Structural transformation and poverty alleviation in Sub-Saharan Africa countries: sectoral value-added analysis

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Abstract

Purpose – This study aims to examine the effect of structural transformation on poverty alleviation in Sub-Saharan Africa (SSA) countries with a higher share of services as a percentage of gross domestic product (GDP). The study specifically focuses on the value-added share as a percentage of GDP in the agricultural, manufacturing, industrial, and service sectors using time series data from 1988 to 2019.

Design/methodology/approach – The study utilizes the autoregressive distributive lag (ARDL) bound test framework for estimation, based on the conclusions drawn from the augmented Dickey-Fuller and Phillips–Perron unit root tests, which provide evidence of a mixed order of integration.

Findings – The result reveals that agriculture value-added (AVA), manufacturing value-added (MVA), industrial value-added (IVA), and services value-added (SVA) have a positive and significant impact on poverty alleviation in both the short and long run. However, the agriculture sector is found to be more effective in reducing poverty compared to the other sectors examined in this study. Additionally, this study challenges the notion that SSA countries have undergone an immature structural transformation. Instead, it reveals a pattern of stagnant structural transformation, as indicated by the lack of growth in the industrial and manufacturing value-added shares of GDP.

Practical implications – To enhance productivity and reduce poverty, SSA economies should adopt a development strategy that prioritizes heavy manufacturing and industrial sectors, leading to a transition from the agricultural to the secondary and tertiary sectors.

Originality/value – The study contributes to the emerging literature on structural transformation by investigating which sector is more efficient in reducing poverty in SSA countries, using the value-added share as a percentage of GDP for agricultural, manufacturing, industrial, and service sectors. The study also aims to determine if SSA countries have experienced immature structural transformation due to the growing share in the service sector.

Keywords Value-added, Structural transformation, Poverty alleviation, Sub-Saharan Africa

Paper type Research paper

1. Introduction

The transformation of all sectors of the economy to boost growth and reduce poverty is the principal objective of every nation. Thus, utilizing labor and other inputs to higher productivity is paramount. Structural transformation shifts an economy's entire structure

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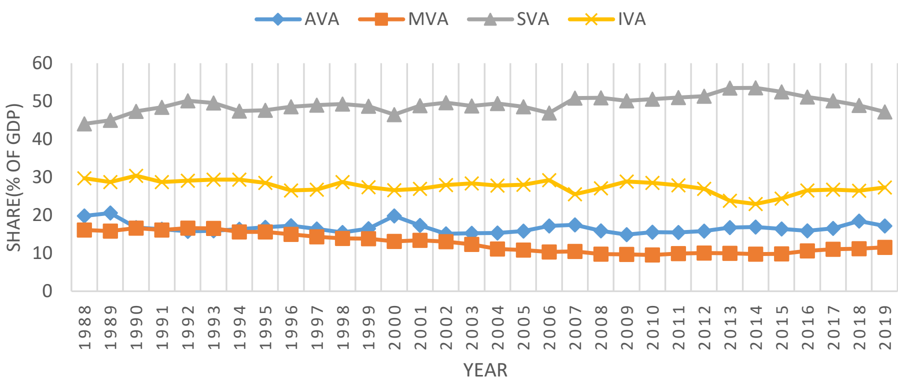
from a labor-intensive method of production to capital intensive method of production to increase productivity (Oyelaran-Oyeyinka and Lal, 2016). However, developing countries are still predominantly traditional in nature, creating a large productivity gap with advanced countries in the agricultural, manufacturing, industrial, and service sectors (McMillan and Rodrik, 2011). A country can only pull itself out of poverty and become wealthier by diversifying production from outdated to contemporary methods to increase productivity and income (McMillan and Rodrik, 2011).

In Sub-Saharan African (SSA) countries, a structural transformation has been growth-reducing because labor is concentrated more in low-productivity sectors (Andy, 2017). The share of natural resources in exports does not generate as much revenue compared to the share of manufacturing or the service industry. Thus, the reallocation of economic resources from the agricultural sector to other sectors of the economy, such as the industrial, manufacturing, and service sectors, to increase value-added share is paramount. The three most common measures of structural changes at the sectoral level are; value-added shares, employment value-added shares, and final consumption expenditure shares (Herrendorf *et al.*, 2014). This study will focus on value-added share as a percentage of GDP by looking at its contribution in the agricultural, manufacturing, industrial, and service sectors.

Looking at Figure 1, there has not been any significant growth in the agricultural sector in SSA. The share of value-added as a percentage of GDP stood at 17.19% in 2019 compared to the highest share of 20.57% in 1989. The figure further indicates that the manufacturing and industrial sectors are both growing at a slow rate. In 2019, the value-added as a percentage of GDP was just 11.55% for the manufacturing sector and 27.29% for the industrial sector. In addition, the figure reveals that in the same year, services were the main economic sector in SSA countries, contributing 47% to the GDP. The industrial sector contributed 27%, agricultural activities came third, contributing 17%, while manufacturing activities were at the bottom, representing approximately just 12% of GDP. With numerous setbacks such as supply chain disruptions, outdated technology, purchasing power, lack of relevant skills, and high cost of energy, the shift of labor from the agricultural to the manufacturing sector is slow, which decelerates structural transformation and shows evidence of deindustrialization. Cadot *et al.* (2016) reveal that "manufacturing has never really flourished in Sub-Saharan Africa". This has caused almost 40% of the population to live below the poverty line of US$1.90 a day.

Rifa'i and Listiono (2021) indicate that an increase in the share of the service sector and a decrease in the share of the industrial sector signify an immature structural transformation. Thus, is SSA experiencing an immature structural transformation? However, when examining



Source(s): Computed by Author, (2022)

Figure 1.
Sectoral value added

Figure 1, it becomes evident that SSA countries do not exhibit such trends. The manufacturing and industrial sectors are the most effective means for SSA economies to reduce poverty and generate employment opportunities. However, there has been an increasing focus on the service sector (Solomon *et al.*, 2021). Historically, structural transformation is characterized by a decrease in the share of the agricultural sector accompanied by an increase in the share of the industrial and manufacturing sectors (Rifa'i and Listiono, 2021). Conversely, Figure 1 indicates that the agricultural sector has not experienced a significant decrease and there is no robust performance in the manufacturing, industrial, or service sectors. These findings suggest that SSA countries are currently experiencing a phase of stagnant structural transformation.

This study addresses a significant gap in the extensive literature on structural transformation and contributes to the empirical literature of the topic. Specifically, the role of value-added shares in different sectors in poverty alleviation in SSA countries has been largely overlooked, to the best of the researcher's knowledge. Thus, this study aims to investigate which sectors are more efficient in reducing poverty in SSA countries by analyzing the value-added share as a percentage of GDP. Additionally, the study seeks to determine whether SSA countries have experienced immature structural transformation due to the expanding share of the service sector.

2. Literature review

2.1 Theoretical literature

Endogenous growth theory, as explained by (Lucas, 1988; Romer, 1990), posits that long-run growth is influenced by internal independent factors rather than external factors. The theory, developed by Romer alongside Arrow and Lucas, holds that "human capital investment, innovation, and knowledge are significant contributors to economic growth." Romer (1990) argues that knowledge is not transferred but rather acquired through investments in physical capital. Hence, a deficiency in knowledge reduces the productivity of both capital and labor. It is therefore crucial for poor countries to invest in knowledge acquisition to facilitate economic transformation.

The Lewis model of 1954, also known as the two-sector or surplus model, is relevant to this study. It suggests that the economy consists of two sectors: a rural agricultural sector and an urban industrial sector. Since agriculture generally has underemployed workers and the marginal productivity of labor is almost zero, the model advocates for the transfer of labor from the less productive agricultural sector to the highly productive industrial sector (Lewis, 1954). This shift will promote industrialization, profit generation, and capital accumulation. However, many developing countries, including those in SSA, have struggled with industrialization and capital formation due to a high percentage of the labor force being employed in rural areas.

The Clark–Fisher hypothesis is another important concept in this study. Fisher (1939) and Clark (1940) argue that the reallocation of the labor force among the three sectors of the economy is crucial for economic development (Clark, 1940; Fisher, 1939). As the economy undergoes a transformation from the primary to the tertiary sector, the high-income elasticity of demand for the service sector, such as leisure, leads to a large portion of the labor force working in the service sector (Aiginger, 2001).

In addition, proponents of balanced growth emphasize the need for all sectors to support one another as growth occurs. This intersectoral connection promotes overall economic growth (James *et al.*, 2008; Nurkse, 1961). This perspective highlights the importance of government support for sectors experiencing growth weaknesses, ensuring a balanced and sustainable growth trajectory.

2.2 Empirical literature

Several empirical studies have investigated the relationship between sectoral value-added, economic growth, and hence poverty reduction worldwide. However, the findings in the literature are diverse and inconclusive. In the following sections, the study explore the existing research under distinct categories to gain a comprehensive understanding of the topic.

2.2.1 Agriculture value-added and poverty reduction. Investment in the agricultural sector is crucial for eliminating poverty, starvation, and malnutrition. Both government and private sector investments play a significant role in addressing these issues (FAO, 2017). Several studies have confirmed that agricultural sector growth is more effective in reducing poverty (Hårsmar, 2022; Ivanic and Martin, 2018; Liu and Zeng, 2022; Obiakor *et al.*, 2021). However, some authors have found a diminishing effect of agriculture on development (Christiaensen *et al.*, 2010; Ferreira *et al.*, 2010), while others have affirmed that the agricultural sector is stronger in reducing poverty compared to the industrial or the service sectors (Ivanic and Martin, 2018; Kahya, 2012).

Gildas *et al.* (2020) indicate that the movement out of agricultural employment is modestly correlated with poverty reduction in SSA. They also reveal that structural transformation is slow in SSA. Tello (2015) concludes that the movement of labor from the informal sector to the formal sector in Peru increases the income of the poor once the economy experiences structural transformation. Similarly, Obiakor *et al.* (2021) conclude that agriculture plays a significant role in providing jobs in Nigeria. According to McMillan and Rodrik (2011), countries that have advanced from poverty have diversified resources from agriculture. This is consistent with the findings of Christiaensen *et al.* (2010), who conclude that agriculture is significantly more effective than non-agriculture in reducing the poverty gap. The study by UNESCAP (2018) indicates that value addition in agriculture is critical for sustainable development and poverty reduction. Using Generalized Methods of Moments (GMM), Osabohien *et al.* (2019) examine the effects of agriculture on employment in West Africa from 2000 to 2016 and find that agriculture increases the earnings of the poor, helping them escape the poverty trap. This is in line with the findings of Khan *et al.* (2016), who examine the role of agriculture in poverty reduction in Pakistan from 1972 to 2013. Using Vector Autoregression (VAR), the results indicate that agriculture, services, and industrial sector positively affect poverty reduction in the long run. According to Christiaensen and Martin (2018), agricultural growth reduces poverty more than an equivalent amount of growth outside agriculture.

Ibrahim *et al.* (2022), in a panel of 33 SSA countries from 2005 to 2019, reveal that human capital development, domestic investment and trade openness significantly improve agricultural sector performance. Modi (2019) indicates that the high levels of poverty and hunger in SSA are due to the poor performance of the agricultural segment. Similarly, Liu and Zeng (2022) show that the development of agricultural products positively narrows the income gap between urban and rural residents and contributes to poverty reduction in China. Tochukwu and Olanipekun (2022), using Nigeria as a case study, find a long-run equilibrium relationship between agricultural value-added, food production index and GDP per capita. In a related study, Hårsmar (2022) indicates that the cultivation of staple crops is more efficient than export crops in poverty reduction in SSA due to the higher multiplier effects of staple crops. Moukpè *et al.* (2022) reveal that the reallocation of agricultural labor positively affects economic growth in Africa. Contrarily, Le and Pham (2012), using Vietnam as a case study from 1998 to 2008, disclose that increasing the proportion of the agricultural sector increases the poverty rate. Also, Moukpè *et al.* (2022) find that agriculture value-added negatively affects economic growth in Africa.

2.2.2 Manufacturing value-added and poverty reduction. The study of Austin *et al.* (2017) concludes that SSA is characterized by interrupted industrial growth rather than sustained convergence with world industrial leaders. Elahinia *et al.* (2019) examine the impact of manufacturing, capital, labor force and technology on economic growth in European economies during the deindustrialization period from 1995 to 2016. Using an eclectic model, they find a significant positive association between the explanatory variables and economic growth. Szirmai and Verspagen (2015) discover that the performance of the manufacturing sector depends on an adequate level of manpower. According to UNIDO (2017), sustainable industrial development is key to poverty reduction efforts and ensures that "no one is left behind" by 2030. Similarly, Justin and Miaojie (2019) conclude that structural transformation and industrial upgrading have significantly increased employment and reduced poverty in China by reducing the share of the primary sector in GDP and increasing the shares of the secondary and tertiary sectors. Nurfika and Maswana (2021) investigate the effects of secondary sectoral growth on poverty in Indonesia from 2003 to 2018. Using the pooled OLS method, the results indicate that sectoral growth has little effect on improving the condition of the poor. Christiaensen and Kaminski (2015) confirm that employment opportunities in the manufacturing sector in Uganda have reduced poverty in urban areas. Similarly, Kim *et al.* (2017) believe that investment in the manufacturing industry is essential for structural transformation to occur. Equally, Erumban and Vries (2021) use data from 42 developing countries over 28 years to indicate that structural transformation and growth in the manufacturing sector are positively and significantly related to poverty reduction. Amadou and Aronda (2020) show that labor reallocation toward more productive activities is weak in Sub-Saharan countries.

2.2.3 Industrialization and poverty reduction. According to UNIDO (2016), Africa and least developed countries (LDCs) cannot achieve sustainable development goals without industrializing. Lin *et al.* (2022) examine the effect of industrial poverty reduction on growth in China from 2016 to 2020 and find a positive relationship between China's local industrial poverty reduction and regional economic growth. Chidiebere (2020), using Nigeria as a case study from 1981 to 2018, reveals that aggregate industrial output and aggregate industrial employment have a positive effect on poverty reduction. The Granger causality test further reveals a unidirectional causality running from aggregate industrial output to the poverty rate and from the poverty rate to aggregate industrial employment. Also, Isiksal and Chimezie (2016) demonstrate that no developing country has achieved economic growth without sub-sector linkage. Pham and Riedel (2019) assess the effect of sectoral economic growth and other factors on poverty reduction in Vietnam from 2010 to 2016. Using the two-stage least squares method, the results reveal that the proportion of both the industrial and the agricultural sectors has a significant effect on poverty reduction. Using dynamic panel models from 1997 to 2016, Totouom *et al.* (2019) consider institutions as key determinants of industrial performance in African countries. According to Cadot *et al.* (2016), "countries that have achieved development 'without factories' are too scarce and idiosyncratic to serve as a model."

2.2.4 Service value-added and poverty reduction. Empirical studies have found a positive link between the service sector and growth. For instance, Uwitonze and Heshmati (2016) conclude, using the regression analysis, that service sector factors can accelerate the transition from a low-income to a middle-income state in Rwanda. Similarly, Zott and Amit (2010) demonstrate that a larger service sector increases the value-added in the manufacturing sector, thereby expanding production capabilities and increasing sales and revenues in the manufacturing industry.

Antai *et al.* (2016) examine the contributions of different sectors to the Nigerian economy. The VAR results reveal that the service sector fosters economic growth and connects other sectors of the economy. Mujahid and Alam (2014) analyze the potential contribution of the service sector to growth in Pakistan. Using the VAR method, they find a significant relationship between the service sector and trade liberalization. Similarly, ADB (2013) shows that the level of service trade is directly related to service sector growth. Thus, developing human capital and implementing effective regulations are essential for fostering a modern service sector. Additionally, Eichengreen and Gupta (2013) find that countries that are open to trade and have democratic systems experience noticeable growth in the service sector. Miroudot *et al.* (2013) argue that a well-equipped and innovative services sector can stimulate growth in other sectors through input and output linkages. Similarly, Rifa'i and Listiono

(2021) affirm that the service sector is effective in reducing poverty in East Java. Contrary, Pham and Riedel (2019) indicate that increasing the percentage of the service sector in Vietnam leads to a higher poverty rate.

3. Data and methods

The study utilizes secondary data extracted from the World Development Indicators (WDI) from 1988 to 2019, employing an *ex post facto* research design. The dependent variable is poverty alleviation, defined as a poverty line of US$1.90 a day, while the explanatory variables include agriculture value-added, manufacturing value-added, industrial value-added, and service value-added, all measured as a percentage of GDP.

The study adopts the autoregressive distributive lag model (ARDL) approach proposed by PesaranShin and Smith (2001) and is inspired by the work of Rifa'i and Listiono (2021). This technique is employed when the stationarity tests indicate that the variables have different orders of integration, with some variables being stationary at levels (I (0)) and others requiring first differencing (I (1)). The bound test is then applied to determine whether the variables exhibit cointegration, even if they are trending apart. The hypothesis is stated as follows:

H0. $h_{1i} = h_{2i} = b_{3i} = h_{4i} = 0$, Implies no cointegration

H1. $h_{1i} \neq h_{2i} \neq h_{3i} \neq h_{4i} \neq 0$, Implies cointegration

The alternative hypothesis is accepted if the critical values for the upper bound *I(1)* are lower than the calculated *F*-statistic, confirming the presence of cointegration. To perform the bounds test for cointegration, the conditional ARDL (p, q) model is specified as follows:

$$y_{t=}\alpha_{oj} + \sum_{j=1}^{p} £_j y_{t-1} + \sum_{j=o}^{q} \beta_j \mu_{t-1} + \mu_{1t} \quad (1.1)$$

In equation (1.1), y_t is a vector representing all variables in the model that can be used as dependent variables. μ_t represent the independent variables with different orders of integration, £ and β are the coefficients to be estimated, pq represents the optimal lag where p is the optimal lag for the dependent variable and q for the independent variable, j is the number of variables ranging from 1,. . . . . . k, μ_{1t} is the error term vector, and α is the intercept.

If the ARDL bound test proves there is long-run convergence, there is a need to estimate the error correction model (ECM), which is expected to be different from zero and negative, indicating the adjustment speed of the variables toward their long-run equilibrium. The specification looks as follows for cointegration:

$$\Delta PA_t = h_{01} + \sum_{i=1}^{p} h_{1i} \nabla AVA_{t-i} + \sum_{i=i}^{q1} h_{2i} \nabla MVA_{t-i} + \sum_{i=1}^{q2} h_{3i} \nabla IVA_{t-i} + \sum_{i=1}^{q3} h_{4i} \Delta SVA_{t-1} + \lambda ECT_{t-1} + \mu_{1t} \quad (1.2)$$

For no cointegration, the specification appears as follows:

$$\Delta PA_t = h_{01} + \sum_{i=1}^{p} h_{1i} \nabla AVA_{t-i} + \sum_{i=i}^{q1} h_{2i} \nabla MVA_{t-i} + \sum_{i=1}^{q2} h_{3i} \nabla IVA_{t-i} + \sum_{i=1}^{q3} h_{4i} \Delta SVA_{t-1} + \mu_{1t} \quad (1.3)$$

Where.

PA = Poverty alleviation

AVA = Agriculture value-added

MVA = Manufacturing value-added

IVA = Industrial value-added

SVA = Service value-added

μ_{1t} = eror term

λ = Adjustment speed

ECT = Error correction term

$b_{1i}b_{2i}b_{3i}b_{4i}$ = Short-run parameters

∇ = The difference operator.

The rationale for applying this approach is based on a mixed order of integration of the variables (PesaranShin and Smith, 2001). With a small sample size of 31 years, the method will be more robust (Kripfganz and Schneider, 2018). Furthermore, the long-run estimates of ARDL are unbiased (Harris and Sollis, 2003; Kripfganz and Schneider, 2016). Lastly, the ARDL/ECM model is also useful in establishing long-run merging and disintegrating long-run association from short-run dynamics (Belloumi, 2014).

The multicollinearity test among the variables was ascertained using the variance inflation factor (VIF) found in Appendix 1, which shows no evidence of multicollinearity as all VIF values are below 10. The descriptive statistics table in Appendix also provides a clear picture of the sample averages, variances, minimum and maximum values, skewness, and kurtosis.

4. Results and discussion

4.1 Stationarity and bound test

To avoid spurious regression, it is paramount to conduct a unit root test (Shrestha and Bhatta, 2018). The Augmented Dickey–Fuller (ADF) (Dickey and Fuller, 1981) and Phillips–Perron (PP) (Phillips and Perron, 1988) tests, which test the null hypothesis of a unit root, are used. The hypothesis is rejected if the ADF or PP statistic is greater than the 5% critical value in absolute terms. A maximum lag of two was used in the study based on the Akaike Information Criterion (AIC).

The results of the unit root test reveal a mixed order of integration (I(0) and I(1)), as shown in Table 1. However, it is essential to verify the long-run convergence of the variables using the bound test proposed by PesaranShin and Smith (2001).

Cointegration is confirmed in the bound test if the F-statistics value exceeds the upper bound (I(1)) or when the value of F-statistics is greater than the T-statistics (PesaranShin and Smith, 2001). The bound test results in Table 2 indicate cointegration among the variables, as the F-statistic value of 14.274 exceeds the upper bounds at all critical values. Therefore, the conclusion requires two estimates: the short-run ARDL and the long-run ECM.

4.2 ARDL short- and long-run estimates

The short-run results in Table 3 indicate that the past realization of the poverty rate has a positive effect on the current poverty rate. This means the past poverty rate affects the current poverty rate by 0.874% at a 1% significant level, *ceteris paribus.*

The short-run results further reveal that AVA and SVA are positively linked with the poverty rate. A percentage point increase in AVA and SVA is associated with a 0.222 and 0.154% point increase in the poverty rate at a 5% significant level, respectively. On the other hand, the second lag of MVA has a positive effect on the poverty rate, where a percentage increase in MVA increases the poverty rate by 0.63% at a 1% significant level, while IVA increases the poverty rate by 0.357% at a 1% significant level.

Test types	Variables	Test statistics at level Constant with trend	 Constant with drift	Test statistic at first difference Constant with trend	 Constant with drift	Decision
ADF	PA	−3.745***	−0.259	–	–	I(0)
	AVA	−6.021***	−6.371***	–	–	I(0)
	MVA	0.245	−1.270	−3.168	−2.471***	I(1)
	SVA	−2.690	−2.937***	–	–	I(0)
	IVA	−3.486	−2.503***	–	–	I(0)
pp	PA	−3.160***	0.357	–	–	I(0)
	AVA	−3.395	−3.718 ***	–	–	I(0)
	MVA	−0.018	−1.335	−5.103 ***	−4.888***	I(1)
	SVA	−2.266	−2.997***	–	–	I(0)
	IVA	−3.627***	−2.576	–	–	I(0)

Note(s): *** Indicates 1% significance levels
Source(s): Computed by author

Table 1.
Unit root test

CV	Lower bound I(0)	Upper bound I(1)
1%	−3.43	−4.60
5%	2.86	4.01
10%	−2.57	−3.66

F-statistic = 14.274, t-statistics = −2.921

Source: Computed by Author

Table 2.
ARDL bounds test for co-integration

Variables	Coefficient	Standard errors
Short-run estimates		
L.PA	0.874***	(0.043)
AVA	0.568***	(0.150)
L.AVA	−0.142	(0.091)
L2.AVA	0.222**	(0.083)
MVA	0.0942	(0.202)
L.MVA	−0.350	(0.255)
L2.MVA	0.630***	(0.212)
SVA	0.289**	(0.101)
L.SVA	0.154**	(0.071)
IVA	0.357***	(0.107)
Constant	−44.65***	(11.08)
Long-run estimates		
ECM	−0.126***	(0.043)
AVA	5.13***	(2.415)
MVA	2.96***	(0.652)
SVA	3.51***	(1.592)
IVA	2.83***	(1.245)
Observations	30	
D-Watson	2.293	
R-squared	0.8247	

Note(s): *** signifies 1% level of significance while ** stands for 5% significant level
Source(s): Computed by Author

Table 3.
ARDL short-run and long-run estimate (1, 2, 2, 1, 0)

In the long-run, as seen in Table 3, all variables are found to have a positive effect on poverty alleviation at a 1% significant level. This indicates that AVA, MVA, IVA, and SVA have a significant role to play in reducing poverty in SSA countries, which confirms past empirical investigations (Chidiebere, 2020; Elahinia *et al.*, 2019; Hårsmar, 2022; Obiakor *et al.*, 2021). The agricultural sector, however, has a stronger effect in reducing poverty than other sectors used in the study. It reduces poverty by 56.8% in the short run and 5.13% in the long-run. The service sector, though having a wider share of GDP, has not matched the trend of the research expectation as it reduces poverty by 28.9% in the short run and 3.51% in the long-run. Thus, SSA has not experienced immature structural transformation. However, the government needs to focus on other sectors. Suryahadi *et al.* (2012) find that the agricultural sector is only important in reducing poverty in rural areas. Thus, Kadir and Rizki (2016) advise that to reduce poverty, the government should develop other sectors.

The adjustment term (−0.126) is significant at a 1% level, signifying that earlier years' errors are rectified in the recent year at a speed of 12.6%. The R-square of 0.8247 shows that about 82% of the variation in poverty reduction is explained by the variation in sectoral value-added while 18% is explained by the error term. The Durbin–Watson statistic of 2.293 also shows no evidence of serial correlation.

4.3 Granger causality results

The decision criteria for the Granger test is to reject the null hypothesis of no causality if the p-value is lower or equal to 0.05. The Granger causality results in Table 4 reveal that AVA, MVA, and SVA Granger cause the poverty rate. The results further indicate that there is a unidirectional causality between SVA and the poverty rate, MVA and AVA and MVA and SVA while there is bidirectional causality between MVA and the poverty rate and AVA and the poverty rate.

4.4 Diagnostic test

The diagnostics results in Table 5 indicate no serial correlation and heteroscedasticity in the model. Additionally, the residual term follows a normal distribution, and the model is correctly specified. The stability of the model is also supported by the stable CUSUM and CUSUM square graphs, as shown in Figure 2, which remain within the 5% critical limit.

Table 4.
Granger causality test

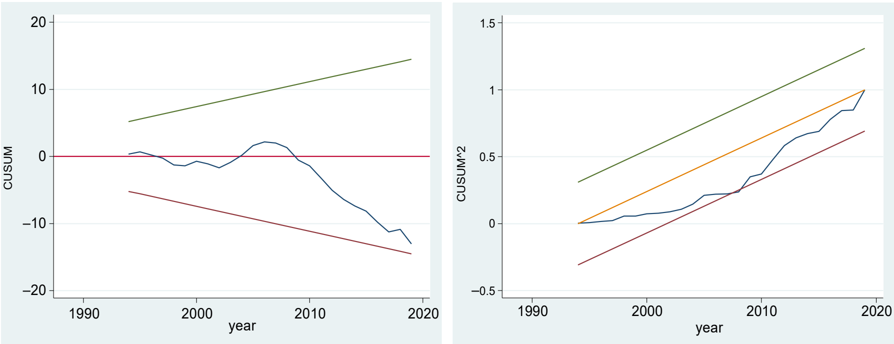
			p-values			
Dependent variable	PR	AVA	MVA	SVA	IVA	Direction of causality
PR		0.073	0.000	0.038	0.108	AVA, MVA&SVA > PR
AVA	0.083		0.099	0.222	0.386	PR, MVA > AVA
MVA	0.000	0.326		0.990	0.775	PR > MVA
SVA	0.669	0.088	0.023		0.102	AVA & MVA > SVA
IVA	0.764	0.711	0.371	0.820		–

Source(s): Computed by author

Table 5.
Result of diagnostic test

Test	p-values	Null hypothesis(Ho)	Decision
White Heteroscedasticity Test	0.4140	No conditional heteroscedasticity	Fail to reject Ho
Breusch-Godfrey LM test	0.1351	No higher-order autocorrelation	Fail to reject Ho
Jarque-Bera test	0.4001	There is normality in residuals	Fail to reject Ho
Ramsey RESET Test	0.9113	The model is correctly specified	Fail to reject Ho

Source(s): Computed by Author



Source(s): Computed by Author, (2022)

Figure 2.
The CUSUM and CUSUMSQ graph

5. Conclusion and recommendations

Despite prudent macroeconomic policies that have been adopted in SSA to shift their economies from labor-intensive to capital-intensive methods of production, aiming to reduce the share of GDP in the agricultural sector and increase the share of the manufacturing and service sectors, the agricultural sector remains a vital activity for poverty alleviation. Hence, this study aimed to examine the contribution of valued-added share in different sectors and its relationship with poverty alleviation. The findings of the study reveal that all sectors analyzed have a positive and significant impact on poverty alleviation in both the short and long run, with the agricultural sector being particularly effective in reducing poverty. The study also shows evidence that Sub-Saharan African countries are facing stagnant structural transformation. Based on these conclusions, the study recommends the following.

First, SSA economies should revive their industrial and manufacturing sectors through private sector investments to add value to agricultural production. It is also crucial to allocate adequate resources to research and development to enhance innovation, technology, and capital accumulation. These steps are necessary for sustainable long-term growth. Second, there is also a need for investment in efficient infrastructural development, including electricity, transportation sectors, and ICTs (Information and Communication Technologies). This will strengthen the manufacturing and industrial sectors, which are considered the engines of economic growth and poverty alleviation.

However**,** for a comprehensive assessment of structural transformation in SSA countries, it is imperative to examine the role of other sectors such as the transportation sector, energy sector, human capital, agricultural prices, agricultural inputs and equipment, and the role of the government.

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Appendix

Table A1. Descriptive statistics and variance inflation factor (VIF)

Variables	Obs	Mean	Std. Dev	min	max	Variance	Skewness	Kurtosis	VIF
PA	32	22.434	4.790	14.8	29	22.944	−0.246	1.583	–
AVA	32	16.654	1.366	14.896	20.571	1.582	1.379	4.497	4.01
MVA	32	12.621	2.541	9.532	16.618	6.457	0.317	1.546	1.79
SVA	32	49.222	2.134	44.043	53.511	4.554	−0.165	3.219	6.27
IVA	32	27.538	1.699	22.957	30.398	2.886	−0.863	3.572	5.09

Source(s): Computed by Author, 2022

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