



RESEARCH ARTICLE

Economic Growth, Good Governance and Agricultural Development in the West African Economic and Monetary Union (WAEMU) Countries: Analysis of the Impact of Official Development Assistance

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ABSTRACT

The main objective of this research was to analyze the effects of official development assistance (ODA) on economic growth and agricultural development in the West African Economic and Monetary Union (WAEMU) countries. The study covered a period of thirty (30) years from 1990 to 2020. We estimated our model using the Pooled Mean Group (PMG) method. The results of our estimations show that ODA positively influences economic growth and agricultural development in the WAEMU countries in the long term. On the other hand, its impact is negative in the short term for both variables. Also, political stability and control of corruption positively impact agricultural development. On the other hand, the interaction of ODA in a context of governance on GDP per capita is not significant. Thus, the relationship between official development assistance and economic growth must be supported by good governance. In view of our results, the resulting policy implications for improving the use of official development assistance flows in these countries are as follows: (i) Promote the quality of governance, a condition for the effectiveness of official development assistance in developing countries (improve transparency and management of flows received by creating aid monitoring committees within the national assemblies of each country, reduce corruption); (ii) Invest in promising sectors such as agriculture through the use of agricultural technologies and

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ARTICLE INFO

Received: 27 November 2025 | Revised: 17 January 2025 | Accepted: 23 January 2025 | Published Online: 14 April 2025
DOI: <https://doi.org/10.36956/rwae.v6i2.1524>

CITATION

DEME, E.H.Y., 2025. Economic Growth, Good Governance and Agricultural Development in the West African Economic and Monetary Union (WAEMU) Countries: Analysis of the Impact of Official Development Assistance. *Research on World Agricultural Economy*. 6(2): 290–303. DOI: <https://doi.org/10.36956/rwae.v6i2.1524>

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training farmers in advanced cultivation techniques; (iii) Strengthen human capital by training competent national experts capable of implementing policies adapted to the realities of the zone; (iv) Strengthen trade openness policies to facilitate trade within WAEMU countries.

Keywords: Official Development Assistance; Good Governance; Economic Growth; Agricultural Development; Pooled Mean Group; WAEMU

1. Introduction

Sub-Saharan African countries face low economic growth and insufficient income, which limits their ability to mobilize domestic resources to meet their considerable investment needs. This inability contributes to perpetuating the vicious cycle of poverty and keeping them in underdevelopment^[1]. In this light, Sub-Saharan African countries resort to foreign capital, the main one being official development assistance. Africa, as one of the largest recipients of ODA, received a net amount that increased from about \$26.72 billion in the 1990s to \$66.89 billion in 2020, according to World Development Indicator (WDI). **Figure 1** shows that over the period from 1990 to 2020, the GDP/capita of the West African Economic and Monetary Union (WAEMU) eight countries (Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal and Togo) is almost similar for the majority of the countries of the union and is evolving slowly but increasingly. Ivory Coast, Senegal and Benin have the highest GDP/capita in the zone, ranging from 900 to 2000 US dollars, while Niger ranks last with the lowest GDP/capita which is around 500 US dollars per capita. **Figure 2** shows an increase in official development assistance flows in the WAEMU zone from 2000 to 2020. Over the period from 2000 to 2010, the main countries that received the highest amounts of aid were mainly Côte d'Ivoire with its largest amount of \$2.33 billion in 2009, then Senegal with \$1.2 billion in 2004 and with \$1 billion in 2007 for Mali and Burkina Faso in 2009. Over the period from 2011 to 2021, aid flows continued to grow for the majority of countries in the union, with Côte d'Ivoire, Mali and Niger leading the way in 2019 and 2020. This increase coincides with the Covid-19 health crisis period. It is also noted that over the entire study period, Togo remains the country that received the least development aid in the zone. While ODA flows

decreased significantly in the 1990s, Burnside and Dollar^[2, 3] proposed a response to the criticism by demonstrating that the effectiveness of ODA depended on improving governance in recipient countries. This is how the concept of governance became a major topic in the literature on ODA. The governance indicators selected for our study are: (i) political stability which measures the likelihood that the government will be destabilized by unconstitutional and/or violent means, including terrorism, it is conducive to growth and development and creates an environment conducive to investment; and (ii) control of corruption which measures the extent of corruption and the manner in which public power is exercised for private ends. These indicators take values ranging from -2.5 to 2.5. **Figure 3** shows that over the period from 2000 to 2010, Benin was the most politically stable country in the WAEMU zone, followed by Mali and for a few years Burkina Faso, all with positive indicators, although very weak. Also over this same period we note that Ivory Coast is the most unstable country in the area with the lowest score which is -2.11 in 2004. Over this period Ivory Coast was marked by the political-military crisis due to the assault of several rebels who tried to take several cities in the country in 2002 and the post-election crisis which broke out following the contestation of the results of the second round of the presidential election. Then over the period from 2012 to 2020 the stability of all the countries in this area deteriorated with negative indicators including Mali becoming the most unstable country in the area with a score of -2.14 in 2020. This country has been sinking into political instability and armed conflicts since the military coup of 2012 and the occupation of the northern regions by armed groups. In **Figure 4**, we read that over the period from 2000 to 2020, all countries in the union have low corruption control scores. Only Burkina Faso and Senegal recorded positive scores in 2000 and 2002. Also,

Ivory Coast and Togo remain the countries with the lowest corruption control with indicators between -0.8 and -1.2 .

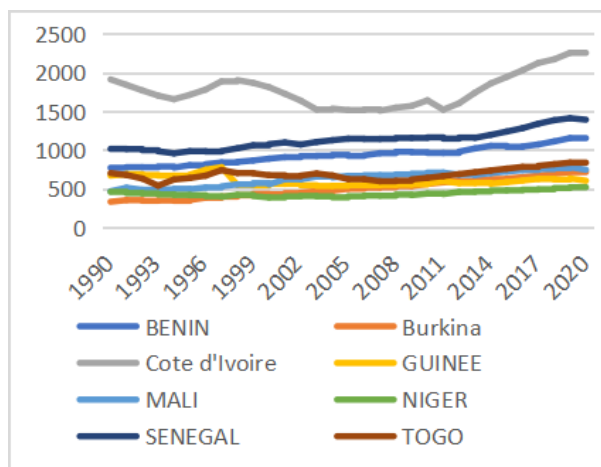


Figure 1. Evolution of GDP/inhabitant in WAEMU from 1990 to 2020.

Source: Author from WDI data (2023) and MGI (2023).

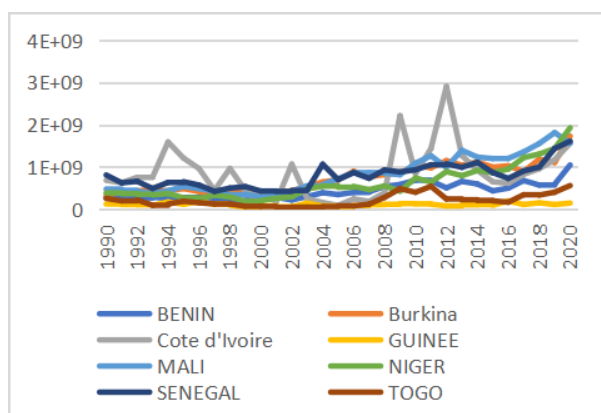


Figure 2. Evolution of ODA in WAEMU from 1990 to 2020.

Source: Author from WDI data (2023) and MGI (2023).

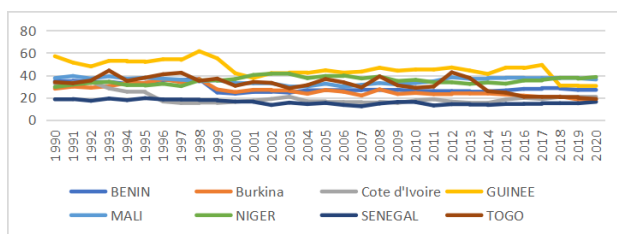


Figure 3. Evolution of AG in WAEMU from 1990 to 2020.

Source: Author from WDI data (2023) and MGI (2023).

In a context marked by periods of instability, conflicts and governance challenges, which have left lasting scars on the political and economic structures of the region, the issue of governance in sub-Saharan Africa is at

tracting growing interest within the international community, researchers and development actors. This low level of governance is worrying, as it reflects the increase in the level of poverty attributable to poor economic performance associated in particular with agricultural production conditions and obstacles to strengthening agriculture. Therefore, the effectiveness of development aid for growth and improvement of WAEMU agricultural development remains controversial. **Figure 5** shows the status of corruption control in the WAEMU countries from 1990 to 2020.

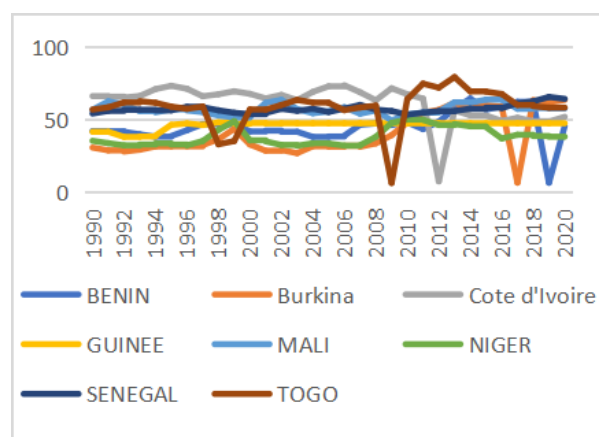


Figure 4. State of political stability in WAEMU from 1990 to 2020.

Source: Author from WDI data (2023) and MGI (2023).

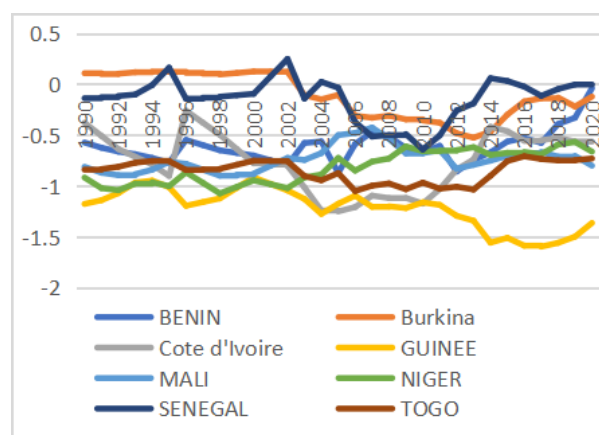


Figure 5. Status of corruption control in WAEMU from 1990 to 2020.

Source: Author from WDI data (2023) and MGI (2023).

The general objective of this study is to analyze the effects of official development assistance on economic growth and agricultural development in WAEMU countries. Specifically, it involves: (i) Measuring the direct

effect of ODA on economic growth in WAEMU countries; (ii) Measuring the direct effect of ODA on governance in WAEMU countries; (iii) Evaluating the impact of ODA on agricultural development in WAEMU countries.

2. Theoretical and Empirical Foundations of Official Development Assistance

The theoretical foundations of official development assistance date back largely to growth and development models. The Harrod-Domar growth model^[4,5] constitutes the basis of the theoretical foundations of the aid-growth relationship. Indeed, it highlights the role of the importance of domestic savings. For these authors, an increase in the economic growth rate is necessarily linked to an increase in the savings rate under the assumption of constant productivity. However, the low level of domestic savings faced by developing countries limits their capacity to invest. Thus, this approach emphasizes that a mobilization of additional external financial resources, in this case official development assistance, is necessary to supplement domestic savings, stimulate investment and consequently achieve the desired level of economic growth. Then, Solow^[6] also places savings and investment at the heart of his model. It assumes decreasing returns to factors, unlike the coefficient of capital which is constant in the Harrod-Domar model. For Solow^[6], capital accumulation influences growth and results in an increase in production, therefore income and ultimately savings. These savings will in turn feed the investments that guarantee an increase in growth. In the event of insufficient savings, it is difficult to hope for any productivity. For this, public development aid is necessary to finance these investments and promote growth, even if it is obvious that transfers of funds from diasporas in the United States and Europe constitute a sometimes very important source of income. Unlike traditional growth theories, the theory of endogenous growth recognizes the importance of human capital in the growth process. Thus, the evaluation of official development assistance on economic growth can be an important attribute to influence capacity building and therefore human capital in most aid-receiving countries. Fur-

thermore, according to Lucas^[7], the hypothesis of increasing returns to capital would imply that official development assistance will improve growth in the long term. For Nurkse^[1], poverty is reflected by low income which generates low savings, this lack of savings in turn leads to low investment and therefore low capital accumulation, which does not allow productivity and therefore income to increase. Thus, he puts forward the idea that underdeveloped countries evolve in this spiral that he called "Vicious circle of poverty" which constitutes a brake on their economic development. For this author, official development assistance will allow the stock of technical capital to be increased and therefore productivity, income and demand, and thereby internal investment, thus committing these countries to the path of balanced growth. North^[8] shows in particular that the existence of good institutions of private property rights both stimulates and allows economic development through more or less "formal" control of economic transactions between individuals. In addition, he shows that the consolidation of governance and institutions contributes to improving investment conditions by reducing risk and increasing the profitability of projects. Kaufman et al.^[9] showed that good governance has a positive impact on economic growth, income per capita and the quality of governance are positively related.

According to Amzat and Coghill^[10], good governance is a program that advocates market-friendly reforms^[10]. For these authors, good governance is now a more open, democratic and participatory process than before, where the state is no longer the sole actor in decision-making and service delivery, even if its importance remains crucial^[10]. It is therefore an investment in human capital. Investment in human capital has positive repercussions both on the individual himself, particularly on his income and employability, but also on the entire economy, given its positive influence on economic growth^[11]. The relationship between institutions and economic growth has been the subject of much research and debate among economists^[12]. According to Bourhaba and Mhenna^[12], institutions that provide opportunities for individuals and firms to compete for resources and power are more likely to generate economic growth than those that concentrate power in the hands

of a few people. They also argue that institutions that promote economic and political competition are more likely to be inclusive and protect the property rights of individuals and firms^[12]. New institutional economics (NIE) shows that effective institutions can make a difference in the success of market reforms and even asserts that institutions are one of the determining factors of economic growth. According to Mtiraoui^[13], the main objective of economic institutions is to restore macroeconomic balances: balancing public accounts and the current account balance, as well as controlling inflation^[13]. They mainly resulted in price and trade liberalization measures, lowering the real exchange rate, and monetary and budgetary restrictions^[13]. The concept of official development assistance dates back several years in the empirical literature. Mtiraoui^[13] finds a positive and significant relationship between the quality of governance and economic performance. Indeed, he studied the effect of institutional variables on economic growth and found that their effect differs from one region to another and depends on the effects of macroeconomic variables such as foreign direct investment, investment, and human capital^[13]. According to Ferrier^[14], in 2020, official development assistance (ODA) granted by member countries of the Development Assistance Committee (DAC) totaled \$161.2 billion, which represents 0.32% of their combined gross national income (GNI). Most studies on the effectiveness of ODA have assumed that ODA should promote growth in developing countries^[15]. According to Jaquet^[15], this is acceptable since economic growth is one of the intermediate objectives for most ODA purposes^[15].

Hansen and Tarp^[16] examine the relationship between official development assistance and economic growth in several developing countries and their results showed that aid improves the economic growth of these countries. Gomanee et al.^[17] focused on the mechanisms by which official development assistance influences economic growth. Their results show that aid has a positive impact on economic growth. As for Karras^[18], he finds that the effect of official development assistance on economic growth is positive, permanent, statistically significant and considerable. For Armah and Nelson^[19], official development assistance has a significant impact

on the economic growth of some sub-Saharan African countries. Jones^[20] used the cointegration method on panel data and also found that development aid has a positive impact on the economic growth of some sub-Saharan African countries. Nafiou^[21], using an error correction model, found that official development assistance has a positive and significant impact on economic growth in Niger. A 10% increase in the amount of aid increases real GDP by 0.83%. In the same vein, Astériou^[22] found a positive effect of official development assistance on economic growth in a study that takes into account five South Asian countries over the period from 1975 to 2002. He uses an ARDL model, specifically the Pooled Mean Group (PMG), which allows them to study the short- and long-term relationship between ODA and growth. Brou and Ouattara^[23] in their study analyzed the effect of official development assistance on the economic growth of WAEMU countries over the period from 2000 to 2015. The Fully Modified Ordinary Least Squares (FMOLS) method allowed them to conclude that official development assistance positively affects the economic growth of WAEMU countries. Also, agriculture, public investment expenditure, human capital captured by education and political stability are determinants of economic growth in the countries of the Union. Their results also identified governance as the only channel for transmitting official development assistance to economic growth in the countries of this zone. The study by Aboubacar et al.,^[24] on the eight WAEMU countries over the period from 2002 to 2013 and using the FMOLS model led to results according to which overall aid has no significant effect on economic growth. In addition, aid improves growth when it is directed to specific sectors such as agriculture, education, trade policies and regulations.

This literature review has generated several different reactions and opinions in the economic literature, but the majority of researchers believe that aid is more effective in an environment with quality government institutions or policies. This article provides a better understanding of the role of official development assistance on agricultural development and economic growth in WAEMU countries. We adopt a modeling by the Pooled Mean group method which is present in Section 3 which

discusses materials and methods.

fore:

3. Materials and Methods

We start from an endogenous growth model to specify our empirical model. Thus, the theoretical model can be formulated as follows:

$$Y_t = f(K_t, A_t, L_t) \quad (1)$$

The empirical models to be estimated are there-

$$\begin{aligned} \ln GDP_{it} = & \beta_{0i} + \beta_{1i} ODA_{it} + \beta_{2i} SPO_{it} \\ & + \beta_{3i} OUV_{it} + \beta_{4i} FBCF_{it} + \beta_{5i} TPOP_{it} \\ & + \beta_{6i} CC_{it} + \beta_{7i} TBSPRIM_{it} + \beta_{8i} VASP_{it} + it \end{aligned} \quad (2)$$

$$\begin{aligned} \ln AG_{it} = & \beta_{0i} + \beta_{1i} ODA_{it} + \beta_{2i} SPO_{it} \\ & + \beta_{3i} OUV_{it} + \beta_{4i} FBCF_{it} + \beta_{5i} TPOP_{it} \\ & + \beta_{6i} CC_{it} + \beta_{7i} TBSPRIM_{it} + \beta_{8i} VASP_{it} + it \end{aligned} \quad (3)$$

We present in the following **Table 1** all of our variables with their definitions and expected signs.

Table 1. Summary of variables and expected signs.

Variables	Definition	Expected Signs
GDP	It is the real GDP per capita (GDP) of country i in year t in constant US dollars. It is a relevant indicator of economic performance to identify the evolution of economic growth in the national economy. The latter is commonly used to estimate economic growth, notably by authors such as Barro [25] and Mankiw et al. [26]. We use GDP per capita in constant 2000 dollars. Data for this variable come from the World Bank Indicators Database.	dependent variable Equation (1)
AG	We use value added at the agricultural level (Ag) to analyze the link between FDI. Indeed, if many authors emphasize agricultural productivity, the expected effects are positive. It is measured by the value added of agriculture as a percentage of GDP. Data for this variable come from the World Bank Indicators Database.	dependent variable Equation (2)
ODA	It corresponds to the total net amount of official development assistance (ODA) received in constant US dollars. This is the variable of interest. A positive and significant sign of this variable on the GDPH is expected. It is measured in constant US dollars. Data for this variable come from the World Bank Indicators Database.	+
SPO	This variable represents the level of political stability of country i at time t, which can have an expected positive effect on economic growth and agricultural development. It is measured by the governance index, a characteristic of government efficiency and responsibility from a world perspective. The stability index and sub-indices range from 0 (poor stability conditions) to 100 (good stability conditions), according to the IOM (Migration Governance Indicators).	+
OUV	It is the ratio of the sum of exports and imports to GDP. More open countries tend to receive aid [27, 28]. It represents the rate of commercial openness expressed as a percentage of GDP. Data for this variable come from the World Bank Indicators Database.	+
TPOP	It is the variation of the set of individuals counted in a given area. The total population at a certain level should have a negative effect on economic growth [29]. It is measured by the population growth expressed as an annual percentage. Data for this variable come from the World Bank Indicators Database.	-
TBSPRIM	The gross primary school enrollment rate is used as a proxy for human capital in this work. A positive sign is expected because according to human capital theory education is a source of growth and it is measured as a percentage. Data for this variable come from the World Bank Indicators Database.	+
GFCF	Gross fixed capital formation. It is the set of acquisitions of productive elements and basic infrastructures (roads, dams, bridges, schools, hospitals). According to growth theories, the accumulation of physical capital is a source of growth. The expected sign is positive. It is measured as a percentage. Data for this variable come from the Central Bank of West African States (CBWAS).	+
CC	Control of corruption measures the extent of corruption and the manner in which public power is exercised for private gain. This is a Corruption Perception Index (CPI). This indicator takes values ranging from -2.5 to 2.5 according to the IOM (Migration Governance Indicators).	+
VASP	Value added of the primary sector corresponds to the wealth created by the primary sector. Agriculture occupies an important place in this sector and it mobilizes a large part of the active population. Its contribution to the GDP is far from negligible. Data for this variable come from the Central Bank of West African States (CBWAS).	+

Source: Author.

We work on a dynamic panel of eight (8) WAEMU countries (Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal and Togo), due to some missing data over certain periods and for certain variables such as the school enrollment rate, gross fixed capital formation. The study period extends from 1990 to 2020. Also, our data are secondary in nature and come from the World Development Indicator, the Worldwide Governance Indicator (WGI), the migration governance indicators database (MGI) and the database of the Central Bank of West African States (CBWAS).

4. Results

In **Table 2** we summarize the descriptive statistics of the variables used.

Descriptive analysis reveals that our panel is not cylinder-based. Overall, only the governance or institutional quality indicators (control of corruption) have a negative average of -0.66 in the WAEMU. The GDP per capita has an average of \$839 while the average population growth of this zone is 2.83 percent. The minimum and maximum values of GDP per capita concern respectively Niger with a value of 5.96 percent in 2000 and Côte d'Ivoire with 7.71 percent in 2020. The minimum and maximum values of ODA correspond respectively to

Togo with a value of 17.98 percent in 2003 and Côte d'Ivoire with 21.076 percent in 2012. Apart from GDP, the gross primary school enrollment rate has the highest average (77,572), followed by the trade openness rate with an average of 55.07. Regarding trade openness, it is expressed as a percentage. However, some countries (such as Burkina Faso) that do not have access to the sea transit their imports through the port of Lomé; which explains this rate of 112% of trade openness for Togo. For the gross enrollment rate, the minimum, average and maximum values are respectively 25.4%, 77.6% and 128% (for Ivory Coast). Indeed, the Ivorian education system ensures that all children and adults receive quality, equitable and inclusive education and training that takes into account the transformation needs of the citizen, making them capable of contributing to the socio-economic development of their community and society. In recent years, with the collaboration of NGOs such as Aide et Action and Plan International, parallel schools have been created to take in children and adults who were not in school due to the post-election violence of 2010, vulnerabilities or the isolation of their localities. These programs have made it possible to train several Ivorians who have subsequently integrated the national state education system. This may explain the high rate (128%) recorded by Ivory Coast.

Table 2. Descriptive statistics.

Variables	Obs	Mean	Std. Dev.	Min	Max
ODA	248	5.72×10^8	4.45×10^8	4.61×10^7	2.91×10^9
GDPI	248	839.1749	429.4491	333.1716	2252.543
AG	248	29.80731	10.16226	12.24591	61.41626
SPO	248	50.44859	12.77286	6.26	79.18
OUV	248	55.06581	14.51821	30.36824	112.761
GFCF	248	1.96×10^9	2.40×10^9	7.79×10^7	1.37×10^{10}
TPOP	248	2.834708	0.5647221	-0.6799861	4.466821
CC	248	-0.6562289	0.3956381	-1.596066	0.2479137
TBSPRIM	248	77.57196	27.96818	25.40658	128.2516

Source: Author.

Before presenting our results, it is our responsibility to present the results of the correlation tests between the variables, multi-collinearity, Fisher, stationarity and co-integration. **Table 3** verifies the two-by-two correlation of the explanatory variables. At first glance, the results reveal the existence of a weak correlation between the different variables. Also, we find that all

the coefficients of the correlation of ODA and the other variables are significant. The correlation with the highest value is that between gross fixed capital formation (GFCF) and GDP with a coefficient of 0.69 at the 10% threshold, which implies a strong correlation. There is a positive correlation between official development assistance and the GDP and control of corruption variables.

On the other hand, the value added of agriculture is negatively correlated with official development assistance and GDP. If trade openness is positively correlated with GDP, it has a negative correlation with official development assistance.

The results (Table 4) show that all the variance

inflation factors (VIF) are less than 5, so the explanatory variables of our model have a low multi-collinearity. However, there is a high multi-collinearity between SPO and CC and their interaction with APD, which means that they cannot be introduced simultaneously in our model to avoid spurious regressions.

Table 3. Correlation matrix of the explanatory variables.

Variables	Apd	pibh	vAg	spo	ouv	Fbcf	Tpop	cc	tbsprim
Apd	1.0000								
pibh	0.3353	1.0000							
Ag	-0.4082	-0.5957	1.0000						
spo	0.1125	0.4519	-0.2832	1.0000					
ouv	-0.0903	0.0271	0.1149	0.3977	1.0000				
Fbcf	0.5998	0.6932	-0.5168	0.2064	-0.0113	1.0000			
Tpop	0.2034	-0.0638	-0.0314	-0.0911	-0.0640	-0.0722	1.0000		
cc	0.3559	0.1276	-0.5489	-0.0932	-0.4050	0.2253	0.1487	1.0000	
tbsprim	-0.0594	0.1906	-0.0790	0.3147	0.3926	0.1343	-0.1581	-0.2440	1.0000

Source: Author.

Table 4. Results of the variance inflation factor (VIF) test.

Variable	Coefficient Variance	Uncentered VIF
APD	0.000260	1.84
SPO	0.000139	1.85
OUV	1.71×10^7	1.43
FBCF	2.21×10^7	1.08
TPOP	0.002003	1.31
CC	0.001225	1.40
TBSPRIM	6.70×10^7	2.17
VASP	0.001529	3.61

Source: Author.

The Fisher test performed gives us a probability Prob (F-statistic) = 0.0000 which is lower than the threshold of 5% rejects the hypothesis of absence of individual effects (Table A1). This allows us to affirm the presence of individual effects and to say that our data support the panel structure. To ensure that the residuals follow a normal distribution, we used the Jarque-Bera test (1987). Prob > chi2 equals 0.0000 (see Table A1) which is less than 1%. We cannot therefore reject the null hypothesis (H0) then the residuals follow a normal distribution. To determine the nature of the variance of the error term or the residuals, we use the heteroscedasticity test. The Breusch-Pagan test which is a test based on the Lagrange multiplier. Araujo et al.^[30] is the test used in our case study. The result of the test gives Prob > chi2 = 0.0007 which is less than 1% hence the model

is homoscedastic. We therefore accept the null hypothesis of no inter-individual dependence between countries. These results therefore authorize us to perform the first generation stationarity test (Table 5) which admits the non-inter-individual dependence. Figure 6, point cloud, shows the correlation between GDP and official development assistance (a) and between agriculture and official development assistance (b).

One of the most used first generation tests is that of Im et al.^[31]. Thus, the probabilities associated with this test show that all our variables are stationary in first differences with the exception of AG, SPO which are stationary in level. We can conclude that the series is integrated of order 1. This allows us to assume the existence of a long-term relationship between the endogenous variables and the exogenous variables.

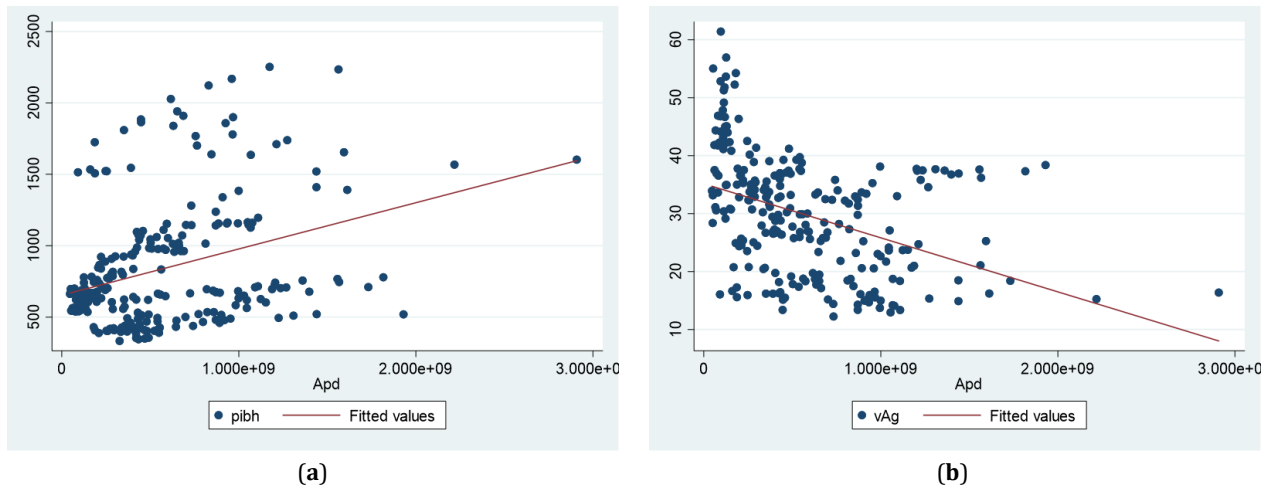


Figure 6. Point cloud. (a) correlation between GDP and official development assistance; (b) correlation between agriculture and official development assistance.

Source: Author.

Table 5. Stationarity tests.

Variables	In Level	In First Difference	Decision
Apd	2.5260 (0.9942)	-9.4995 (0.0000)	(I)
pihb	5.0977 (1.0000)	-7.3746 (0.0000)	(I)
Ag	-1.4244 (0.0772)	-9.4662 (0.0000)	(0)
spo	-3.5559 (0.0002)	-9.5183 (0.0000)	(0)
ouv	-0.2930 (0.3847)	-8.3758 (0.0000)	(I)
Fbcf	5.3087 (1.0000)	-8.3496 (0.0000)	(I)
Tpop	-0.4362 (0.3314)	-6.7335 (0.0000)	(I)
cc	0.1194 (0.5475)	-7.9949 (0.0000)	(I)
tbsprim	0.1839 (0.5730)	-7.4778 (0.0000)	(I)

(I) = stationary in first difference and (0) = stationary at level. Source: Author.

The null hypothesis of no cointegration is rejected therefore proceed to estimate our model by the Pooled by the Kao test because of the ADF test (**Table 6**). We can Mean Group (PMG) method.

Table 6. Results of the Kao Cointegration Test.

KAO	Statistic	p-Value
Modified Dickey-Fuller	-2.0265	0.0214
Dickey-Fuller	-2.2834	0.0112
Augmented Dickey-Fuller	-0.0060	0.4976
Unadjusted modified Dickey Fuller t	-11.0697	0.0000
Unadjusted Dickey-Fuller t	-5.6451	0.0000

Source: Author.

These results show that our variables are significant with the exception of gross fixed capital formation, and do not all have the expected sign. Indeed, the variables OUV and TPOP are statistically significant in the long term in both models at the 1% and 10% thresholds respectively. The variable FBCF is significant in the short (10%) and long term (5%), while the TBSPRIM is statistically significant at the 1% threshold in the long term in both models. We also note in model 2 the significance of the variable VASP, at 1%. The error term is positive and significant at 1% in both models.

ODA positively impacts economic growth and agricultural development in the short and long term in the WAEMU countries. Corruption positively impacts economic growth and negatively impacts agricultural development in the long term. However, the results reveal that its impact is positive on both variables in the short term. Political stability has a positive effect on economic growth and agricultural development in the WAEMU in the long term. In the short term, political stability negatively affects growth and positively affects agricultural development. The discussion of our results is the subject of the following section.

5. Discussion

Following the estimation of our two models (Table 7) by the Pooled Mean Group (PMG) method, we arrive at the results according to which the official development assistance (ODA) variable has no significant impact. However, while it is clear that official development assistance positively influences economic growth and agricultural development in WAEMU countries in the long term over our study period, the impact is not very significant; which may be due to the extent of corruption, the informal sector which employs more than 90% of farmers and the insufficiency of state efforts in promoting agriculture. For many authors, official development assistance must provide the necessary resources to fill the savings gap, promote investment and therefore

economic growth in the WAEMU countries. It can also contribute to improving the living conditions of the population of beneficiary countries by investing in health care, education and food donations. Our results contradict those of Djankov et al.^[32] and Mallik^[33], Rajan and Subramanian^[34], Laciné^[35], Imen^[36], Aboubacar et al.^[24] who found that official development assistance has a negative impact on economic growth and are in line with those of Papanek^[13], Snyder^[14], Fayissa and El kaissy^[15], Gomanee et al.^[17], Karas^[18], Jones^[20], Brou and Ouattara^[23]. Trade openness (OUV) has positive effects on economic growth, in the short and long term. While its effect on agricultural development is positive in the short term, an increase of one percentage point in the latter leads to an increase in agricultural development of 0.10% (in the long term). This positive result may be due to the growth of trade in WAEMU which facilitates free trade between the populations of the member states. Trade openness improves technology transfer through technological progress. The latter strengthens the quality of the workforce and improves productivity. This result confirms the work of Dème and Yerbanga^[37]. The population growth rate (TPOP) is positive in the short term (model 1). The implication of our results is that high demographics in certain countries such as Niger should promote poverty in the long term and slow down economic growth if human capital is not strengthened. An increase in the population slows down economic growth because of the use of part of the capital for social rather than economic purposes. The variable gross primary school enrollment rate (TBSPRIM) shows a negative coefficient in model 1, in the long term. The impact of schooling on agricultural development, although low, is also explained by the fact that the majority of countries in this zone invest in this sector and that primary education is almost free. It should be noted, however, that the authorities of the WAEMU states have difficulty keeping children in school. As for governance, the political stability (SPO) has a positive impact on economic growth in the long term.

Table 7. Results of the estimations by the PMG method.

Model 1: Dependent Variable: GDP		Model 2: Dependent Variable: AG		Model 1: Dependent Variable: GDP		Model 2: Dependent Variable: AG	
Long Term				Short Term			
Variables		Coefficient		Variables		Coefficient	
				ECT	0.2107666*** (0.0737815)	0.3766874*** (0.1097351)	
Apd	1.15e-08 (2.53e-08)	4.10e-10 (1.31e-09)		D. Apd	-2.47e-09 (5.63e-09)	-1.08e-09 (1.73e-09)	
spo	0.9516883 (0.5827531)	0.0333433 (0.0542539)		D.spo	-0.6441872 (0.8335273)	0.0240715 (0.0338675)	
ouv	-3.046254*** (0.5547027)	0.1004956*** (0.02906)		D.ouv	0.1654679 (0.3769713)	-0.0239954 (0.0477415)	
Fbcf	5.32e-08*** (6.69e-09)	-2.27e-10 (2.70e-10)		D.Fbcf	6.13e-08** (2.82e-08)	-1.47e-09 (1.42e-09)	
Tpop	15.48945* (8.239458)	-0.9869093* (0.5818591)		D.Tpop	6.717048 (12.28215)	0.016689 (1.065253)	
cc	18.82106 (26.62428)	-1.409393 (1.043673)		D.cc	-8.576574 (25.26739)	-1.103506 (1.72309)	
tbsprim	1.805591*** (0.256826)	-0.1949136*** (0.0257434)		D.tbsprim	1.271562 (1.186272)	-0.0314177 (0.1006276)	
vasp	1.150573 (0.4292973)	-0.0008437 (0.0022505)		D.vasp	0.1010856*** (0.0336636)	0.0089139*** (0.0033719)	
Constant	-137.4067*** (52.60692)	-15.26889*** (3.974226)					
Observations		248		Observations		248	
Number of Countries		8		Number of Countries		8	
Log Likelihood Model 1		-1009.565		Log Likelihood Model 2		-491.5461	

*** significant at 1%, ** significant at 5%, * significant at 10%. ECT = error correction term.

Source: Author.

This is explained by the fact that political stability plays a very important role in the economic development of a country. In the WAEMU zone, an improvement in this index helps create a space favorable to investments capable of leading to good economic performance. Consequently, the most stable countries are more attractive to investors. On the other hand, controlling corruption (CC) remains a major problem in the WAEMU countries, explaining the fact that political stability plays a very important role in the economic development of a country. In the WAEMU zone, an improvement in this index creates a space favorable to investments capable of leading to good economic performance. Consequently, the most stable countries are more attractive to investors. On the other hand, an increase in the anti-corruption index (CC) leads to an increase in GDP per capita in the long term and a decrease in it in the short term. This result is contrary to our expectations and is explained according to the World Bank by the fact that the fight against corruption in WAEMU countries has not yet reached the threshold capable of positively impacting growth and this exacerbates inequalities and

reduces investments likely to improve economic growth. It weakens public institutions on which just and equitable societies are based and diverts funds intended to meet the basic needs of populations. An improvement in these indicators of good governance is therefore necessary for good growth. Davis et al.^[38] have mainly noted that the traditional bureaucratic governance model, focused on national objectives, has evolved into a multi-stakeholder agricultural development model. The latter places greater importance on responsibility, relevance and local performance linked to decentralization processes, where the emphasis is on taking into account the local needs of beneficiaries^[38]. This leads to a disengagement of the State which favors the formation of corruption networks in agricultural regions where there are new wealthy producers whose sources of financing are unknown. The coefficient of the primary sector value added variable (VASP) is significantly positive in the short term. Minorly captured by agriculture, the increase of one percent (1%) of this variable leads to an increase of 0.10% of GDP per capita and 0.01% of the level of agricultural development. Indeed, economic activities

in the WAEMU remain dominated by the primary sector, particularly agricultural production in terms of employment of the population. It represents more than a quarter of the added value and employs a large and diversified workforce; which explains why this sector weighs heavily in achieving economic growth in the WAEMU zone.

6. Conclusion

In short, the main objective of this research was to analyze the effects of official development assistance on economic growth and agricultural development in WAEMU countries. The study covered a period of thirty (30) years from 1990 to 2020. To achieve this objective, we use very recent econometric methods, including cointegration on panel data. We estimated our model using the Pooled Mean Group (PMG) method. Furthermore, governance variables impact agricultural development: positively for political stability (SPO) and negatively for corruption control (CC). On the other hand, the interaction of official development assistance in a governance context on GDP per capita is not significant. These results thus lead us to say that official development assistance has a positive impact on the economic growth of the WAEMU countries in the long term and could have a positive impact on agricultural development if measures are taken to curb corruption and political instability. Thus, the relationship between official development assistance and economic growth should therefore be associated with good governance. In view of our results, the resulting policy implications are as follows: (i) Promote the quality of governance, which is a condition for the effectiveness of official development assistance in developing countries (improve transparency and management of flows received by creating aid monitoring committees within the national assemblies of each country, reduce corruption); (ii) Invest in growth sectors such as agriculture through the use of agricultural technologies and training farmers on advanced cultivation techniques; (iii) Strengthen human

capital by training competent national experts capable of implementing policies adapted to the realities of the area; (iv) Strengthen trade openness policies to facilitate trade within WAEMU countries.

Funding

This research received no external funding.

Institutional Review Board Statement

Ethical review and approval were not applicable as this study did not involve human or animal participants.

Informed Consent Statement

Informed consent is not applicable as this study does not involve human participants.

Data Availability Statement

The data are secondary in nature and come from the World Development Indicator (WDI), 2023, <https://databank.worldbank.org/source/world-development-indicators>; the Worldwide Governance Indicator (WGI); <https://www.worldbank.org/en/publication/worldwide-governance-indicators>; The OIM migration governance indicators <https://www.iom.int/migration-governance-indicators>; and the database of the Central Bank of West African States (CBWAS), <https://edenpub.bceao.int/>.

Acknowledgments

I thank DOLI S. A. for the contributions in the processing of the database and the estimates.

Conflict of Interest

The author declares that there is no conflict of interest.

Appendix A

Table A1. Fisher test.

Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	240.501754	(6,118)	0.0000
Cross-section Chi-square	348.624545	6	0.0000

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