



## **Harnessing Agriculture for Economic Growth: A Study of Sub-Saharan Africa using the Arellano-Bover/Blundell-Bond Estimation Model**

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### **ABSTRACT**

Despite facing various challenges, agriculture remains a vital pillar for economic development in Sub-Saharan African countries. This paper examines the role of agricultural growth in promoting economic development across fifteen SSA nations from 1990 to 2024, utilizing the Arellano-Bover/Blundell-Bond (ABBB) estimation model. A significant contribution of this paper is its use of Dynamic Panel Data analysis to explore the complex relationship between agricultural sector development and economic growth while controlling for the dynamics of the manufacturing industry and population growth. The findings reveal a significant positive correlation, indicating that a 1% increase in agricultural growth leads to a 0.2% increase in GDP per capita. This underscores agriculture's essential role as a catalyst for economic progress, consistent with the Dual Economy framework. Additionally, the results show a positive effect of the manufacturing sector on economic growth, where a 1% increase in manufacturing output results in a 0.03% increase in GDP per capita. Conversely, the study identifies a negative impact of population growth, with a 1% increase correlating to a 1.1% decrease in GDP per capita, highlighting the challenges posed by rapid demographic changes. The study recommends that policymakers prioritize investments in agricultural technology and infrastructure, enhance educational initiatives to develop a skilled workforce, and implement effective population management strategies. Furthermore, fostering public-private partnerships can stimulate investments in agriculture and manufacturing, leading to diversified economies. Thus, by adopting these strategies, SSA countries can leverage their agricultural potential to achieve sustainable economic growth and improved living standards, ultimately enhancing global economic competitiveness.

**Keywords:** Agriculture; Economic Growth; Sub-Saharan Africa; Manufacturing Industry; Population Growth.

**JEL Codes :** O13, O47, O55, C33

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## 1. INTRODUCTION

Agriculture remains a cornerstone of economic development in many Sub-Saharan Africa (SSA) countries, contributing significantly to the region's Growth Domestic Product (GDP) per capita<sup>2</sup>, food security, and employment creation (Sassi, 2023; Kanza et al., 2022; Jarzebski et al., 2020). According to the OECD-FAO report (2016), approximately 60% of the population in Sub-Saharan Africa relies on agriculture for their livelihoods, with the sector accounting for more than 20% of the region's GDP. Additionally, Agriculture contributes 15% of total GDP in SSA; however, it ranges from below 3% in Botswana and South Africa to more than 50% in Chad, implying a diverse range of economic structures (OECD-FAO, 2016). Furthermore, the World Bank (2025) recently reported that between the year 2023 and 2024, Agriculture sector contribution to the GDP of Tanzania was approximately 24% and 23%, Botswana remained 2%, Rwanda 27% and 25%, Zambia 2.2% and 1.8%, Zimbabwe 4% and 5%, Mozambique 25.9% and 26.3%, Lesotho 6.6% and 6.5%, Kenya 22% and 21%, Egypt 11% and 14%, Cameroun 17.3% and 17.4%, Gabon 6.3% and 6.2%, Mali 32.5% and 33.5%, Senegal 17.4% and 15.5%, Chad 35% and 32% and South Africa 2.6% and 2.9% respectively. These dynamic statistics indicate that agriculture still needs more efforts to enhance its role in catalysing economic growth in Sub-Saharan African countries. On top of that, the World Bank estimates that agricultural growth is nearly twice as effective in reducing poverty compared to growth in other sectors of the economy (World Bank, 2025). Nevertheless, with the growing population in SSA countries, agriculture remains the key source of food and nutrition, supporting more than 800 million workers and families for sustainable development (Wudil et al., 2022).

Despite agriculture's potential as a driver of economic growth, many Sub-Saharan African countries have failed to capitalize on this opportunity for their economic development (Kohnert, 2025; Bjornlund et al., 2020), for instance, Botswana, Zambia, and Zimbabwe. Various structural and institutional barriers hinder agricultural productivity and economic development in the region (Adenle et al., 2028). Additionally, agricultural productivity has stagnated, and the sector faces numerous challenges, including climate change, inadequate infrastructure, and limited access to markets and financing (Chand, 2022). Besides, Wudil et al. (2022) justify that “the high food insecurity rate in Africa is due to many factors, including low agricultural productivity, harsh climatic conditions, slow economic growth, poor governance, a dearth of research and innovation, and many other factors”. Moreover, the interplay between agricultural growth and broader economic indicators, such as Manufacturing industries and Population growth, remains inadequately understood. Thus, without a clear understanding of these dynamics, policymakers may struggle to design effective interventions that foster growth and improve livelihoods in SSA.

Furthermore, the existing literature (Mwangi et al., 2020; Dorosh & Thurlow, 2018; Ssozi et al., 2019) has explored the relationship between agriculture and economic growth using other methods such as Granger causality tests, economy-wide models, and generalized method of

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2 GDP per capita is used as a proxy for Economic Growth/Development in this study. GDP per capita is a key economic indicator that measures the average economic output per person in a specific region, usually a country, over a given time period. Usually, provides a useful way to assess the economic performance and standard of living in different countries, allowing for comparisons between regions.

moments. However, there remains a significant gap in empirical studies utilizing dynamic panel data models to analyse this relationship in Sub-Saharan Africa. This study aims to fill this gap by applying the Arellano-Bover/Blundell-Bond (ABBB) model to investigate the effect of agricultural growth on economic development across fifteen Sub-Saharan African countries. Those SSA sampled countries for study include Tanzania, Botswana, Rwanda, Zambia, Zimbabwe, Mozambique, Lesotho, Kenya, Egypt, Cameroon, Gabon, Mali, Senegal, Chad, and South Africa. This empirical study uses balanced panel data from 1990 to 2024 extracted from the World Bank dataset. The Arellano-Bover/Blundell-Bond (ABBB) estimation model offers a robust econometric framework for addressing issues of endogeneity and unobserved heterogeneity that are prevalent in agricultural economics. On the other hand, this paper contributes to the existing body of knowledge by providing a nuanced understanding of how agricultural growth influences economic performance in Sub-Saharan Africa. Thus, by employing the ABBB model, the study will yield more reliable estimates of the causal relationship between agriculture and economic growth while controlling for Manufacturing industrial growth and Population growth. The study considers Manufacturing industrial growth as a control variable because the performance of the manufacturing sector can significantly impact overall economic growth. An expanding manufacturing base may create demand for agricultural products, thus influencing agricultural growth and its economic contributions (Fukase & Martin, 2020). Moreover, Population dynamics affect labour supply, demand for goods, and resource allocation. A growing population can increase the demand for agricultural products and services, which may in turn influence agricultural productivity and economic outcomes (Hemathilake & Gunathilake, 2022). Thus, controlling for these important variables helps to analyse the unique contribution of agricultural sector on the economic development of SSA countries. Basically, this study endeavours to provide novel insights that will not only enrich academic discourse but also support policymakers in crafting effective strategies aimed at leveraging agriculture for economic growth in Sub-Saharan Africa.

The primary purpose of this study is to analyse the intricate relationship between agricultural growth and economic development in Sub-Saharan Africa, using the ABBB model to provide empirical evidence that can inform policy decisions. Thus, by understanding how agricultural productivity influences economic growth, the study aims to highlight pathways for sustainable development in the region. Nevertheless, the central research question guiding this study is: "How does agricultural growth influence economic development in Sub-Saharan Africa when analysed through the Arellano-Bover/Blundell-Bond framework?"

The remaining part of this paper is structured as follows: Section two (2) provides a literature review, Section three (3) gives details of the methodology, Section four (4) presents results and discussion, Section five (5) presents the conclusion and policy implications.

## **2. LITERATURE REVIEW**

### **2.1 Theoretical review**

The theoretical framework for this study borrows the idea enshrined in the theory of Dual Economy. Sir Arthur Lewis primarily articulated this theory in the 1950s, and it provides a framework for understanding the coexistence of distinct economic sectors within a society (Lewis, 1954). In his influential work, "Economic Development with Unlimited Supplies of Labor" (1954), Lewis identified a traditional agricultural sector characterized by low productivity and subsistence farming, alongside a modern industrial sector that enjoys higher productivity, capital investment, and technological advancement (Lewis, 1954). This theory emerged from observations of economic structures in colonial and post-colonial contexts,

where agricultural practices remained dominant despite the presence of industrial activities (Lewis, 1954). Thus, by delineating these two sectors, Lewis laid the groundwork for analyzing how they interact and influence overall economic development, as this study does in its context.

This theory is particularly relevant to this study, given the SSA region's unique economic landscape. Many countries in Sub-Saharan Africa exhibit characteristics of dual economies, where a significant proportion of the population depends on agriculture for their livelihoods, while industrial growth remains limited (Bjornlund et al., 2020; Jarzebski et al., 2020). In addition to that, a large portion of the population relies on subsistence agriculture, while a smaller segment engages in industrial activities (Jarzebski et al., 2020). Thus, this framework allows exploring the dynamics between agricultural productivity and industrialization, providing insights into how agricultural growth can catalyze broader economic development in SSA. It is essential for understanding the structural challenges that hinder the harnessing of the agriculture sector for economic progress in the region.

Furthermore, in the context of Sub-Saharan Africa, the relevance of the Dual Economy Theory cannot be overstated. With a large segment of the population engaged in agriculture (Bjornlund et al., 2020), understanding the relationship between agricultural growth and industrial development is critical for formulating effective economic policies. The study underscores leveraging policy insights from the theory to design strategies that not only enhance agricultural productivity but also foster industrial growth, ultimately leading to sustainable economic development. Furthermore, by analyzing the interactions between these sectors, the study will address structural challenges such as market access, technological adoption, and investment needs that significantly impact economic performance in SSA region.

Moreover, the Dual Economy theory is built on several key assumptions that are crucial for this analysis (Lewis, 1954). First, it posits a clear distinction between the traditional and modern sectors, each with its own characteristics and functions. Second, the theory highlights the potential for labor mobility, suggesting that as agricultural productivity improves, surplus labor can transition to more productive industrial jobs, thereby contributing to economic growth. Additionally, it emphasizes the importance of capital accumulation, asserting that profits from the modern sector can be reinvested to enhance productivity in both sectors. Lastly, the theory acknowledges the existence of market imperfections, such as limited access to credit and technology, which can impede the growth potential of the agricultural sector. In contrary, the Dual Economy Theory has faced various criticisms, primarily regarding its oversimplification of complex economic systems. Critics argue that (Hodson & Kaufman, 1982) the theory inadequately captures the intricate interactions between the modern and traditional sectors; often failing to account for how these sectors can influence and support each other. Additionally, the theory tends to highlight disparities without addressing the potential for integration and growth that can arise from these interactions. Some economists also contend that the concept can lead to a deterministic view of economic development, suggesting that countries must transition from a dual economy to a singular, modern economy, which may not reflect the diverse paths that different nations can take. Furthermore, the theory has been criticized for its lack of attention to the social and political factors that shape economic behaviour, thereby neglecting the broader context in which economic activities occur.

Therefore, this study connects to the central idea of the Dual Economy Theory, which provides a comprehensive lens for analysing agricultural growth and its role in economic development in Sub-Saharan Africa. Thus, by focusing on the dynamics of labor mobility, capital accumulation, and market imperfections, this framework will guide effective policy

interventions aimed at leveraging agriculture for sustained economic growth. In that case, applying this theory within the study context offers valuable insights that will inform both academic discourse and practical policymaking for improving agricultural development and sustainable Economic growth in the region.

## 2.2 Empirical Literature Review

The relationship between agricultural growth and economic development has garnered significant attention in empirical literature, particularly within the context of Sub-Saharan Africa. Numerous studies have explored how agricultural productivity can catalyse broader economic transformation, especially in regions characterized by dual economies (Bjornlund et al., 2020; Jarzebski et al., 2020). The following are the previous empirical studies reviewed by this study to reveal the existing gap that needs to be addressed, as well as presenting some comparison situations from other countries or regions.

Mwangi et al. (2020) investigated the causal links among agricultural imports, agricultural productivity, and economic growth in 40 sub-Saharan African countries over the period 1990 to 2015 using Granger causality tests and the generalized two-stage least squares. However, the weakness of Granger causality tests is that they only indicate a temporal precedence between variables and do not establish true causality. Conversely, the weakness of the Generalized Two-Stage Least Squares method is its reliance on the assumption of the correct specification of the model and the validity of the instruments used. If the instruments are weak or endogenous, the estimates produced can be biased and inconsistent, undermining the reliability of the results. Besides, the results of their study revealed bidirectional causality between agricultural imports and agricultural productivity in the full sample, and in middle and low-income non-oil-exporting countries. The relationship between agricultural imported inputs and agriculture productivity is positive and significant. In addition, unidirectional causality from agricultural imports to economic growth was observed in the full sample and middle-income non-oil exporters. The growth elasticity of agricultural imports was about 1.0 in the full sample and 1.3 in the middle-income group. These results then cast new light on the importance of agricultural imports for growth and development in the African region.

Sassi (2023) conducted a study on “Economic connectedness and pro-poor growth in sub-Saharan Africa: The role of agriculture”. This study was specifically carried out in nine Eastern, Western, and Central African countries using the inter-industry linkages analysis employing the Nexus project SAMs data by the International Food Policy Research Institute. Afterward, it investigated the income distribution multipliers of activity growth across households classified in quantiles in rural and urban areas. The results indicate that, apart from country-specific factors, the results confirm the strong integration of agriculture with the economy. The growth of key agricultural activities presents the most pronounced multiplicative effect on the income of rural households in the lowest quantiles. Poor urban households also benefit from their growth, but not to the same extent as rural households, with an increase in the rural–urban income gap.

Kanza et al. (2022) conducted a study in 26 SSA countries using panel data from 1955 to 2011 by utilizing the rates of assistance indices method. The results indicate that the overall policy orientation of SSA governments is biased against agriculture. Still, within the specific policy dimensions, there was a significant bias towards cash over food crops and exports over imports. The result also shows that the level of government assistance in resource-rich countries decreased as the rural population share increased above 57%. These multifaceted results indicate the loose nuts of the SSA policy governance towards Agricultural promotion for economic development.

Vicente Cateia et al. (2024) examined the effects of improved agricultural productivity (IAP) on structural transformation and poverty in Guinea-Bissau from 2014 to 2030, utilizing a recursive dynamic computable general equilibrium (CGE) model. The findings revealed a positive impact of IAP on economic growth and sectoral output. The accumulation of wealth and labour savings within agriculture facilitated reinvestments in the manufacturing and services sectors, leading to a migration of rural workers away from agriculture. Additionally, there are long-term positive welfare outcomes resulting from increased real income and household consumption, with the most significant benefits observed among the poor in both rural and urban areas. The study advocates for an agricultural development agenda aimed at fostering structural transformation in Guinea-Bissau and enhancing the living standards of disadvantaged populations.

However, Agriculture's contribution to economic development presents a contrasting picture between Africa and other regions. For example, in Asia, particularly during the Green Revolution, agriculture catalyzed broader economic transformation through increased productivity, labor exit, and savings transfers to the industrial sector (Sarker et al., 2025). This led to significant reductions in poverty and improved food security (Sarker et al., 2025; FAO, 2025). While agriculture's share of GDP has declined as Asian economies have diversified, its initial role was crucial in jumpstarting economic growth (Sarker et al., 2025). In contrast, Africa has experienced a more gradual agricultural transformation, with productivity growth lagging behind Asia (FAO, 2025; Jarzebski et al., 2020). Although there have been improvements in recent years, agriculture in Africa is still characterized by small-scale farming and vulnerability to climate-related shocks, and it has struggled to achieve the same level of broad-based economic impact as seen in Asia (Hemathilake & Gunathilake, 2022). This is evidenced by the study conducted by Sarker et al. (2025) in South Asia and Africa, which used a four-stage paradigm of agricultural transformation techniques. The results indicate that in South Asia, agricultural employment declined sharply, with Bangladesh dropping from 80% in 1973 to 35% in 2023, and India from 70% to 37%. Africa saw a more gradual decline, from 70% to 48% during the same period. Productivity improvements highlight regional progress, with agricultural productivity growth rising in Bangladesh (3.3% to 4.1% by 2023) and Kenya (3.3% to 4.1%), while manufacturing productivity surged in Kenya (6.6%) and India (5.2%). South Asia's growth leverages high-yield crops and market integration from the Green Revolution. At the same time, Africa focuses on climate-smart agriculture, diversification, and community-based solutions to address climate vulnerabilities and infrastructure gaps. This highlights the different trajectories, with Asia leveraging high-yield crops and market integration, while Africa focuses on climate-smart agriculture and community-based solutions.

Zhang et al. (2023) conducted a study in China using time series data from 1997 to 2020, employing both the Coupling Coordination Degree (CCD) model and the Local Spatial Autocorrelation Model. Their research examined the relationship between Agricultural and Rural Green Development Efficiency (ARGDE) and Economic Growth, focusing on coordination and spatial correlation. The findings indicate that ARGDE in China showed a phased growth trend significantly influenced by policies from 1997 to 2020, with interregional ARGD producing a hierarchical effect. However, provinces with higher ARGDE did not necessarily experience faster growth, resulting in a varied optimization pattern characterized by continuous optimization, phased optimization, and on-going deterioration. Over time, ARGDE demonstrated notable upward jumps. Additionally, the CCD between ARGDE and economic growth improved, revealing a clear trend of high-high agglomeration shifting from the eastern

and north eastern provinces to the central and western regions. This implies that promoting "quality agriculture" and "green agriculture" could play a crucial role in enhancing ARGD development. Moving forward, it is essential to facilitate the transformation of ARGD while minimizing the risk of undermining its coordinated relationship with economic growth.

On the other hand, this study considers looking at the potential effects of the manufacturing industry sector and Population growth on economic growth in the SSA region. For example, Moyo and Jeke (2019) assessed the impact of the manufacturing sector on economic growth in 37 African countries using the System-GMM Model for the period between 1990 and 2017. The results show that manufacturing value has a positive effect on economic growth in African countries. Therefore, it is recommended that policymakers enact measures to boost manufacturing output. Besides, Peter and Bakari (2018) examined the impact of population growth on the economic growth of 53 African countries using a panel data approach from 1980 to 2015. The study used descriptive statistics and dynamic panel models of difference and system GMM. The results of the difference and system GMM suggest that population growth exerts a positive impact on the economic growth of Africa. At the same time, fertility has a negative impact on the economic growth of Africa. The study recommends that population growth has a positive impact on economic growth. Thus, African countries should adopt and implement pragmatic policy measures that will enhance the productivity of their population to reap more demographic dividends.

Overall, the reviewed literature indicates a methodological gap, as most of the studies utilized other empirical models such as Granger causality tests, generalized two-stage least squares, inter-industry linkages analysis, and System-GMM models. However, this study aims to fill the identified gap by employing the Arellano-Bover/Blundell-Bond (ABBB) model, which underscores a novel contribution to the discourse in agricultural economics both in Africa and globally.

### **3. METHODOLOGY**

#### **3.1 Data type, source, and analysis**

The data utilized in this study are purely quantitative time series panel data from 1990 to 2024, extracted from the World Bank dataset based on development indicators in fifteen countries within the SSA region (World Bank, 2025). Additionally, STATA software was employed as an econometric tool for the analysis and operationalization of the empirical econometric model used in this study.

#### **3.2 Model of estimation**

This study employs an Arellano-Bover/Blundell-Bond estimation model to investigate the intricate nexus between agricultural growth and Economic Growth (GDP per capita), while controlling for Manufacturing industrial growth and Population growth across the Sub-Saharan Africa region. This model is one of the Dynamic Panel Data (DPD) regression models used in panel time series data. The model is fit for the analysis in this study because it employs Generalized Method of Moments (GMM) to analyze dynamic panel data, allowing researchers to address issues of endogeneity and unobserved heterogeneity (Cheng and Bang, 2021). This approach utilizes lagged values of the dependent variable as instruments, enhancing the efficiency of estimates by combining both first-differenced and level equations. Thus, by relying on these GMM techniques, the model provides robust forecast even in the presence of weak instruments and autocorrelation in the error terms. Since agricultural development aspects may influence each other in the long run, the inclusion of lagged dependent variables calls for a robust strategy to avoid biased estimation. By providing precise and consistent estimates, the

method ensures a better understanding of the dynamic relationship between Economic growth and agricultural development, thereby allowing better policy decisions for sustainable development in the SSA region. In addition to this, the model has also included Manufacturing industrial growth and population growth as control variables in order to provide a truer explanation of the direct link between agricultural development and economic growth under the general economic and institutional framework in the SSA countries. The detailed explanation of the key variables used in this study is indicated in Table 1.

Besides, the Arellano-Bover/Blundell-Bond estimation model relies on several key assumptions to produce consistent and efficient estimates in dynamic panel data settings. Firstly, it assumes that the error term is not correlated with the regressors, which is crucial for obtaining unbiased estimates. Secondly, it assumes that lagged dependent variables can serve as valid instruments for current endogenous variables, provided that the instruments are uncorrelated with the error term. Thirdly, the model assumes that the panel data is sufficiently large, allowing for the use of both levels and first differences to improve efficiency. Additionally, it presumes that the individual effects are uncorrelated with the explanatory variables, ensuring that the model can adequately control for unobserved heterogeneity. These assumptions are essential for the robustness of the estimates derived from the model.

**Table 1. Variable names, Units of measure, and Data sources**

| Variable name          | Units of measure                                                  | Sources                |
|------------------------|-------------------------------------------------------------------|------------------------|
| GDP per capita         | Annual %                                                          | World Bank (1990-2024) |
| Agriculture Growth     | Agriculture, forestry, and fishing, value added (annual % growth) | World Bank (1990-2024) |
| Manufacturing Industry | Manufacturing, value added (annual % growth)                      | World Bank (1990-2024) |
| Population Growth      | annual %                                                          | World Bank (1990-2024) |

Source: World Bank (2025)

### 3.3. Empirical econometric model

The Arellano-Bover/Blundell-Bond econometric model used in this study is designed to estimate agriculture development and economic growth, with manufacturing industry and population growth as control variables, and to eliminate the unobserved heterogeneity problem among SSA countries. The equation for the level of the simple Dynamic Panel Data model can be described as;

$$Y_{it} = \alpha + \beta_1 Y_{it-1} + \beta_2 X_{it} + \beta_3 Z_{it} + \varepsilon_{it}$$

Where;

$Y_{it}$  = dependent variable (GDP per capita) for country  $i$  at time  $t$

$Y_{it-1}$  = lagged dependent variable (the value of  $Y$  at the previous period).

$X_{it}$  = vector of independent variables (Agriculture).

$Z_{it}$  = vector of control variables (Manufacturing Industry and Population Growth),  $\alpha$  = constant term;  $\varepsilon_{it}$  = error term.

Hence, to apply the Arellano-Bover/Blundell-Bond estimation, the model is usually converted into a first-order equation to remove unobserved individual effects, referred to as the first-difference estimation equation, which is used in this study.

Thus;

$$\Delta Y_{it} = \beta_1 \Delta Y_{it-1} + \beta_2 \Delta X_{it} + \beta_3 \Delta Z_{it} + \Delta \varepsilon_{it}$$

Where;

$\Delta Y_{it} = Y_{it} - Y_{it-1}$  denote the change in the dependent variable (GDP per capita)

$\Delta X_{it} = X_{it} - X_{it-1}$  denote the change in the independent variables (Agriculture)

$\Delta Z_{it} = Z_{it} - Z_{it-1}$  denote the change in control variables (Manufacturing Industry and Population Growth)

$\beta_{1,2,3}$  represent the coefficients of estimation in the model

$\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$  denote the change in the error term. Basically, differencing the error term is used to eliminate unobserved individual effects that could be biasing the estimates. This is particularly necessary in the context of panel data settings, where individual-specific variables may influence the dependent variable. Second, differencing the error term is useful to ensure the model estimates unobserved heterogeneity appropriately and yields stable estimates in dynamic panel data analysis.

## 4. RESULTS AND DISCUSSION

### 4.1. Unit root test

Running panel time series data requires testing for stationarity of all variables to avoid running a spurious regression model with invalid estimated results. The results in Table 2 indicate that all variables were stationary at the level when tested using the Levin-Lin-Chu test. During testing, the hypotheses were:  $H_0$ : Variables are non-stationary and  $H_1$ : Variables are stationary. Thus, given the existing regression results, we reject  $H_0$  and conclude that variables are stationary.

**Table 2. Regression results for Levin-Lin-Chu unit-root test**

| Variable               | t-statistic (adjusted t*) | p-value (critical, level-0.05) |
|------------------------|---------------------------|--------------------------------|
| GDP per capita         | -5.4723                   | 0.0000**                       |
| Agriculture Growth     | -9.7471                   | 0.0000**                       |
| Manufacturing Industry | -4.8254                   | 0.0000**                       |
| Population Growth      | -4.2340                   | 0.0000**                       |

Source: World Bank (2025)

Note: \*\* $p < 0.05$ -significant

### 4.2. Regression estimates for the effect of agricultural development on the Economic Growth of SSA countries

The results in Table 3 are statistically significant ( $p < 0.05$ ), indicating that past economic performance has a positive influence on current performance; specifically, a 1% increase in lagged GDP is associated with an approximately 0.1% increase in current GDP per capita. This finding underscores the importance of historical economic growth as a predictor of future

performance, suggesting that investments and policies fostering economic development in previous periods can yield ongoing benefits. The persistence of economic growth implies that enhancing productivity and stability in prior years sets a foundation for sustained growth in the present (World Bank, 2025). Consequently, this relationship highlights the necessity for policymakers to focus on long-term strategies that prioritize economic resilience and growth, as these efforts can create a virtuous cycle of increasing GDP per capita over time. Such insights are crucial for formulating economic policies aimed at fostering sustainable development and improving living standards in the SSA region.

Furthermore, the results indicate a robust positive effect of agricultural growth on economic growth, revealing that a 1% increase in agricultural growth is associated with approximately a 0.2% increase in GDP per capita in the Sub-Saharan Africa (SSA) region, with statistical significance at the 0.05 level. This finding underscores the pivotal role that agriculture plays in driving economic development, aligning closely with the Dual Economy theoretical framework proposed by Lewis in 1954 (Lewis, 1954). According to this framework, the development of the agricultural sector is essential for fostering economic growth in developing countries, as it provides not only a source of food and employment but also the necessary surplus to stimulate industrialization and investment. In the context of SSA, where a significant portion of the population relies on agriculture for their livelihoods, enhancing agricultural productivity can lead to improved economic outcomes and poverty reduction (Sarker et al., 2025; Jarzebski et al., 2020). Thus, these insights affirm the need for targeted agricultural policies and investments that can harness the sector's potential, ultimately contributing to sustainable economic growth and development in the region. Basically, this fact is also supported by the previous studies, for example, Mwangi et al. (2020) identified bidirectional causality between agricultural imports and agricultural productivity across the entire sample, as well as in middle- and low-income non-oil-exporting nations. Their findings indicate a positive and significant relationship between imported agricultural inputs and agricultural productivity. Additionally, a unidirectional causality was noted from agricultural imports to economic growth in both the overall sample and among middle-income non-oil exporters. The growth elasticity of agricultural imports is approximately 1.0 for the full sample and 1.3 for the middle-income group. These findings highlight the crucial role of agricultural imports in fostering growth and development within the African region.

Moreover, the econometric results from the model further indicate a positive effect of the manufacturing industry on economic growth, revealing that a 1% increase in manufacturing output results in a 0.03% increase in GDP per capita. This finding is statistically significant at the 0.05 level. This result underscores the critical role that the manufacturing sector plays in contributing to economic development, highlighting its potential to generate employment opportunities and enhance productivity (Moyo & Jeke, 2019). However, it also suggests that the impact of manufacturing on economic growth is relatively modest compared to the more pronounced influence of the agricultural sector. This disparity may reflect the unique position of agriculture in Sub-Saharan Africa, where it not only drives economic output but also sustains livelihoods for a large portion of the population (Sarker et al., 2025). While the manufacturing sector is crucial for diversification and industrialization, the comparatively more minor elasticity indicates that efforts to bolster economic growth may need to prioritize agricultural advancements to achieve more substantial and immediate impacts.

In contrast, the results indicate a negative effect of population growth on economic growth, revealing that a 1% increase in population is associated with a decrease of

approximately 1.1% in GDP per capita. This finding is highly significant at the 0.05 level, underscoring the potential challenges that rapid population growth poses to economic development in the SSA region. Such a negative relationship suggests that as the population expands, it places increasing strain on limited resources, such as food, water, and energy, which can hinder productivity and economic output (Peter & Bakari, 2018). Additionally, a growing population often leads to higher dependency ratios, meaning that a larger proportion of the population consists of dependents such as children and the elderly who are not actively contributing to the economy (Peter & Bakari, 2018). This dynamic can create further economic pressures, as fewer working-age individuals are available to support the needs of the dependents, thereby reducing overall economic productivity (Mahtta et al., 2022). Furthermore, the implications of this result highlight the importance of implementing effective population management strategies and investing in education and workforce development to ensure that population growth does not outpace economic opportunities. Ultimately, (Mahtta et al., 2022) addressing these challenges is crucial for fostering sustainable economic growth in the region, as it allows for a more balanced relationship between population dynamics and economic performance.

Overall, these results underscore the economic significance of harnessing the agriculture sector for the economic growth of the Sub-Saharan Africa (SSA) region through various avenues. Basically, the findings suggest that strategic investments in agricultural technology, training, and sustainable practices can yield substantial economic returns, making agriculture a critical driver of sustainable development. Thus, by enhancing agricultural productivity, countries can not only increase food security and improve nutrition but also generate surplus income that can be reinvested into other sectors of the economy. This reinvestment can lead to job creation, infrastructure development, and increased industrial activities, all of which contribute to a more vibrant economy. Furthermore, a thriving agricultural sector can stimulate local markets and foster rural development, reducing poverty levels and improving overall living standards. On top of that, prioritizing this sector, SSA countries can leverage their agricultural potential to achieve broader economic objectives, ultimately fostering resilience and stability in the face of global economic challenges.

**Table 3. Arellano-Bover/Blundell-Bond model regression estimates**

| Variables                    | Coefficient | Standard Error | T-statistic (z) | P-value ( z ) |
|------------------------------|-------------|----------------|-----------------|---------------|
| GDP per capita               | .0894476    | .0397381       | 2.25            | 0.024**       |
| L1                           |             |                |                 |               |
| Agriculture Growth           | .2225581    | .0239557       | 9.29            | 0.000**       |
| Manufacturing Industry       | .033734     | .012588        | 2.68            | 0.007**       |
| Population Growth            | -1.091817   | .1467651       | -7.44           | 0.000**       |
| Constant                     | 3.117586    | .3955745       | 7.88            | 0.000         |
| Number of observations = 510 |             |                |                 |               |
| Number of groups =15         |             |                |                 |               |

Source: World Bank (2025)

Note: \*\* $p < 0.05$ -significant

### 4.3. Validity/Robust model check

This study uses the Sargan test to check for the validity of the model. The Sargan test of over-identifying restrictions is a statistical test used in the context of the Arellano-Bover/Blundell-Bond estimation method to evaluate the validity of the instruments employed in the model (Cheng & Bang, 2021). Specifically, it assesses whether the instruments used are uncorrelated with the error term, which is a crucial assumption for obtaining consistent estimates. If the test indicates that the instruments are valid, it suggests that the model is well-specified and valid; however, a rejection of the null hypothesis ( $H_0$ : over-identifying restrictions are valid) if  $P<0.05$  implies that at least some of the instruments may be invalid, indicating potential issues with the model's assumptions or its specification. This test is essential for ensuring the reliability and robustness of the results obtained from the GMM estimation. The results in Table 4 indicate that  $P>0.05$ , which is not statistically significant thus failing to reject the null hypothesis and conclude that the model is valid and robust in this study.

**Table 4. Sargan test of over-identifying restrictions**

| Chi2(422) | Prob > chi2 |
|-----------|-------------|
| 394.0891  | 0.8314      |

Source: STATA output, 2025

*Note: \*\* $p<0.05$ -significant*

## 5. CONCLUSION AND POLICY IMPLICATIONS

This study assessed the contribution of the agriculture sector development in catalysing Economic Growth in Sub-Saharan Africa using the Arellano-Bover/Blundell-Bond Estimation Model with Dynamic Panel Data from 1990 to 2024. The study wanted to answer the question of “How does agricultural growth influence economic development in Sub-Saharan Africa when analysed through the Arellano-Bover/Blundell-Bond framework”. The positive relationship between agricultural growth and GDP per capita underscores the necessity of prioritizing this sector in the region, as a 1% increase in agricultural output is associated with a 0.2% increase in economic performance in the SSA region. This aligns with the Dual Economy framework, which emphasizes agriculture's importance in providing food, employment, and surplus for further industrialization. In contrast, the study reveals a concerning negative impact of population growth on economic growth, indicating that rapid population increases can strain resources and hinder productivity.

Therefore, policymakers need to develop comprehensive strategies that not only enhance agricultural productivity but also address population dynamics through effective management and educational initiatives. Thus, based on these insights, several key policy recommendations emerge. First, governments in Sub-Saharan Africa should prioritize investments in agricultural technology and infrastructure to boost productivity and sustainability. This includes providing access to modern farming techniques, improving irrigation systems, and facilitating access to markets for smallholder farmers. Second, there is a pressing need for educational initiatives that equip the workforce with skills relevant to agriculture and the manufacturing sector, thereby enhancing overall economic resilience. Third, policies should be developed to manage population growth effectively, including family planning and health education programs, which can help balance population dynamics with economic opportunities. Finally, fostering partnerships between the public and private sectors can stimulate investments in agriculture and manufacturing, creating a more diversified and robust economy. Hence, by implementing these

policy strategies, Sub-Saharan African countries can harness their agricultural potential to drive sustainable economic growth and improve the standard of living for their populations while spurring SSA countries to the top World economies.

Despite the valuable insights provided by this study, two observed limitations should be acknowledged. First, the study does not account for external factors such as political instability, environmental changes, or global economic trends, which can also significantly influence economic growth and agricultural productivity. Secondly, the model focuses primarily on quantifiable indicators, potentially overlooking qualitative aspects of agricultural development, such as social dynamics and cultural factors that may also play a crucial role in shaping economic outcomes. Thus, acknowledging these limitations is essential for contextualizing the findings and guiding future research efforts in this area.

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