastructure, $PSEC_{it}$ is an aid to the productive sector, $MSEC_{it}$ is an aid to multi-sector, $UNALLO_{it}$ is unallocated aid, FDI_{it} is a foreign direct investment (net FDI inflow, % GDP), $POPN_{it}$ is population (total). $IGROWTH_{it}$ is the dependent variable, which is generated with the ADB (2010, 2014) Framework for Inclusive Growth Index (FIGI) to capture the extent of inclusiveness in various economies.

Re-specifying equation (1), we have;

$$IGROWTH_{it} = \beta_0 + \beta_1 SINFR_{it} + \beta_2 EINFR_{it} + \beta_3 PSEC_{it} + \beta_4 MSEC_{it} + \beta_5 UNALLO_{it} + \beta_6 FDI_{it} + \beta_7 POPN_{it} + \varepsilon_{it} \quad (4)$$

Where β_0 is the constant term, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6,$ and β_7 are the regression parameters. ε_{it} is the error term. The number of countries ranges from i = 1, ..., N while t = 1, …, T. Apriori expectations are that $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0,$ and $\beta_7 < 0$.

Though this study aims to investigate sectoral foreign aid on inclusiveness in sub-Saharan Africa, other control variables are added as supported by Asongu and Nwachukwu (2017). The control variables include both FDI and population.

Subsequently, an instrumental variable estimator nested within the IV-GMM Framework by Baum et al, (2010) is adopted to estimate equation (4). IV-GMM accounts for dependence amongst cross-sections, endogeneity, autocorrelation, and heteroscedasticity amongst the series (Philips & Hansen, 1990; Baum et al, 2010; Carvalho et al, 2016). Thus, the study adopts the two-step IV-GMM. Also, IV-GMM addresses the weak instrument problem associated with panel data estimation. This study further employs Driscoll and Kraay estimator for robustness. Using this estimator implies that the estimated parameters can be interpreted as causal relationships. The study also employed the method of moment quantile regression by Machado and Silva (2019) on the assumption that the dependent variable is not normally distributed such that the regressors impart changes along its conditional distribution. The quantile regression model is a defined solution to minimise the equation for the Q_τ regression quantile, $0 < Q_\tau < 1$ and it is thus expressed as;

$$Q_\tau = arg\min_{Q_\tau} \sum_{k=1}^{q} \sum_{t=1}^{T} \sum_{i=1}^{N} (|y_{it} - \alpha_i - x'_{it} Q_\tau| w_{it}) \quad (5)$$

$q, T, N,$ and w_{it} stand for the number of quantiles, years, cross-sections, and weight of the ith country in the tth year respectively.

Empirical Results and Discussion

Summary statistics and correlation analysis

Table 2 explores the historical features of variables and as well presents a correlation among variables of interest. The descriptive statistics show that Botswana recorded the highest rate of inclusiveness in 2005 while the Congo Democratic Republic shows the lowest rate of inclusion in 2019. The standard deviation of 0.78 indicated that countries in the sample are widely dispersed from the mean. Nigeria recorded the highest social infrastructure foreign aid in 2018 while Eswatini 2005 recorded the lowest foreign aid on social infrastructure to sub-Saharan Africa. Tanzania showed the highest value of economic infrastructure in 2008 while Chad 2016 recorded the lowest value for economic infrastructure. Ethiopia recorded the highest value for aid to the productive sector in 2018 while Comoros recorded the lowest value in 2008. For foreign aid to other sectoral development, Cote d'Ivoire recorded the highest value in 2019 while Comoros recorded the lowest value in 2005. Cote d'Ivoire recorded the highest value for unspecified aid to sub-Saharan Africa in 2014 while Lesotho recorded the lowest value in 2017.

The correlation matrix indicates the degree of correlation among the series. The results show that all the explanatory and control variables exhibit a positive association with inclusive growth except foreign aid to social infrastructure and unallocated foreign aid. All the variables show a moderate association between them hence, no serious threat of multicollinearity amongst the variables.

Table 2: Descriptive statistics and correlation matrix analysis

	$IGROWTH_{it}$	$SINFR_{it}$	$EINFR_{it}$	$PSEC_{it}$	$MSEC_{it}$	$UNALLO_{it}$	FDI_{it}	$POPN_{it}$
Observation	592	592	592	592	592	592	592	592
Mean	-0.469633	258.8752	64.58809	41.71601	29.69242	13.3308	4.5940	22418910
Std dev	0.780523	282.0446	118.4883	59.06818	40.42612	29.2038	8.7633	32626034
Minimum	-2.078372	2.700000	0,00000	0.020000	0.020000	0.00000	-11.198	463034.0
Maximum	1.376276	1269.100	928.070	371.2900	404.9100	301.520	103.337	206E+08
Correlation analysis								
$IGROWTH_{it}$	1.0000							
$SINFR_{it}$	-0.0448	1.0000						
$EINFR_{it}$	0.0798	0.5762	1.0000					
$PSECT_{it}$	0.0331	0.6232	0.5236	1.0000				
$MSEC_{it}$	0.0477	0.5820	0.5462	0.5485	1.0000			
$UNALL_{it}O$	-0.0427	0.2064	0.2105	0.1530	0.1984	1.0000		
FDI_{it}	0.0200	-0.0226	0.0363	-0.0316	-0.0418	-0.0410	1.0000	
$POPN_{it}$	-0.2077	0.6907	0.3474	0.4244	0.3748	0.1850	-0.1101	1.0000

Source: Authors' computation, 2022

Estimation Results

The extent of inclusive growth in sub-Saharan Africa and other regions of the world

In most sub-Saharan African countries, the extent of inclusive growth was negative and declining within the period covered in this study (see Figure 4). On average, the extent of inclusive growth in sub-Saharan Africa was -0.46 with most countries in the sub-region recording below the average value except for countries in the high and middle-upper-income cluster. For instance, the extent of inclusive growth in high and middle-upper-income sub-Saharan Africa declined from 0.67 to 0.43 between 2000 and 2019 (see figure 5). This was due to the declining rates recorded by most countries in the income cluster within the years under consideration. Though the extent of inclusive growth in all countries in the income cluster except Gabon was positive, the income cluster like other income clusters suffered a declining rate of inclusiveness (see figure 6). This simply indicates that available opportunities in these countries were not evenly distributed. Mauritius for instance marginally declined from 0.76 in 2000 to 0.70 in 2019. Botswana, Gabon, and Namibia also took a downward path from 1.13, -0.47, and 0.93 in 2000 to 1.04, -0.82, and 0.75 in 2019 respectively. South Africa as well experienced a similar case by recording a decline from 0.97 in 2000 to 0.48 in 2019.

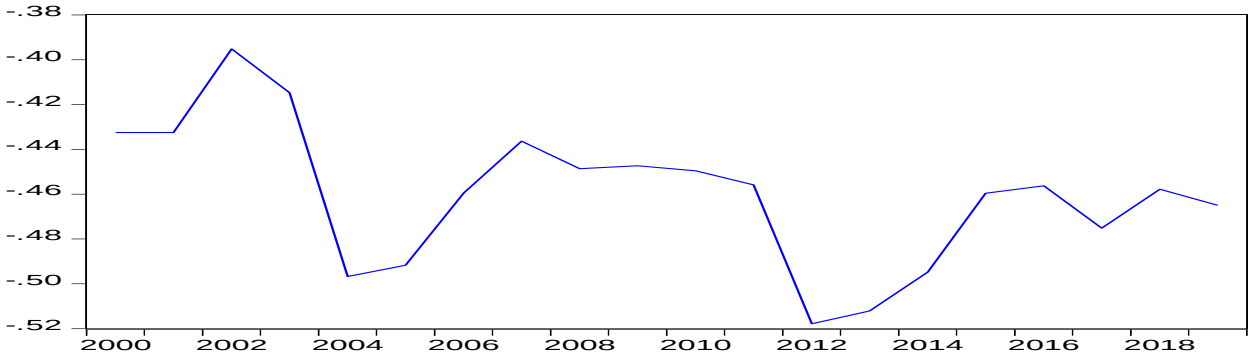


Figure 4: Average inclusive growth in sub-Saharan Africa.
Source: Authors' 2022.

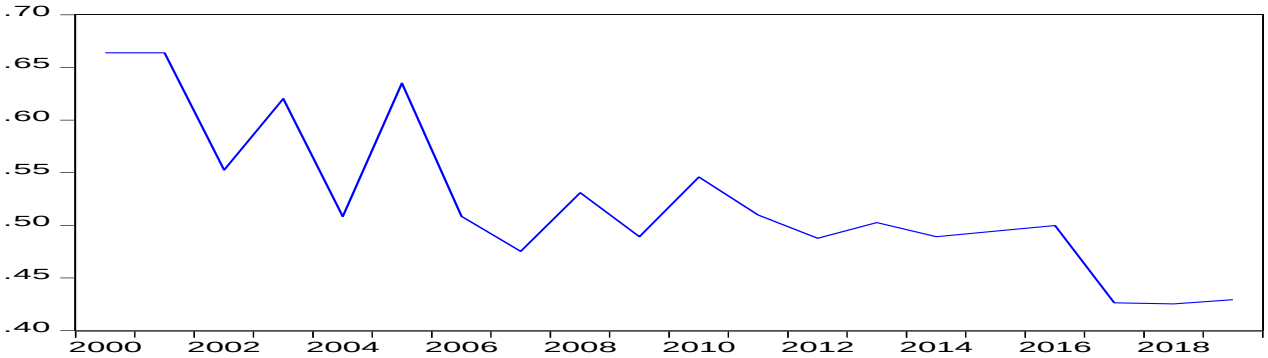


Figure 5: Average inclusive growth rate in high and middle-upper sub-Saharan African countries.
Source: Authors' 2022.

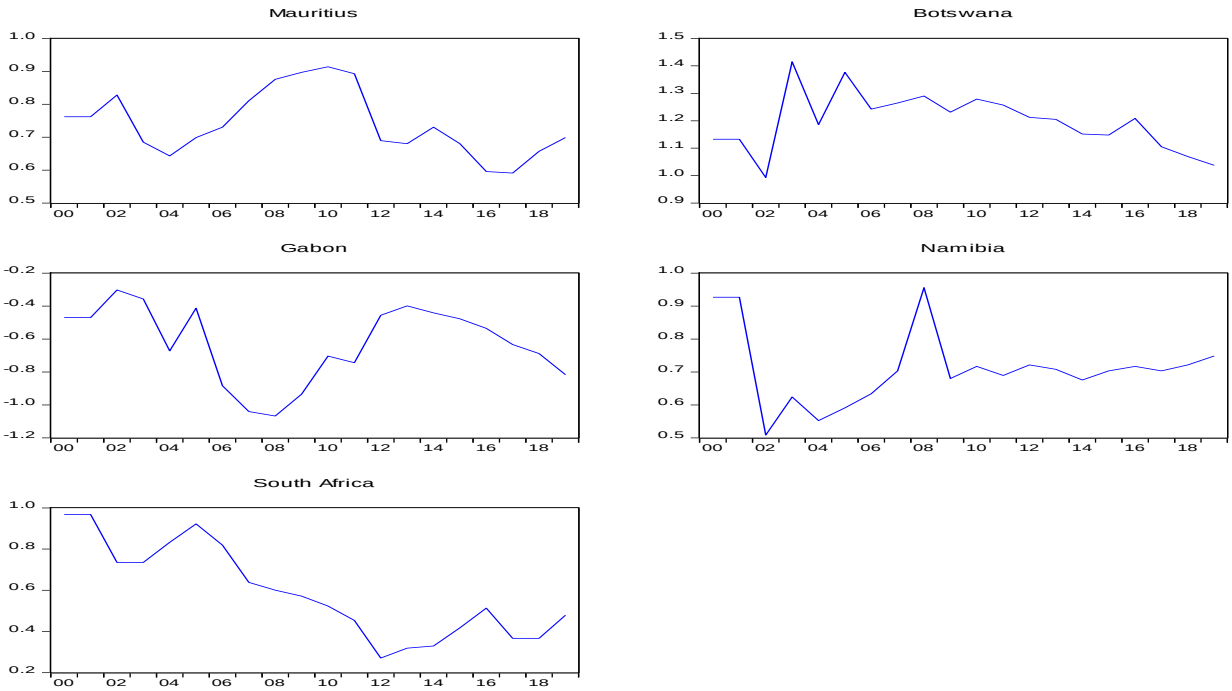


Figure 6: Inclusive growth in high and middle-upper-income sub-Saharan Africa.
Source: Authors' 2022.

Relative to high-income countries in some other regions, the extent of inclusive growth in Western Europe and Germany also declined but marginally between 2000 and 2019 from 1.74 to 1.72 (see Figure 7). Comparatively, this is quite higher relative to the extent of inclusiveness recorded for the panel of high and middle-upper-income sub-Saharan Africa and sub-Saharan Africa as a whole whose value declined from -0.43 in 2000 to -0.47 in 2019. In the same vein, high-income countries in Western Europe and Germany also performed better relative to their counterparts in sub-Saharan Africa. Belgium, Ireland, Luxembourg, and Germany improved from 1.61, 1.56, 1.94, and 1.83 to 1.63, 1.58, 1.97, and 1.85 between 2000 and 2019, respectively (see Figure 8). The United States and Canada are also economies with high-income status. Both countries recorded a rising trend of inclusive growth between 2000 and 2019 (see Figure 10). The average inclusive growth rate between the two countries rose from -0.07 to 0.07 (see Figure 9).

Specifically, the United States made huge progress within the period under study, rising from 0.88 in 2000 to 1.07 in 2019 while Canada, though still in the negative region also made progress rising from -1.01 to -

0.93 between 2000 and 2019 (see Figure 10). Likewise, the East Asia region, captured by selected countries such as China, Japan, South Korea, and Mongolia recorded average figures of 0.59 to 0.65 between the periods under study (see Figure 11). The values compared to what was recorded in sub-Saharan Africa under the same study period are high and commendable. It was not only high but rising which indicated a relatively more inclusive growth in the East Asia region although lesser than when it is compared to countries in Western Europe. Japan and South Korea both recorded rising inclusive growths, from 1.46 and 0.71 to 1.59 and 1.07 between 2000 and 2019 respectively (see Figure 12). On the other hand, China and Mongolia both recorded declining rates in the period under review (see Figure 12). China dropped from 0.16 to 0.03 while Mongolia also recorded a downward trend from 0.05 to -0.11 between 2000 and 2019.

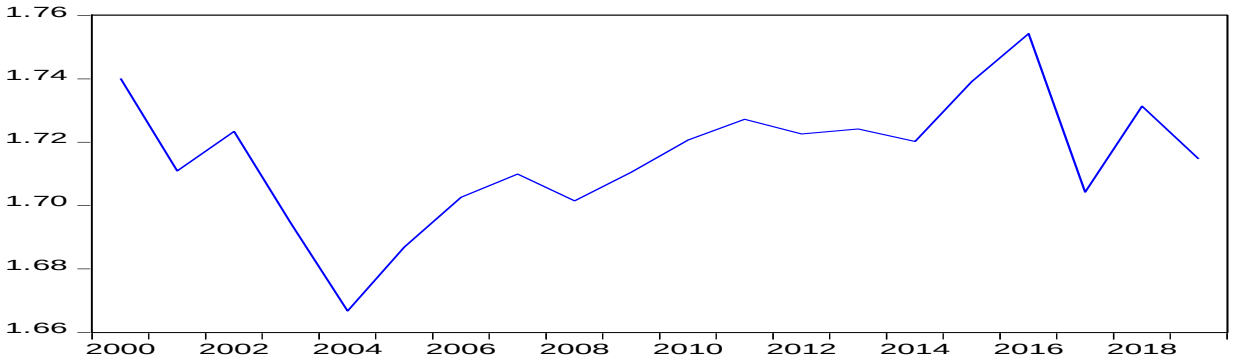


Figure 7: Average Inclusive growth in Western Europe and Germany.
Source: Authors' 2022.

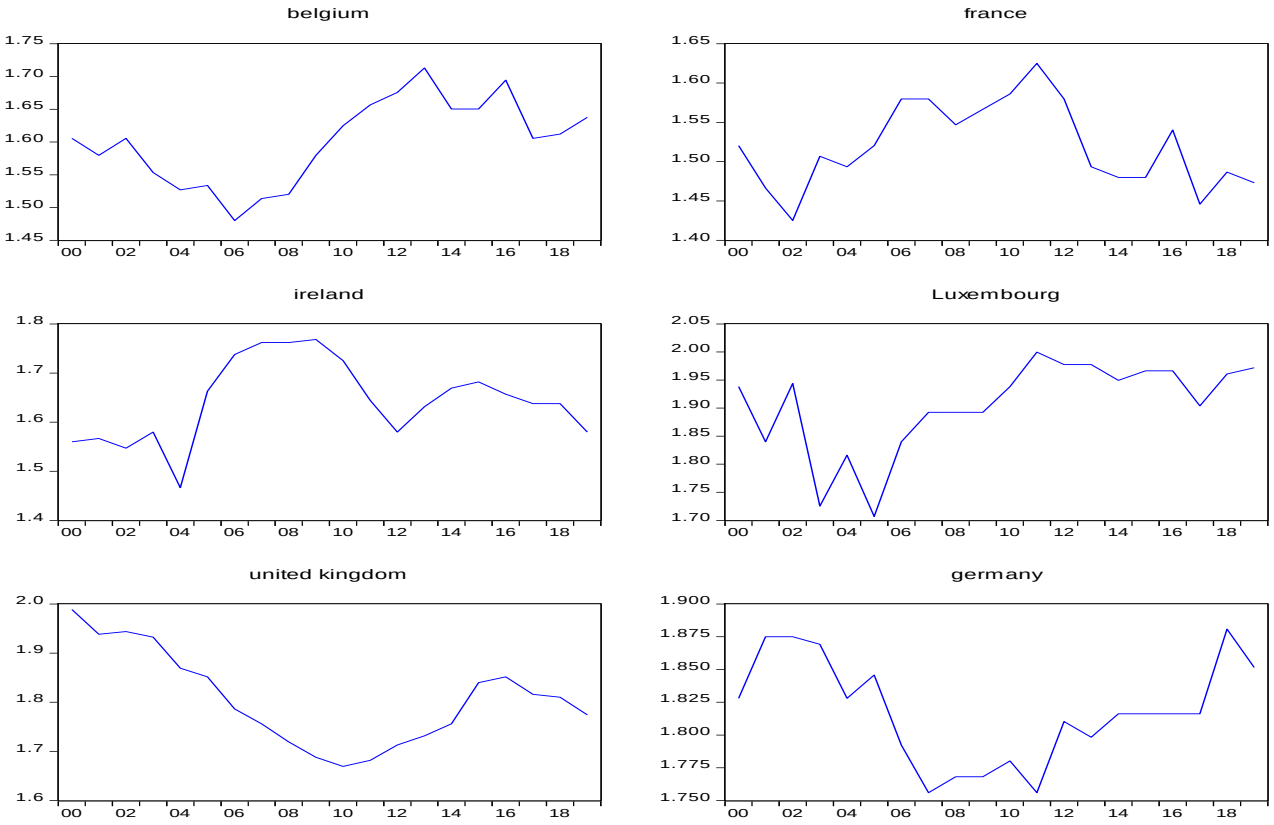


Figure 8: Inclusive growth in Western European countries and Germany.

Source: Authors' 2022.

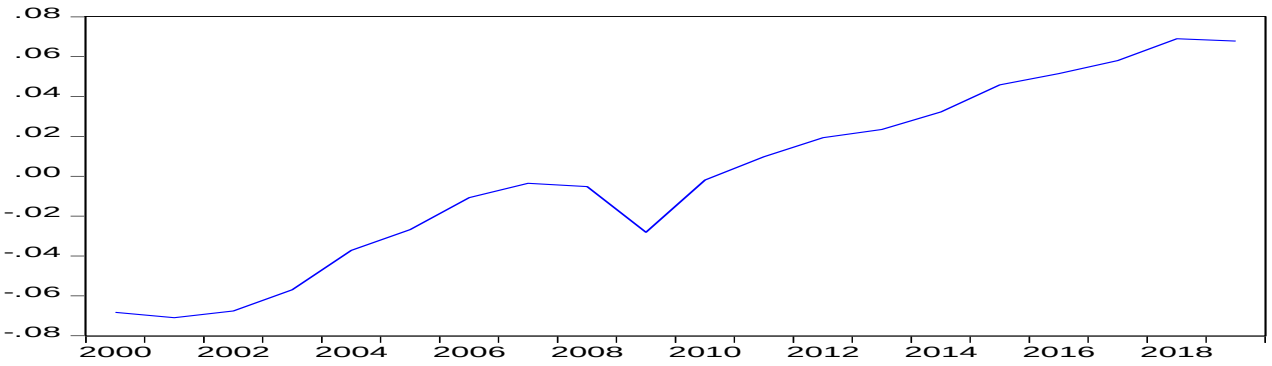


Figure 9: Average Inclusive growth in the United States and Canada.
Source: Source: Authors' 2022.

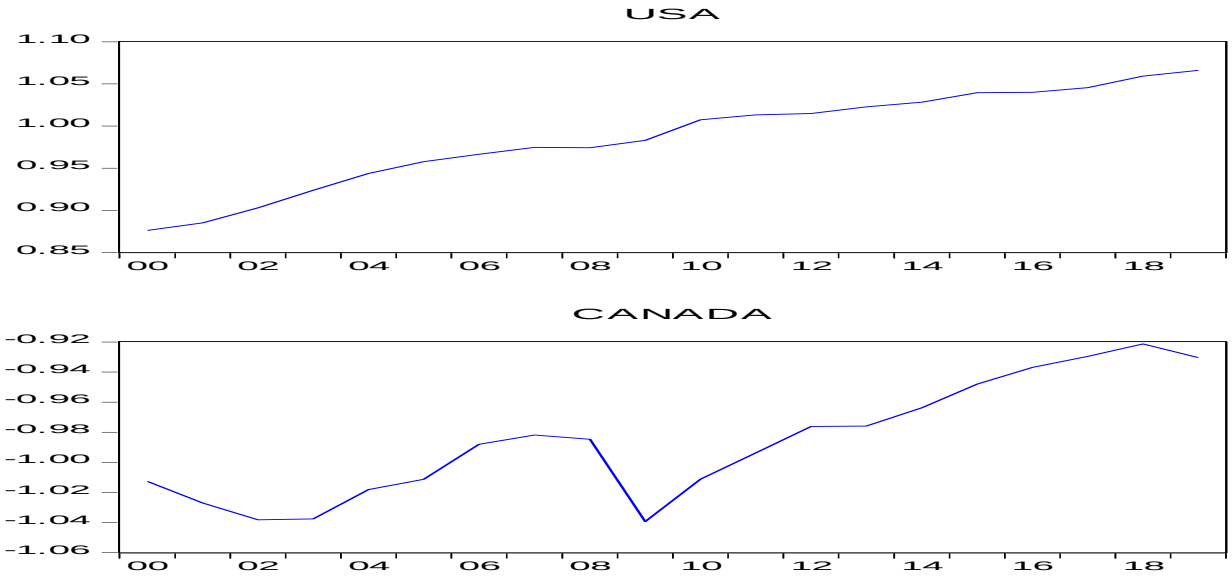


Figure 10: Inclusive growth in the United States and Canada.
Source: Source: Authors' 2022.

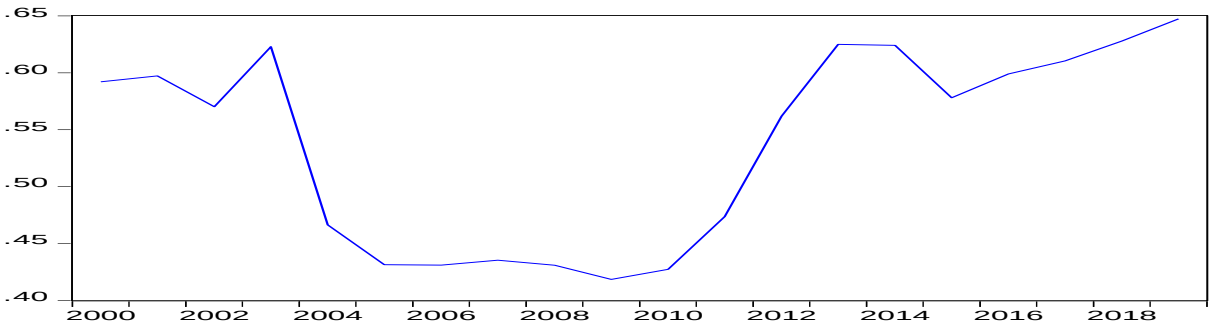


Figure 11: Average inclusive growth in East Asia.
Source: Source: Authors' 2022.

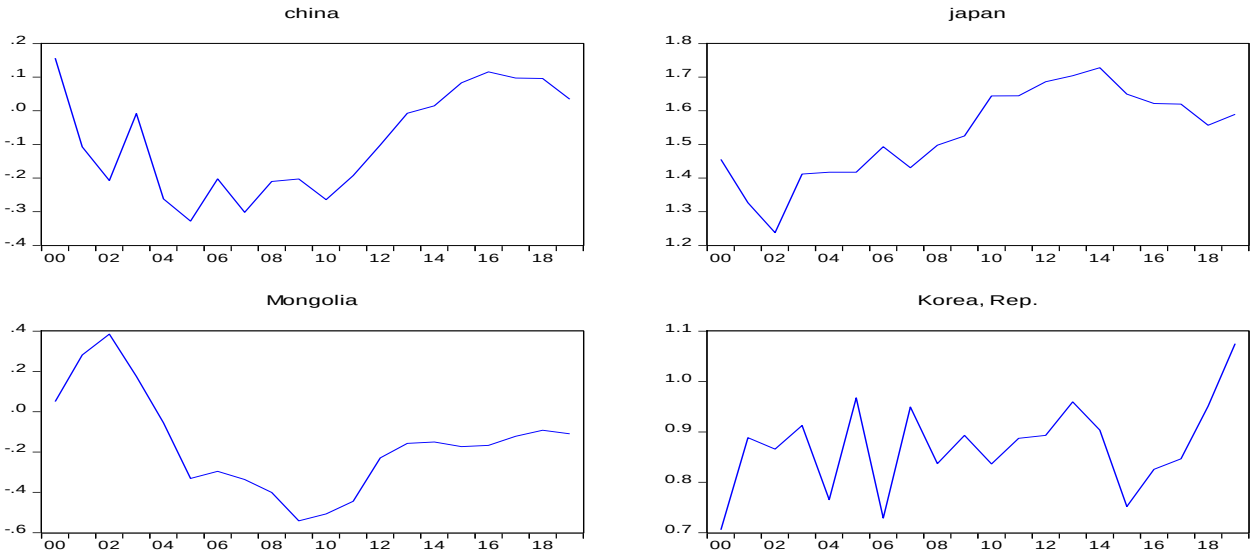


Figure 12: inclusive growth in East Asian countries.
Source: Source: Authors' 2022.

Incidentally, middle-lower income sub-Saharan African countries recorded a marginal improvement in inclusive growth. On average, the extent of inclusive growth rose marginally from -0.50 to -0.43 between 2000 and 2019 (see Figure 13). This could be due to inclusive policies implemented in such economies. Specifically, Angola, Benin, Carbo Verde, Comoros, Cote d'Ivoire, Eswatini, Ghana, Kenya, Nigeria, Senegal and Tanzania all recorded a marginal improvement in their inclusiveness (see Figure 14). Angola progressed from -2.04 to -1.02 between 2000 and 2019. Benin, Carbo Verde, Comoros, Cote d'Ivoire and Eswatini as well recorded rising rates from -0.15, 0.97, -1.11, -0.43 and 0.19 in 2000 to 0.03, 1.16, -0.96, -0.22 and -0.17 in 2019 respectively. The likes of Ghana, Kenya, Nigeria, Senegal and Tanzania as well progressed marginally from 0.29, -1.02, -1.34, 0.31 and -0.61 in 2000 to 0.31, -0.57, -1.10, 0.44 and -0.05 in 2019 respectively. Olarenwaju, Tella and Adesoye (2019) argued that the quality of institutions in Nigeria seems to be a dominant driving force behind inclusive growth in Nigeria. Hence, they argued for institutional improvement beyond the present liberal-democratic threshold.

On the contrary, Cameroun, Congo Republic, Lesotho, Mauritania, and Zimbabwe all experienced a declining trend. Cameroun rates declined from -1.28 in 2000 to -1.32 in 2019. Congo Republic, Lesotho, and Mauritania rates also declined from -1.14, 0.39, -0.13 in 2000 to -1.95, 0.37, -0.70 in 2019 respectively. Zimbabwe also declined from -0.89 in 2000 to -.1.38 in 2019, respectively. The extent of inclusiveness in most countries in the panel of middle-lower income group hovered in the negative region except for countries like Benin, Carbo Verde, Ghana, Lesotho and Senegal which had positive but low values relative to other regions. These further buttressed the fact that only a few nations of the world were recording a decent rate of inclusiveness (Anand, Mishra & Peiris, 2013).

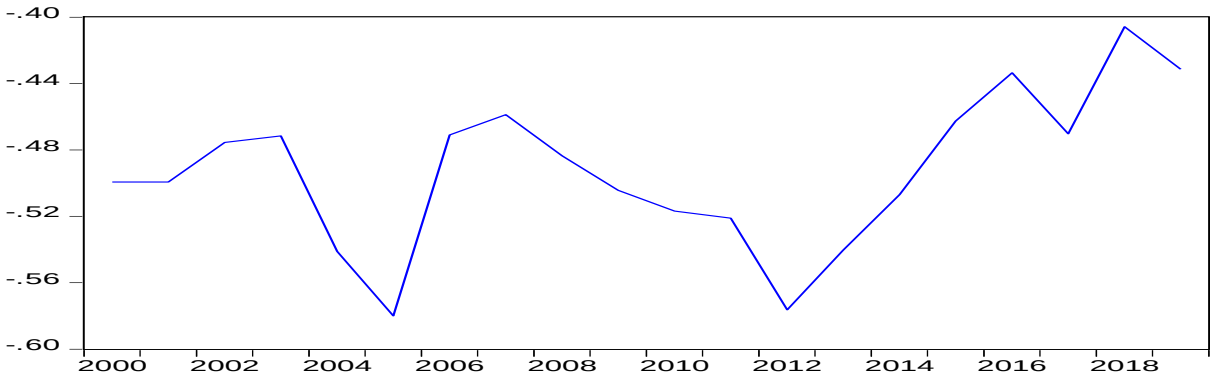


Figure 13: Average inclusive growth in middle-lower income sub-Saharan Africa.
Source: Source: Authors' 2022.

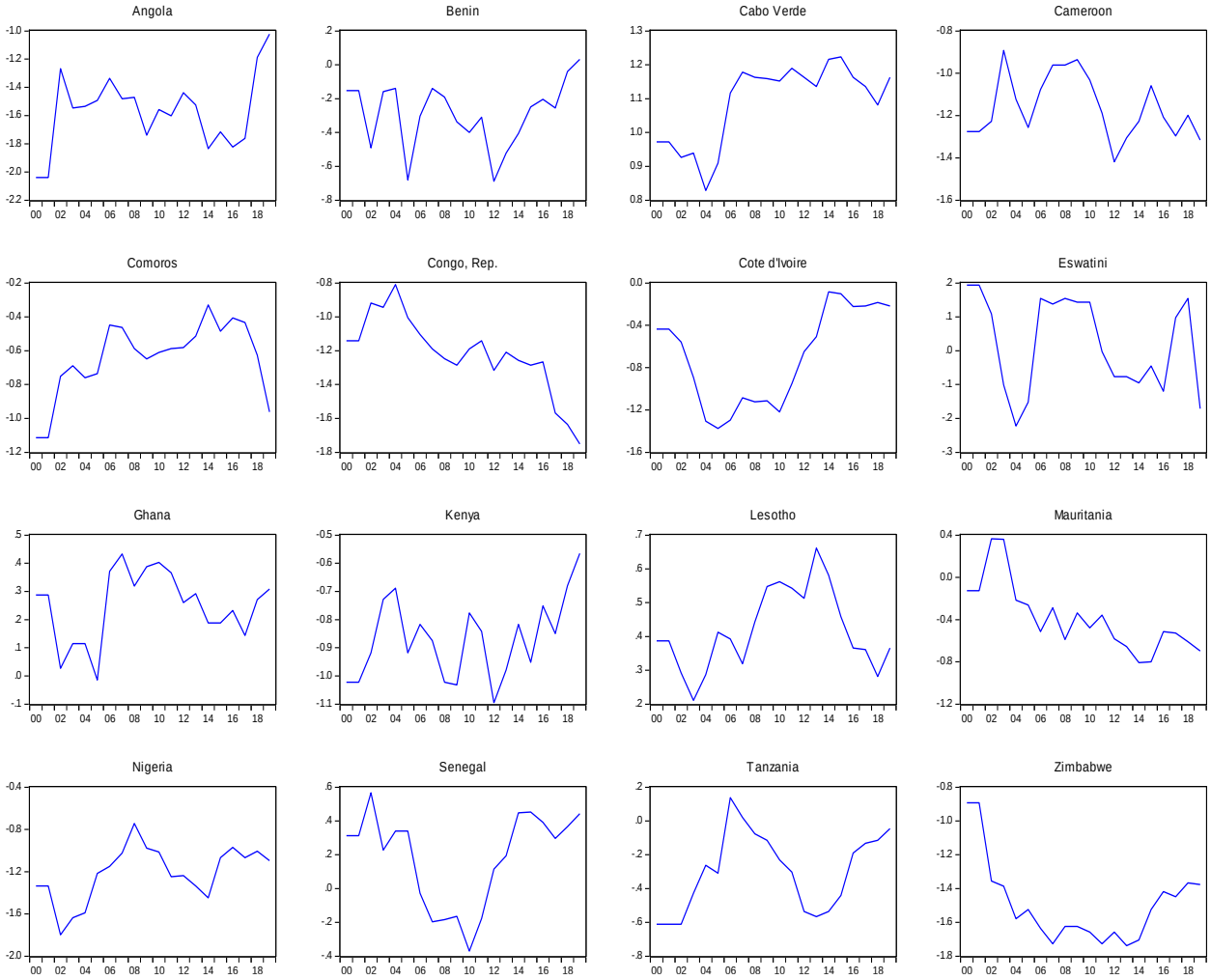


Figure 14: Inclusive growth in middle-lower income sub-Saharan African countries.
Source: Source: Authors' 2022.

Comparatively, the extent of inclusive growth in Middle East North Africa (MENA) dipped marginally from 0.35 to 0.32 between 2000 and 2019 (see Figure 15). This is quite high relative to the extent of inclusiveness recorded for the panel of middle-lower-income sub-Saharan African countries (-0.50 in 2000

and -0.43 in 2019) and sub-Saharan Africa as a whole (-0.43 in 2000 and -0.47 in 2019). Individual countries considered in this region included Algeria, Bahrain, Egypt, Iran, Israel, Kuwait, Morocco, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates due to data availability. Of these countries, Algeria, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates recorded an upward trend (see Figure 16). These countries progressed from -0.82, 0.89, 0.19, 0.14 and 0.51 in 2000 to -0.35, 1.15, 0.66, 0.31 and 1.34 in 2019 respectively. On the other side, Bahrain, Egypt, Iran, Israel, Kuwait, and Morocco rates declined to 0.38, -0.41, -1.01, 1.11, 0.25, and 0.09 in 2019 from 0.76, -0.25, -0.06, 1.30, 0.94, and 0.28 as at year 2000 respectively. Incidentally, most of the economies in this region enjoyed a low but positive rate of inclusion relative to sub-Saharan Africa.

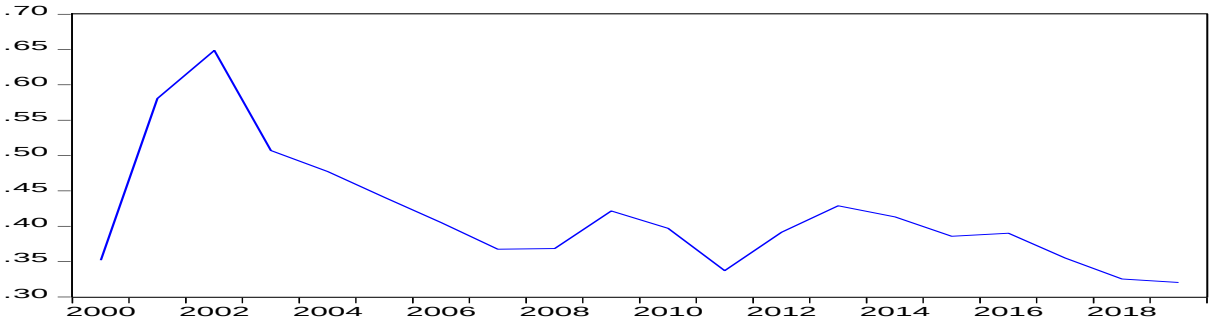


Figure 15: Average inclusive growth in Middle East North Africa (MENA).
Source: Source: Authors' 2022.

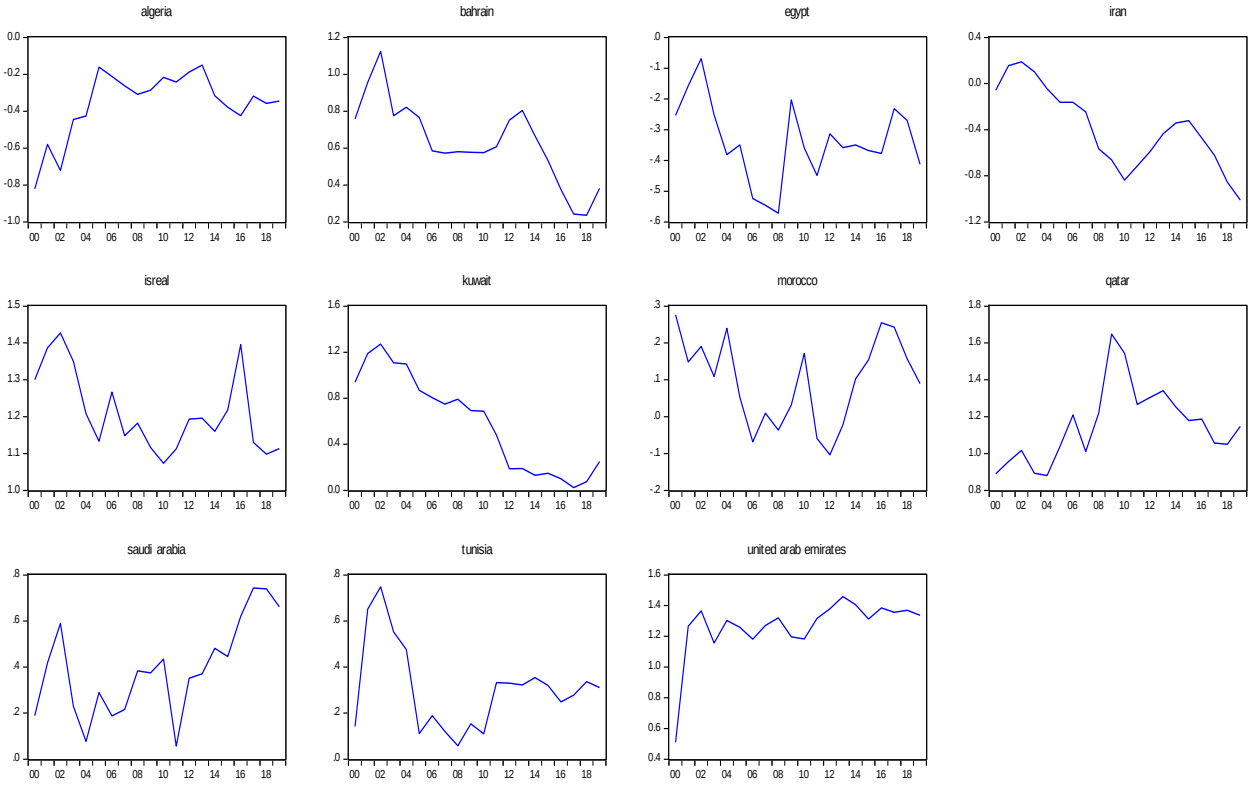


Figure 16: inclusive growth in Middle East North Africa (MENA) countries.
Source: Source: Authors' 2022.

Furthermore, the extent of inclusive growth in the panel of low-income sub-Saharan African countries on average declined from -0.71 in 2000 to -0.78 in 2019 (see Figure 17). The extent of inclusive growth in this income cluster except for Burkina Faso and The Gambia hovers in the negative region. Relative to other income clusters, the high and middle-upper income cluster (with an average of 0.67 in 2000 and 0.43 in 2019) and the-middle lower income cluster (with an average of -0.50 in 2000 and -0.43 in 2019) could boast of more inclusion than the low-income sub-Saharan countries. This did not negate the fact that only a marginal difference separated the extent of inclusiveness in low-income sub-Saharan Africa and middle-lower income sub-Saharan Africa. The extent of inclusion in most countries in both clusters was below the average of -0.45 for sub-Saharan Africa.

Specifically, the extent of inclusive growth in Burkina Faso, Burundi, Central African Republic, Chad, Madagascar, Mozambique and Uganda plummeted over the period considered in the study (see figure 4.8). These countries dipped from 0.32, -0.61, -1.25, -1.11, -0.12, -0.09 and -0.72 in year 2000 to 0.19, -1.87, -1.36, -1.77, -0.94, -0.60, and -1.23 in year 2019 respectively. On the contrary, Congo Democratic Republic, Ethiopia, The Gambia, Guinea, Liberia, Mali, Niger, Sierra Leone, and Togo progressed marginally (see Figure 18). The Congo Democratic Republic progressed marginally from -2.11 in 2000 to -2.08 in 2019. Ethiopia, Gambia, Guinea, Liberia and Mali also progressed from -0.12, -0.04, -0.84, -1.96, and -0.66 to -0.06, 0.08, -0.77, -0.73 and -0.45 in 2019 respectively. Niger Republic, Sierra Leone, and Togo also rose from -0.73, -0.74 and -0.54 to -0.26, -0.07 and -0.53 between 2000 and 2019 respectively. As earlier indicated, most countries in the panel of low-income sub-Saharan Africa hovered in the negative axis.

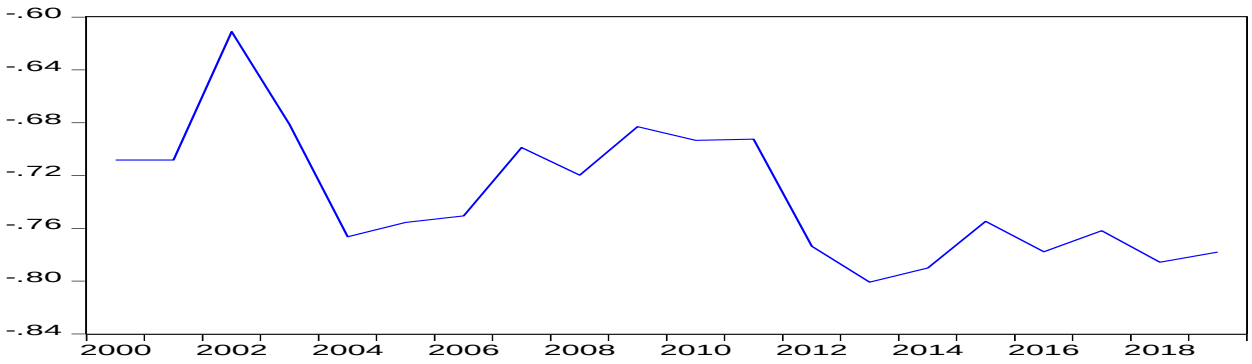


Figure 17: Average inclusive growth in low-income sub-Saharan Africa.
Source: Source: Authors' 2022.

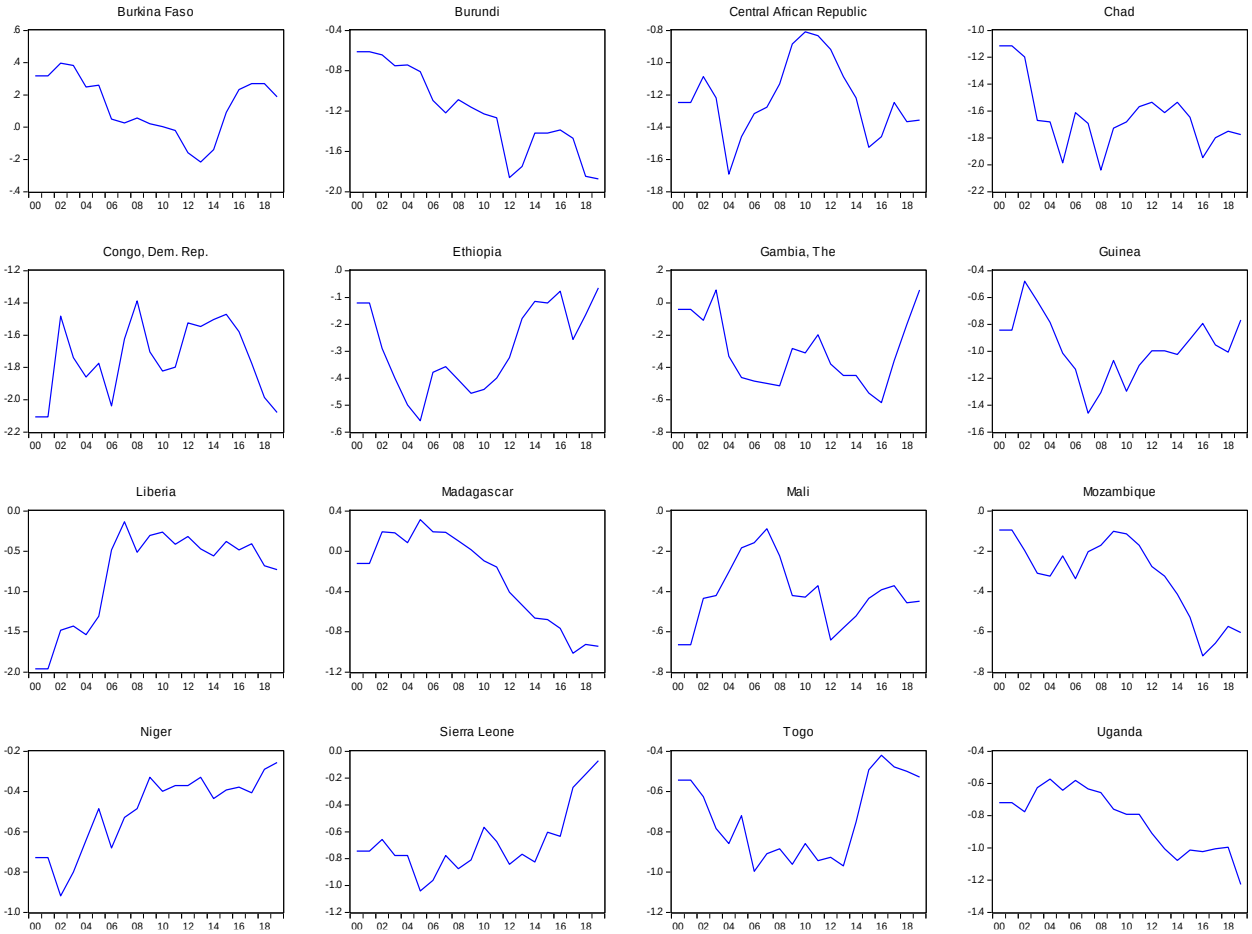


Figure 18: Inclusive growth in low-income sub-Saharan African countries.
Source: Source: Authors' 2022.

Regression results

The study estimates the baseline model as in equation (4) with the key independent variables as well as the control variables. As presented in Table 3, the estimated Hansen p-value is greater than .05. This validates the instruments used in the models. Thus, Table 3 presents the aggregate findings of the effect of sectoral foreign aid on inclusive growth in sub-Saharan Africa. The estimation results show that foreign aid to all five sectors has a positive and significant effect on inclusive growth in sub-Saharan Africa. A 1 per cent rise in foreign aid to social infrastructure spurs inclusiveness by 0.0009 per cent. Likewise, a 1 per cent rise in economic infrastructure aid also spurs inclusive growth by 0.0004 per cent. a 1 per cent growth in both foreign aid to productive and multisector improves inclusive growth by both 0.0001 and 0.0003 respectively. These are in line with apriori expectations and support extant literature on the foreign aid-growth nexus (Nketiaa, et al, 2021; Afolabi-Ibikunle, et al, 2022).

Table 3. IV-GMM and DK estimation results (dep var: $IGROWTH_{it}$).

Variable	IV-GMM	DK
$SINFR_{it}$	0.0007** (1.99)	0.0009*** (6.18)
$EINFR_{it}$	0.0003 (0.08)	0.0004** (1.97)
$PSEC_{it}$	0.0001*** (5.16)	0.0018*** (5.09)
$MSEC_{it}$	0.0003*** (3.28)	0.0024*** (3.43)
$UNALLO_{it}$	0.0046*** (3.02)	0.0016*** (3.18)
FDI_{it}	-0.0015 (-0.32)	-0.0038 (-1.12)
$POPN_{it}$	-0.6622*** (-8.00)	-0.4587 (-29.84)
CONSTANT	9.8910*** (7.93)	6.4775*** (26.25)
Observation	518	592
R-Square	0.62	0.6243
F-statistics	51.54	361.74
Hansen J test	1.869	
P value (Hansen J)	0.4668	
Anderson-Kleibergen-Paap Underidentification test	78.142	
P-value (underidentification test)	0.0000	
Observation	518	592

Note: ***, **, * represents statistical significance at 1%, 5% and 10% respectively, t-statistics are in parentheses.
Source: Authors' computation, 2022.

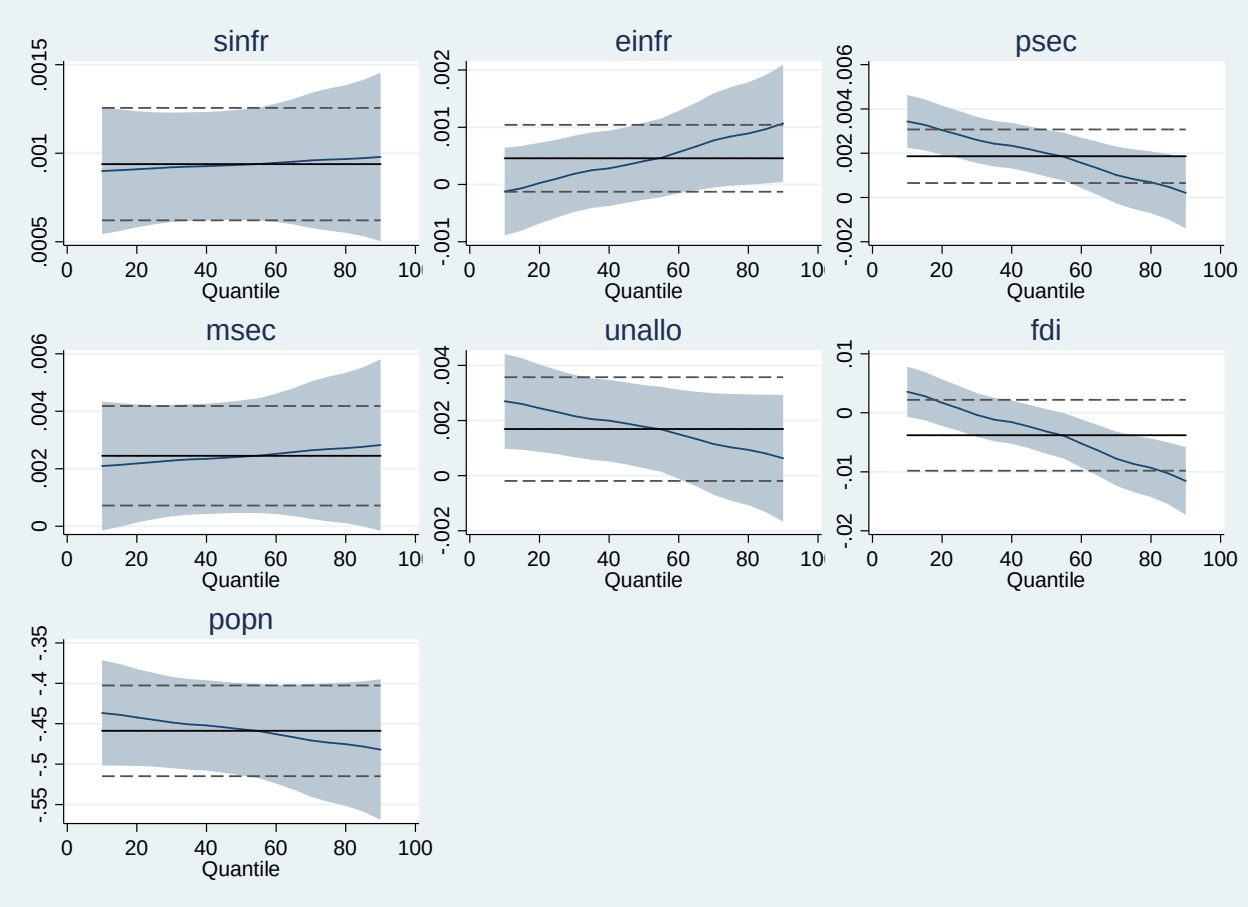
This study further examined variability in the foreign aid-inclusive growth nexus. No study to the best of our knowledge has attempted to address this question in extant literature. Table 4 present the method of moment quantile regression for the aggregate sample from the 5^{th} to the 95^{th} quantiles. The sign and statistical significance of foreign aid to social infrastructure, economic infrastructure, multi-sector and population are consistent with the panel results of both the IV-GMM and the Driscoll and Kraay estimator. While foreign aid to economic infrastructure is significant across quantiles, aid to economic infrastructure is only significant from the 70^{th} quantiles and above. Aid to the productive sector is only significant from the 5^{th} to the 60^{th} quantile. While aid to multi-sector is significant across quantiles except for the 5^{th} quantile. Unspecified aid is signed up to the 60^{th} quantile beyond which it becomes insignificant to inclusiveness. FDI is only significant at the 5^{th}, 60^{th}, 70^{th}, 80^{th}, 90^{th}, and 95^{th} quantiles while the population is significant and negative across quantiles. The quantile plot presented in Table 6 buttresses this point.

Table 4. MMQR results (dep var: $IGROWTH_{it}$).

Variable	Loc Par	Sca Par	Quantiles									
			0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95
$SINFR_{it}$	0.0009***	0.0000	0.0008***	0.0009***	0.0009***	0.0009***	0.0009***	0.0009***	0.0009***	0.0009***	0.0009***	0.0009***
	(5.08)	(0.28)	(4.94)	(5.44)	(5.84)	(5.93)	(5.87)	(5.55)	(4.93)	(4.55)	(4.03)	(3.47)
$EINFR_{it}$	0.0004	0.0003**	-0.0001	0.0000	0.0001	0.0002	0.0004	0.0005	0.0007**	0.0008***	0.0010***	0.0012***
	(1.32)	(1.98)	(-0.31)	(0,06)	(0.55)	(0.84)	(1.19)	(1.54)	(1.84)	(1.95)	(2.04)	(2.11)
$PSEC_{it}$	0.0018***	-0.001***	0.0034***	0.0030***	0.0025***	0.0023***	0.0019***	0.0015***	0.0010	0.0006	0.0002	-0.0004
	(3.42)	(-3.44)	(5.63)	(5,38)	(4.88)	(4.45)	(3.17)	(2.70)	(1.55)	(0.96)	(0.25)	(-0.44)
$MSEC_{it}$	0.0024***	0.0002	0.0020**	0.0021**	0.0022**	0.0023**	0.0024***	0.0025***	0.0026**	0.0027**	0.0028**	0.0029*
	(2.41)	(0.42)	(1.84)	(2.08)	(2.31)	(2.39)	(2.42)	(2.35)	(2.17)	(2.04)	(1.86)	(1.65)
$UNALLO_{it}$	0.0016**	-0.0006	0.0026***	0.0024***	0.0021***	0.0019***	0.0017***	0.0015**	0.0011	0.0009	0.0006	0.0002
	(2.16)	(-1.53)	(3.07)	(3.03)	(2.84)	(2.65)	(2.31)	(1.82)	(1.22)	(0.91)	(0.54)	(0.17)
FDI_{it}	-0.0038**	-0.004***	0.0035	0.0017	-0.0003	-0.0015	-0.0031	-0.005***	-0.007***	-0.009***	-0.011***	-0.014***
	(-1.97)	(-4.54)	(1.64)	(0.85)	(-0.19)	(-0.84)	(-1.65)	(2.50)	(-3.32)	(-3.96)	(-3.94)	(-4.27)
$POPN_{it}$	-0.458***	-0.0148	-0.436***	-0.442***	-0.448***	-0.452***	-0.456***	-0.462***	-0.470***	-0.475***	-0.481***	-0.490***
	(-15.50)	(-0.89)	(-13.13)	(-14.47)	(-15.56)	(-15.83)	(-15.69)	(-14.85)	(-13.23)	(-12.23)	(-10.86)	(-9.38)
CONST	6.4775***	0.808***	5.2732***	5.5753***	5.9149***	6.1135***	6.3738***	6.7041***	7.1267***	7.3786***	7.7451***	8.2265***
	(14.36)	(3.18)	(10.40)	(11.92)	(13.42)	(14.02)	(14.28)	(13.99)	(13.10)	(12.47)	(11.38)	(10.32)

Note: ***, **, * represents statistical significance at 1%, 5% and 10% respectively, t-statistics are in parentheses. Source: Authors' computation, 2022.

Table 5: Quantile plot



Source: Authors' 2022.

Dumitrescu and Hurlin causality test

The study further employs Dumitrescu and Hurlin's (2012) granger non-causality test in the heterogeneous panel to ascertain the direction of causality amongst inclusive growth and the various sectoral foreign aid in sub-Saharan Africa. DH granger non-causality test takes into account the heterogeneity and dependence among cross-sections (Koçak and Şarkgüneşi 2017). It is a more effective causality test that the Vector Error Correction Model [VECM] (Vo, Nguyen, Tran & Vo, 2019) and the null hypothesis is assumed to reflect that no causal direction exists between variables in contrast to the alternative hypothesis which assumed a causal relationship amongst variables of interest. The outcome of the test is presented in Table 6. Table 6 shows the unidirectional causality between inclusive growth and foreign aid to social infrastructure. The causal relationship is from aid to social infrastructure to inclusive growth. A unidirectional causality also exists between inclusive growth and aid to economic infrastructure. The Dumitrescu and Hurlin causality test reveals that foreign aid to economic infrastructure granger causes inclusive growth in sub-Saharan Africa. Bidirectional causality is recorded between inclusive growth and foreign aid to the productive sector, inclusive growth and foreign aid to multi sectors, inclusive growth and unspecified foreign aid, inclusive growth and FDI and inclusive growth and population.

Table 6: Dumitrescu and Hurlin causality test

Hull hypothesis	W-stat	Zbar-stat	Prob	Conclusion
$IGROWTH_{it} \neq> SINFR_{it}$	2.3785	1.1512	0.2496	Unidirectional causality
$SINFR_{it} \neq> IGROWTH_{it}$	4.0507	6.2371	0.0000	
$IGROWTH_{it} \neq> EINFR_{it}$	2.1868	0.5680	0.5700	Unidirectional causality
$EINFR_{it} \neq> IGROWTH_{it}$	2.5860	1.7824	0.0747	
$IGROWTH_{it} \neq> PSEC_{it}$	3.5110	4.5957	0.0000	Bidirectional causality
$PSEC_{it} \neq> IGROWTH_{it}$	5.9308	11.9552	0.0000	
$IGROWTH_{it} \neq> MSEC_{it}$	3.0285	3.1281	0.0018	Bidirectional causality
$MSEC_{it} \neq> IGROWTH_{it}$	3.3709	4.1696	0.0000	
$IGROWTH_{it} \neq> UNALLO_{it}$	2.9300	2.8286	0.0047	Bidirectional causality
$UNALLO_{it} \neq> IGROWTH_{it}$	3.8600	5.6571	0.0000	
$IGROWTH_{it} \neq> FDI_{it}$	2.9488	2.8857	0.0039	Bidirectional causality
$FDI_{it} \neq> IGROWTH_{it}$	5.5917	10.9236	0.0000	
$IGROWTH_{it} \neq> POPN_{it}$	8.2227	18.9256	0.0000	Bidirectional causality
$POPN_{it} \neq> IGROWTH_{it}$	13.4182	34.7272	0.0000	

Source: Authors' computation, 2022.

Conclusions

Inclusive growth focuses on creating sustainable economic opportunities while ensuring equal access to these opportunities (Zhuang & Ali, 2010). Growth becomes rather inclusive as the poor contribute and benefit equally from economic opportunities as the non-poor. Thus, declining global poverty can then be interpreted as evidence of pro-poor growth. However, growth has not been inclusive in sub-Saharan Africa (Doumbia, 2018). The rate of inclusion is rather low and declining. Most countries in sub-Saharan Africa experienced a rate of inclusion below the region's average. Only countries in the panel of high and middle-upper-income sub-Saharan Africa recorded positive, though declining rates of inclusion. This is contrary to what is obtainable in Western Europe and Germany, the United States and Canada, East Asia and MENA (Stawska & Jabłońska, 2021).

Rising growth recorded in sub-Saharan Africa is not yet inclusive. Efforts to reverse the negative and downward trend of inclusive growth in sub-Saharan Africa are essential. If sustained growth is necessary for inclusion, policies necessary for economic prosperity, inclusion and sustainability are non-negotiable. Estimates in this study have shown that sectoral foreign aid is not detrimental but rather supportive of inclusiveness. Most sub-Saharan African countries have many areas of inclusive growth to improve upon. Sectoral foreign aid comes in handy. Sub-Saharan African countries need to identify their most pressing concerns on growth, sustainability and issues around distribution and their determinants. Addressing these concerns of which sectoral foreign aid seems to be relevant in addressing will limit factors that exacerbate inclusion in sub-Saharan Africa. Policies that admit excluded groups within a society must be designed and implemented in countries across sub-Saharan Africa. Foreign aid and local investments in socioeconomic infrastructures and access to such infrastructures (like health, education, and other public services) that aids inclusiveness must be put in place in sub-Saharan African countries. In general, improving the quality of governance in sub-Saharan Africa can help spur inclusive growth in sub-Saharan Africa. The limitation of the study is that the threshold of inclusive growth that is sufficient for abating inequality and poverty is not considered by the study. This can be valuable to subsequent studies.

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List of countries used.

High-and-middle-upper-income-countries: Mauritius, Botswana, Gabon, Namibia, South Africa
Middle-lower-income-countries: Angola, Benin, Cabo Verde, Cameroon, Comoros, Congo Republic, Cote d'Ivoire, Eswatini, Ghana, Kenya, Lesotho, Mauritania, Nigeria, Senegal, Tanzania, Zimbabwe
Low-income-countries: Burkina Faso, Burundi, Central African Republic, Chad, Congo Democratic. Republic, Ethiopia, Gambia, Guinea, Liberia, Madagascar, Mali, Mozambique, Niger, Sierra Leone, Togo, Uganda
MENA: Algeria, Bahrain, Egypt, Iran, Israel, Kuwait, Morocco, Qatar, Saudi Arabia, Tunisia, U.A. E
East Asia: China, Japan, Mongolia, Korea, Rep.
Western Europe and Germany: Belgium, France, Ireland, Luxembourg, United Kingdom, Germany
United States and Canada: USA, Canada

Appendix 1

Summary of the extent of inclusive growth in sub-Saharan Africa and other regions of the world

Country/Region	2000	2019
Sub-Saharan Africa	-0.43	-0.46
High and middle-upper-income sub-Saharan Africa	0.67	0.43
Middle lower income sub-Saharan Africa	-0.50	-0.43
Low-income sub-Saharan Africa	-0.71	-0.78
Western Europe and Germany	1.74	1.72
USA and Canada	-0.07	0.07
East Asia	0.59	0.65
MENA	0.35	0.32

Appendix 2

Pairwise correlation matrix for sub-Saharan Africa

	GDP	RGE	RCC	ELE	SSN	EMPL	PTR	GDR	EMPR
Sub-Saharan Africa									
GDP	1.000								
RGE	0.15***	1.000							
RCC	0.13***	0.59***	1.000						
ELE	0.01	0.39***	0.42***	1.000					
SSN	0.05***	0.33**	0.42***	0.08***	1.000				
EMPL	-0.01	0.32***	0.47***	0.10***	0.25	1.000			
PTR	0.01***	-0.41	-0.46***	-0.53**	-0.18***	-0.45**	1.000		
GDR	0.01***	-0.24**	-0.36	-0.44**	-0.02***	-0.38**	0.25***	1.000	
EMPR	0.03***	-0.23**	-0.32**	-0.39**	-0.01**	-0.45**	0.49***	0.40***	1.000
High and middle-upper-income sub-Saharan African countries									
GDP	1.000								
RGE	-0.34**	1.000							
RCC	-0.20**	0.52***	1.000						
ELE	0.38	0.01**	-0.44***	1.000					
SSN	-0.47**	0.22***	0.28***	-0.37**	1.000				
EMPL	0.46**	-0.39**	-0.48***	0.40***	-0.53***	1.000			
PTR	0.02***	-0.39**	-0.54	-0.14**	-0.03**	0.38***	1.000		
GDR	-0.37**	-0.10**	0.26***	-0.33**	0.55	-0.22	0.15	1.000	
EMPR	-0.10**	0.47***	0.42**	0.11***	-0.15***	-0.40**	-0.79**	-0.360**	1.000
Middle lower income sub-Saharan African countries									
GDP	1.0000								
RGE	-0.03**	1.000							
RCC	0.12	0.47***	1.000						
ELE	0.34***	0.01***	0.23***	1.000					
SSN	0.02***	0.33	0.40***	-0.09**	1.000				
EMPL	0.36***	-0.04**	0.13***	0.31	0.01***	1.000			
PTR	-0.24**	-0.24**	-0.49***	-0.52**	-0.33***	-0.33**	1.0000		
GDR	0.07**	-0.07**	-0.31***	-0.21**	0.07**	-0.26	0.31***	1.0000	
EMPR	-0.44**	0.05***	-0.28***	-0.39**	0.14***	-0.34**	0.43**	0.48***	1.000
Low-income sub-Saharan African countries									
GDP	1.000								
RGE	0.27***	1.000							
RCC	0.10***	0.73***	1.000						
ELE	0.42***	0.27**	0.27***	1.000					
SSN	-0.10**	0.26***	0.19***	-0.21**	1.000				
EMPL	0.35***	0.28***	0.21	0.59**	-0.16***	1.000			
PTR	-0.12**	0.01***	-0.12**	-0.23**	0.11	-0.27**	1.000		
GDR	-0.42	-0.24**	-0.27**	-0.18**	-0.04***	-0.38**	-0.09	1.000	
EMPR	-0.24**	0.36***	0.29***	-0.34**	0.34***	-0.44**	0.31***	-0.06***	1.000

Note: ***, ** and * respectively represents 1%, 5% and 10% level of significance. GDP, RGE, RCC, ELE, SSN, EMPL, PTR, GDR and EMPR are GDP per capita, rescaled government effectiveness, rescaled control of corruption, access to electricity, domestic general government health expenditure, GDP per person employed, pupil-teacher ratio, the female-male ratio of labour force participation rate, employment to population ratio, respectively.
Source: Authors' computation, 2022.

Appendix 3

Pairwise correlation matrix for the rest of the world

	GDP	RGE	RCC	ELE	SSN	EMPL	PTR	GDR	EMPR
MENA									
GDP	1.000								
RGE	0.35***	1.000							
RCC	0.28***	0.49***	1.000						
ELE	0.28***	0.16	0.18***	1.000					
SSN	-0.29**	-0.03**	-0.20**	0.22***	1.000				
EMPL	0.55***	0.46**	0.33	0.38***	-0.22	1.000			
PTR	-0.27**	-0.52**	-0.6***	-0.41***	0.11***	-0.18**	1.000		
GDR	0.30**	0.37***	0.23***	0.14***	-0.15**	0.38	-0.57**	1.000	
EMPR	0.20***	0.20***	0.29***	0.22***	-0.35**	0.13***	-0.15	0.02***	1.000
East Asia									
GDP	1.000								
RGE	0.31***	1.000							
RCC	0.37***	0.53***	1.000						
ELE	0.50***	0.38***	0.48***	1.000					
SSN	0.22***	0.31***	0.39***	0.35***	1.000				
EMPL	0.12***	0.42***	0.21	0.53***	0.18***	1.000			
PTR	-0.55**	-0.5***	-0.47**	-0.17***	-0.53**	-0.44**	1.000		
GDR	-0.39**	-0.35**	-0.29**	-0.17***	-0.16**	-0.27**	0.42***	1.0000	
EMPR	-0.33**	-0.15**	-0.34**	0.41***	-0.32	-0.41**	-0.47	0.21***	1.000
Western Europe and Germany									
GDP	1.000								
RGE	0.24***	1.000							
RCC	0.51***	0.35***	1.000						
ELE	0.03***	0.20***	0.02***	1.000					
SSN	-0.44**	-0.25	0.01***	0.01***	1.000				
EMPL	0.38***	0.23***	0.43***	0.14***	-0.48**	1.000			
PTR	-0.58**	-0.19**	-0.47**	0.07***	0.37***	-0.01**	1.000		
GDR	-0.12**	-0.53**	0.01***	0.01	0.19**	-0.17**	0.03***	1.000	
EMPR	0.20***	-0.02**	0.12***	0.22***	0.15***	0.11***	0.36	-0.04**	1.000
United State and Canada									
GDP	1.000								
RGE	-0.35**	1.000							
RCC	-0.36**	0.46	1.000						
ELE	0.24**	-0.28**	-0.29**	1.000					
SSN	0.43***	-0.18**	-0.30**	0.57***	1.000				
EMPL	0.39***	-0.15**	-0.17**	0.14	0.43***	1.000			
PTR	0.23***	0.10	0.16***	0.23**	0.11	0.12***	1.000		
GDR	-0.31**	0.46***	0.55***	-0.36***	0.09***	-0.11**	0.11***	1.0000	
EMPR	0.53***	-0.27**	-0.23**	0.51***	-0.06**	0.51***	0.10***	-0.2***	1.000

Note: ***, ** and * respectively represents 1%, 5% and 10% level of significance. GDP, RGE, RCC, ELE, SSN, EMPL, PTR, GDR and EMPR are GDP per capita, rescaled government effectiveness, rescaled control of corruption, access to electricity, domestic general government health expenditure, GDP per person employed, pupil-teacher ratio, the female-male ratio of labour force participation rate, employment to population ratio, respectively.
Source: Authors' computation, 2022.

Appendix 4

PCA results for sub-Saharan Africa

Component	Eigenvalue	Difference	Proportion	Cumulative
Sub-Saharan Africa				
Comp1	5.39596	4.12967	0.5996	0.5996
Comp2	1.26629	0.381198	0.1407	0.7403
Comp3	0.885094	0.248757	0.0983	0.8386
Comp4	0.636337	0.330174	0.0707	0.9093
Comp5	0.306163	0.0416767	0.0340	0.9433
Comp6	0.264486	0.0976807	0.0294	0.9727
Comp7	0.166806	0.0959762	0.0185	0.9912
Comp8	0.0708295	0.062797	0.0079	0.9991
Comp9	0.00803252		0.0009	1.0000
High and middle-upper-income sub-Saharan African countries				
Comp1	4.1639	1.58411	0.4627	0.4627
Comp2	2.5797	1.72187	0.2866	0.7493
Comp3	0.8579	0.13995	0.0953	0.8446
Comp4	0.7179	0.31153	0.0798	0.9244
Comp5	0.4064	0.28584	0.0452	0.9696
Comp6	0.1205	0.02411	0.0134	0.9830
Comp7	0.0964	0.05051	0.0107	0.9937
Comp8	0.0459	0.03492	0.0051	0.9988
Comp9	0.0110		0.0012	1.0000
Middle lower income sub-Saharan African countries				
Comp1	3.2197	0.9563	0.3577	0.3577
Comp2	2.2634	1.2077	0.2515	0.6092
Comp3	1.0557	0.2040	0.1173	0.7265
Comp4	0.8516	0.1195	0.0946	0.8212
Comp5	0.7321	0.3085	0.0813	0.9025
Comp6	0.4235	0.1516	0.0471	0.9496
Comp7	0.2718	0.1185	0.0302	0.9798
Comp8	0.1533	0.1247	0.0170	0.9968
Comp9	0.0285		0.0032	1.0000
Low-income sub-Saharan African countries				
Comp1	2.9996	0.795953	0.3333	0.3333
Comp2	2.2036	1.07619	0.2449	0.5781
Comp3	1.1275	0.298645	0.1253	0.7034
Comp4	0.8288	0.155108	0.0921	0.7955
Comp5	0.6737	0.112289	0.0749	0.8704
Comp6	0.5614	0.232288	0.0624	0.9328
Comp7	0.3291	0.14206	0.0366	0.9693
Comp8	0.1871	0.0983095	0.0208	0.9901
Comp9	0.0888		0.0099	1.0000

Note: comp1 to comp9 represents loggdp, logrge, logrcc, logele, logssn, logempl, logptr, loggdr, logempr respectively. loggdpg, logrge, logrcc, logele, logssn, logempl, logptr, loggdr and logempr represent the natural log of growth in GDP per capita (annual %), natural log of rescaled values government effectiveness, natural log of rescaled values of control of corruption, natural log of access to electricity, natural log of government expenditure on health, natural log of GDP per person employed, natural log of the pupil to teacher ratio, natural log of the female-male ratio of labour force participation rate, and the natural log of employment to population ratio, respectively.
Source: Authors' computation, 2022.

Appendix 5

PCA results for the rest of the world

Component	Eigenvalue	Difference	Proportion	Cumulative
MENA				
Comp1	5.44577	3.97979	0.6051	0.6051
Comp2	1.46598	0.498653	0.1629	0.7680
Comp3	0.967331	0.515051	0.1075	0.8755
Comp4	0.45228	0.113879	0.0503	0.9257
Comp5	0.338401	0.173999	0.0376	0.9633
Comp6	0.164403	0.0699513	0.0183	0.9816
Comp7	0.0944513	0.0355103	0.0105	0.9921
Comp8	0.0589409	0.0465081	0.0065	0.9986
Comp9	0.0124329		0.0014	1.0000
East Asia				
Comp1	6.10381	4.22548	0.6782	0.6782
Comp2	1.87834	1.26339	0.2087	0.8869
Comp3	0.614948	0.446142	0.0683	0.9552
Comp4	0.168806	0.0506795	0.0188	0.9740
Comp5	0.118126	0.0600726	0.0131	0.9871
Comp6	0.0580535	0.0247568	0.0065	0.9936
Comp7	0.0332968	0.0136083	0.0037	0.9973
Comp8	0.0196884	0.0147588	0.0022	0.9995
Comp9	0.00492963		0.0005	1.0000
Western Europe and Germany				
Comp1	3.30158	1.90508	0.4127	0.4127
Comp2	1.39651	0.132842	0.1746	0.5873
Comp3	1.26366	0.246962	0.1580	0.7452
Comp4	1.0167	0.465244	0.1271	0.8723
Comp5	0.551459	0.280772	0.0689	0.9412
Comp6	0.270687	0.0767257	0.0338	0.9751
Comp7	0.193961	0.188527	0.0242	0.9993
Comp8	0.00543467	0.00853	0.0007	0.9995
Comp9	0.0001		0.0001	1.0000
The United States and Canada				
Comp1	5.43852	3.9863	0.6798	0.6798
Comp2	1.45221	0.754939	0.1815	0.8613
Comp3	0.697275	0.503576	0.0872	0.9485
Comp4	0.193699	0.0843347	0.0242	0.9727
Comp5	0.109365	0.0171681	0.0137	0.9864
Comp6	0.0921965	0.0754997	0.0115	0.9979
Comp7	0.0166969	0.0166589	0.0021	0.9997
Comp8	0.0000379721	0.0061659	0.0012	1.0000
Comp9	0.0000081191		0.0000	1.0000

Note: comp1 to comp9 represents loggdp, logrge, logrcc, logele, logssn, logempl, logptr, loggdr, logempr respectively. loggdpg, logrge, logrcc, logele, logssn, logempl, logptr, loggdr and logempr represent the natural log of growth in GDP per capita (annual %), natural log of rescaled values government effectiveness, natural log of rescaled values of control of corruption, natural log of access to electricity, natural log of government expenditure on health, natural log of GDP per person employed, natural log of the pupil to teacher ratio, natural log of the female-male ratio of labour force participation rate, and the natural log of employment to population ratio, respectively.
Source: Authors' computation, 2022.