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Article

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Institutional quality, investment and economic growth in WAEMU countries: an empirical approach using DOLS

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ABSTRACT

Investment, whatever its nature, is an indispensable channel for increasing economic growth. The aim of this paper is to empirically study the effect of institutional quality and investment on economic growth in WAEMU countries. The methodological approach is based on a dynamic panel model covering the period from 2005 to 2020 for all eight WAEMU countries. Results are obtained using the Dynamic Ordinary Least Squares (DOLS). The results show a significant effect of governance indicators and public investment on GDP per capita. Furthermore, the results show that governance indicators modify the effect of investment (public and FDI) on GDP per capita. These results imply that efforts must be made to take full advantage of the positive effects of investment. As the quality of governance is a key factor in attracting and securing investment, policymakers must adopt strategies to improve governance indicators if they are to achieve their growth objectives. The originality of this research lies in highlighting the effects of Institutional quality and investment on economic growth through a DOLS.

IMPACT STATEMENT

Investment is an indispensable channel for increasing economic growth. The goal of our research paper is to empirically study the effect of institutional quality and investment on economic growth in WAEMU countries. The results show a significant effect of governance indicators and public investment on GDP per capita. Furthermore, the results show that governance indicators modify the effect of investment (public and FDI) on GDP per capita. These results imply that efforts must be made to take full advantage of the positive effects of investment. As the quality of governance is a key factor in attracting and securing investment, policymakers must adopt strategies to improve governance indicators if they are to achieve their growth objectives. The originality of this research lies in highlighting the effects of Institutional quality and investment on economic growth through a DOLS.

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1. Introduction

Economic literature has widely discussed the contribution of investment to economic growth. While it is clear that investment drives economic growth, the results of empirical studies have produced mixed results. Some studies find a positive effect of investment on growth (Jwan & James, 2014; Tiwari & Mutascu, 2011), while others find a negative effect of investment on economic growth (Carkovic & Ross, 2002). This situation can be explained by the influence of many factors, notably institutional quality and public debt.

Although the link between public investment and economic growth has been widely studied in the literature, it has been difficult to draw firm conclusions about the effectiveness of public investment. In recent studies, there is some convergence regarding the importance of public investment on growth,

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but the results still vary from country to country, or sample to sample, and seem to depend on many different factors (Bayraktar, 2019).

In developing countries, the availability of financial resources is a prerequisite for any investment process. But the gap between investment needs and available resources was enormous. Thus, faced with an unfavorable macroeconomic environment and a huge need for basic infrastructure, low-income countries adopted public debt as an economic policy instrument. Economic theory suggests that indebtedness makes it possible to make investments that savings cannot. The income generated by debt should be used to finance profitable investments, capable of repaying the capital and its interest. However, a high debt ratio indirectly slows down productive investment through high domestic real interest rates and low profitability due to a drop in economic activity.

Today, new development strategies to combat poverty and inequality place particular emphasis on the quality of institutions, especially in developing countries and more specifically in Sub-Saharan Africa (El Jabri, 2022). Following the controversial results of structural adjustment programs, there has been a clear revival of interest in institutional quality. As a result, traditional macroeconomic determinants alone cannot explain the level of economic performance and development gaps observed between countries. In this sense, a significant number of researchers agree that the institutions quality is the main determinant of differences between countries in terms of economic and human development (Kouchad & Dinar, 2020). It would be wise to place particular emphasis on indicators that escape traditional theories, such as institutional quality.

- Generally speaking, the contribution of public investment to sustainable growth in developing countries is low, and foreign direct investment (FDI) is one of the channels for supporting government action. Achieving the objectives of sustainable development requires investment in all sectors of activity, and FDI is proving to be essential for achieving these objectives in developing countries, particularly those in sub-Saharan Africa. Against this backdrop, mechanisms have been put in place to attract foreign investors, notably the quest for good governance (Immurana, 2021). According to UNCTAD statistics (2018, 2019), FDI flows to developing economies increased by 2% in 2018, while for Africa, FDI flows increased by 10.05% from 2017 to 2018.

However, the effect of FDI on economic growth remains debatable, as growth depends on both social and physical capital. On the one hand, FDI can increase the transfer of technology and domestic capital, leading to higher incomes and economic growth. Thus, thanks to the increase in FDI and the resulting rise in income levels, there is an increase in private and public spending, which translates into an improvement in the population's well-being. In contrast, for other authors, increased FDI in the manufacturing sector leads to negative externalities, especially in terms of preserving the environment quality (Hitam & Borhan, 2012). In the same vein, other authors, such as Agosin and Machado (2005), have shown that FDI crowds out domestic investment, leading to higher levels of unemployment. For these researchers, the repatriation of foreign companies' profits can adversely affect economic growth and worsen the country's socio-economic conditions.

The contradiction between these findings on the effect of investment on economic growth has led to renewed interest in the role of non-traditional growth factors in this relationship. In this sense, institutional quality, or good governance, is essential for the investment orientation in preferred sectors and for the attraction of FDI. According to Outreville (2007), the governance quality is a determinant of FDI and has a significant effect on the choice of countries by these companies. Thus, good governance is a relevant factor explaining the locations most favored by multinationals for establishing subsidiaries abroad. So, in the context of SSA countries, and more specifically in the WAEMU countries where local investment is low and governance indicators are weak, we need to analyze the institutional quality contribution to the investment-growth relationship.

In light of the above analysis, it is clear that there is a vast literature on investment and growth (Abdoul & Hammami, 2017; Nguyen et al., 2020) on the one hand, and governance and growth on the other. However, none of these studies explored the simultaneous effect of local and foreign investment on economic growth in the context of WAEMU countries. Thus, as an addition to the empirical literature, the present study aims to analyze the institutional quality role in the relationship between investment

(local and foreign) and economic growth in WAEMU countries, taking into account the interaction of the former on the latter. The study results should help decision-makers to implement and design policy initiatives that target economic growth objectives in coincidence with investment, in order to better direct investment (local and foreign) toward growth-generating sectors.

This study makes several contributions. Firstly, it deals significantly with a subject for which there is limited empirical literature in the WAEMU countries. It provides evidence of the relationship between public debt and public investment, and between public investment and economic growth. The main is to answer the following two research questions: has an increase in government debt led to an increase in investment and hence economic growth, or has it mitigated the effect of investment on growth? Furthermore, our study sheds light on the problem of debt by identifying a possible relationship between the level of debt and economic growth, with an emphasis on governance indicators. Finally, the findings of this paper may be useful for other analyses of economic growth and for the formulation of effective debt management.

The rest of the paper is organized as follows: the next section deals with the literature review, the third section is about methodology. The results and discussions are, respectively, presented in [sections 4](#) and [5](#). The final section is for conclusions and policy recommendations.

2. Literature review

Reflection on the economic growth sources, and in particular on the role of capital in growth, developed in two ways. For Solow (1956), public investment was irrelevant to the analysis of growth. By contrast, at the end of the 1980s, there was a resurgence of endogenous growth theory, which sees public investment as a growth factor (Barro, 1990).

Solow (1956) based his analysis on the flexibility of production technology. This analysis is based on a production function with two components: capital and labor. Growth presupposes the development of capital through investment and the growth of the working population. But one of the most important conclusions of Solow's model is that growth is limited, on the one hand, by the population growth rate, an exogenous quantity, and capital, whose growth is limited by the diminishing returns law, on the other. In other words, Solow's neoclassical model is based on the diminishing returns hypothesis. He proposed that the long-term growth rate of an economy is exogenously determined by the rate of technological progress and demographics. In this theoretical perspective, public investment policy (infrastructure) only modifies the economy's growth rate when it reaches long-term equilibrium (stationary state).

By contrast, Barro (1990) includes public investment in his analysis, emphasizing its productive role in economic growth. Productive public spending, which he equates with public infrastructure capital, plays a driving role in the growth process. The complementarity between private and public capital is attributed to the latter's positive effect on private factor productivity (Sala-I-Martin & Barro, 1995). In other words, Barro's (1990) endogenous growth model emphasizes the positive externalities generated by public services. Externalities arise when public services affect the productivity of the private sector, and the private sector does not directly bear the costs. These productive public services provided to domestic and foreign private companies reduce production costs and increase output. The externalities existence justifies governments not only directing private players toward growth-generating activities, but also developing infrastructures that increase their productivity.

The authors, therefore, believe that public investment can enter the productive function of firms, making private inputs more productive and stimulating rather than crowding out private investment.

Following Barro (1990), Alogoskoufis and Kalyvitis (1996) describe an endogenous growth model with solutions that emphasize the public capital role in growth and investment. According to these authors, public investment policy is prepared in three stages. At a given point in time, the public authorities will determine the ratio of public capital to GDP; this model makes it possible to highlight the long run growth dynamic driven by private investment. This, in turn, is an increasing function of the public capital level. Authorities can then set targets for the public capital growth rate or the ratio of public investment to GDP. In this case, the public capital growth rate determines the economy equilibrium growth rate.

After that, private investment will increase steadily, as the ratio of public to private capital will remain stable over the long run, and marginal productivity will improve as public investment increases.

However, studies have produced contradictory results between a significant and non-significant impact of public investment on economic growth. Bosede et al. (2013) deduced that improved transport infrastructure has a positive and significant impact on the Nigerian economy for the period 1981 to 2011. Morley and Perdakis (2000) asserted the positive long-term impact of total public spending on Egyptian growth. Analyzing the impact of public infrastructure on competitiveness and economic growth in Madagascar, Andrianady et al. (2023) found that increased public spending on infrastructure promotes economic growth and improves business performance. Reinikka and Svensson (2007) also found that economic growth was significantly justified by public investment. According to a World Bank (2005) study about Senegal over the period 1966–2000, the effect of public investment is delayed over time and its positive impact, estimated at 2.47 points, appears after two years.

On the other hand, some empirical studies have suggested that public spending does not have a significant effect on economic growth. Zahira and Mostefa investigated the impact of public investment in infrastructure on economic growth in India over the period 1951–2010. The study used a vector autoregressive (VAR) model and found that public investment in infrastructure had no statistically significant impact on economic growth. Yovo (2017) also investigated the relationship between public investment and economic growth in Latin America and the Caribbean using panel data from 1980 to 2010. The results of the study suggest that public investment has no significant effect on economic growth in the region.

In summary, while some empirical studies have suggested a positive relationship between public investment and economic growth, other studies have found no significant evidence to support this idea. The results of these studies highlight the need for further research in this area to better understand the relationship between public investment and economic growth.

While these economic theories emphasize the importance of factors such as human capital, technology, public infrastructure and incentives to innovate in explaining growth differentials between countries, in recent years, a paradigm shift has been observed. Similarly, there is an abundance of empirical literature on the relationship between public investment and economic growth. However, the results differ slightly depending on the statistical definition of capital, the production function specification and the estimation method. Indeed, there has been a growing emphasis on the effects of institutional quality and governance on economic development. North and Thomas (1973) argue that institutions are at the root of growth disparities between countries. For their part, Acemoglu et al. (2005) argue that institutions are the most fundamental cause of economic growth. Broadening this perspective, Rodrik (2004) points out that institutions not only exert a direct influence on growth, but also impact other factors such as capital, investment and innovation, which, in turn, stimulate economic growth. Moreover, sound governance can encourage foreign investment, boost consumer and business confidence, and thus create an environment conducive to sustained growth.

However, the literature on the importance of institutions in economic dynamics only began to gain prominence in the second half of the 20th century. Thus, the fundamental importance of institutions as a driver of economic recovery has been emphasized by many eminent researchers (Greif, 2006). Building on this research, Acemoglu et al. (2014) put forward a fundamental idea: economic institutions drive market players to invest in human and physical capital and adapt to new technologies, thereby contributing to economic growth. For these researchers, institutions influence not only the trajectory of growth, but also the way wealth is distributed within a society.

For his part, North (1990) argues that the institutional quality of a society directly influences its ability to accumulate human capital, which consists essentially of the skills, knowledge and experience of individuals. A country's strong and effective institutions can have a direct impact on its economic growth, notably by influencing fundamental aspects such as the education system. In fact, a strong education system that is adequately funded and effectively regulated is beneficial to the achievement of the sector's desired objectives. On the other hand, a weak or corrupt system could hinder the development of human capital.

Similarly, Acemoglu et al. (2005) concluded that institutions that guarantee property rights are key drivers of long run economic growth, investment and financial development. Furthermore, they noted

that these institutions are the most important factor in attracting foreign direct investment. Their studies highlight the crucial role played by institutions as fundamental determinants of sustained economic growth. Similarly, Cavalcanti et al. (2008) deduce that states with stronger, more efficient institutions not only increase their investment in human and physical capital, but also make more efficient use of the resources at their disposal. This is one of the reasons why some advanced countries boast much higher productivity per worker than other territories.

Coe et al. (2009) find that countries with a business-friendly climate and high-quality higher education tend to capitalize more on their R&D investments and enhance the value of their human capital. In the same vein, Dias and Tebaldi (2012) demonstrate that improving the institutions quality promotes human capital accumulation, reduces income inequality and redefines the historical development path of nations. Their findings reveal that institutions have a long run effect on economic performance and, consequently, determine the path a country will take in terms of economic development. However, when it comes to the influence of political systems on economic growth, Dias and Tebaldi (2012) fail to establish a direct causal link.

In short, according to institutionalist theory, a country's economic performance depends not only on innovation, human and physical capital, but also on the quality of its institutions (political and economic). As a result, a significant number of researchers place greater value on the role institutions play in understanding why some nations are able to prosper and flourish, while others face persistent economic challenges. We also note a limitation in the methodologies used in the literature, which leads us to revisit the subject with a new methodology, Dynamic Ordinary Least Squares (DOLS).

3. Methodology

3.1. Model

To analyze institutional quality's and investment impact on economic development we move from the above literature. We followed the model used by Ahmad et al. (2023), Nawaz et al. (2014), Moudine et al. (2019), Saad and Uddin (2021), Abubakar (2020), Tran et al. (2021), Uddin and Rahman (2023) and Gu et al. (2023). The existing literature on the relationship between institutional quality, investment and economic growth leads us to the following general empirical formulation:

$$GDPH = f(I, Gov, X) \quad (1)$$

Where **GDPH** is Gross Domestic Product per capita; **I** represents the vector of investments, notably local investment (**Inv**) and foreign direct investment (**FDI**); **Gov** is the vector of governance indicators measured here by political stability (**StaPol**), corruption (**Corr**) and government efficiency (**Gouv Efficiency**). These indicators are used in preference to the others, as they best represent the situation of WAEMU countries in terms of good governance. **X** represents the vector of socio-economic variables.

To analyze the involvement of governance in the investment-economic growth relationship, we define an equation for the interaction of governance and investment on growth as follows:

$$GDPH = f(I, Gov * I, X) \quad (2)$$

Where **GOUV*I** represents the interaction of governance and investment indicators.

The methodological approach is based on a panel data model for the eight WAEMU countries, covering the period from 2005 to 2020. The model equation is given below:

$$GDPH_{it} = \alpha_i + \alpha_1 I_{it} + \alpha_2 Gov_{it} + \alpha_3 Infl_{it} + \alpha_4 CrPop_{it} + \varepsilon_{it} \quad (3)$$

Where α_i represents the country-specific effect. **i** and **t** represents the number of individuals (country) and the period (year), respectively. The role of investment in economic growth has been widely discussed in the literature. We, therefore, expect a positive effect of investment on economic growth (Saidi et al., 2023). **Gov** represents the institutional quality indicator measured here by governance indicators. The literature has shown that economic growth improves in the presence of better governance indicators (Fatnassi & Et Gutate, 2023; Yacouba et al., 2023). **Infl** refers to inflation measured by consumer prices. However, the literature has found mixed results regarding the positive effect of inflation on

economic growth (Barro, 2013). **Crpop** refers to the population growth. We expect a positive effect of population growth on economic growth (Onjala & K'Akumu, 2016).

To analyze the contribution of governance on the investment effect to improve economic growth, the interaction model is given as follows:

$$GDPH_{it} = \alpha_i + \alpha_1 I_{it} + \alpha_2 Gov * I_{it} + \alpha_3 Inf_{it} + \alpha_4 Crpop_{it} + \varepsilon_{it} \quad (4)$$

Where $Gov * I$ is the interaction between governance and investment.

3.2. Data source

The data set comes mainly from the World Bank database (WDI, 2022) covering the period from 2005 to 2020 and covers all WAEMU countries.¹

3.3. Estimation technique

3.3.1. Cross-sectional dependency test

To determine the appropriate estimation technique for our model, we carry out various tests, starting by checking the stationarity of our variables. There are two levels of unit root tests. The first generation of tests is based on the assumption of independence between individuals and the second generation tends to lift this assumption of independence by taking into account all possible forms of dependence between individuals. We therefore propose to carry out the cross-sectional dependence test and determine the appropriate unit root test in our case.

We speak of cross-sectional dependence when the observed common effects are omitted, the common effects are unobserved or even if the observed and unobserved effects are taken into account, the interdependencies could remain. Therefore, to conduct our study properly, we will perform the Pesaran et al. (2004) cross-sectional dependence test, which is a robust test to breaks in the coefficients as long as the unconditional means of the variables are constant throughout the time dimension. After the test, when there is no cross-sectional dependence we proceed to the first generation unit root test, otherwise we proceed to the second generation unit root test.

Our results, presented in Table 1, show that there is cross-sectional dependency, as most of the probabilities (p value) are less than .05. The presence of cross-sectional dependence in our data leads us to proceed with the second generation unit root test.

3.3.2. Unit root test

To test the stationarity of our variables, we refer to the second generation unit root test of Pesaran (2007) which takes into account all types of dependence and heterogeneous characteristics. After applying this test, we find that the inflation variable is stationary at levels. For the other variables (variables of interest and control variables), none is stationary at level but they are stationary in first difference. The presence of unit roots in our model allows us to verify the presence of long-term relationships by performing a cointegration test.

3.3.3. Cointegration test

We use the Westerlund (2007) test, which we believe is suitable for our model because it takes into account heterogeneous panel characteristics and also long-term and short-term cointegration relationships. This test takes into account two types of test, namely the group average test (Gt and Ga) with the

Table 1. Cross-sectional dependency test.

Variable	CD-test	p Value	Corr	Abs(corr)
PIBH	19.32	.000	0.920	0.920
InvPub	6.61	.000	0.315	0.480
FDI	1.45	.046	0.069	0.205
Inflation	15.18	.000	0.723	0.723
CrPop	-1.28	.199	-0.061	0.444
Corruption	0.94	.350	0.046	0.457

Source: Author, based on World Bank data (WDI, 2022).

Table 2. Cointegration test GDP_Public investment.

Statistic	Value	Z-value	p Value
Gt	−2.360	−1.835	.033
Ga	−4.991	1.118	.068
Pt	−5.543	−1.457	.073
Pa	−4.341	−0.071	.072

Source: AUTHOR (2024).

Table 3. Cointegration test GDP_Corruption.

Statistic	Value	Z-value	p Value
Gt	−2.252	−1.493	.068
Ga	−4.990	1.118	.868
Pt	−5.821	−1.736	.041
Pa	−4.875	−0.411	.041

Source: AUTHOR (2024).

Table 4. Cointegration test GDP_Debt.

Statistic	Value	Z-value	p Value
Gt	−1.761	0.053	.021
Ga	−5.014	1.106	.066
Pt	−4.592	−0.500	.008
Pa	−4.557	−0.208	.018

Source: AUTHOR (2024).

alternative hypothesis that at least one unit is cointegrated, and the panel test (Pt and Pa) with the alternative hypothesis that the panel is globally cointegrated as shown in [Tables 2 to 4](#).

The results show that at least one unit is cointegrated and also that the panel is globally cointegrated at 5% means that there's long run relation.

The presence of cointegrating relationships between our variables leads us to choose estimators that take into account long-term relationships for dynamic panels with unit root. The econometric literature has shown four main estimators that take cointegration into account, namely FMOLS (Fully Modify Least Squares), DOLS (Dynamic Ordinary Least Squares), MG (Mean Group) and PMG (Pooled Mean Group). In addition, estimators such as the dynamic ARDL (Auto Regressive Distributed Lag) and CCR (Common Correlation Ratio) method can be used to take these long-term relationships into account. However, the FMOLS and DOLS estimators were proposed respectively by Pedroni (2004) and Kao and Chiang (2001) with a view to remedying the problems from which the Ordinary Least Squares (OLS) estimator suffers. OLS suffer from correlation problems between series and endogeneity problems in the regressions of cointegrating relationships. Furthermore, based on properties of finite sample sizes, Kao and Chiang (2001) have shown that OLS generates significant bias problems for small sample sizes and the FMOLS estimator does not provide a significant improvement over the OLS estimator. As a result, they conclude that the DOLS estimator is better than OLS and FMOLS for estimating long-run relationships with finite sample sizes.

The MG estimator proposed by Pesaran and Smith (1995) is an estimator generally used for estimating panel models and designed to average each unit making up the panel. It is therefore an efficient estimator of parameter means. The MG estimator is also consistent for estimates of long-term relationships, mainly for large sample sizes (Piotte, 1999). The PMG method, developed by Pesaran et al. (1999), is an intermediate estimator between two estimation methods often used for panel data estimates, namely, the MG estimation method on the one hand, and the usual panel data estimation methods which include random and fixed effect models or the generalized method of least squares (GMM), on the other. In fact, it is an estimator that offers a dynamic adjustment between long run and short run relationships via the convergence coefficients. However, it is important to note that the PMG estimator imposes homogeneity on the long run coefficients, while allowing heterogeneity for the short run parameters.

From all the above, we refer to the DOLS method for the estimation of our model because, apart from taking into account long run relationships, this method also takes into account endogeneity and autocorrelation problems and combines the necessary information relating to the explanatory variables

at the time of their measurement (Begum et al., 2020). It is also an estimator that gives reliable measures of static significance, especially for small sample sizes. Our motivation in opting for the DOLS estimation method is therefore linked to the size of our sample, as the FMOLS, MG and PMG estimators are not effective for small samples.

3.3.4. Estimated model

On the basis of models 3 and 4 defined above, our model to be estimated is as follows:

$$GDPH_{it} = \alpha_i + \alpha_1 GDPH_{it-1} + \alpha_2 I_{it} + \alpha_3 Gov_{it} + \alpha_4 CrPop_{it} + \alpha_5 Inf_{it} + \varepsilon_{it} \quad (5)$$

$$GDPH_{it} = \alpha_i + \alpha_1 GPH_{it-1} + \alpha_2 I_{it} + \alpha_3 Gov * I_{it} + \alpha_4 CrPop_{it} + \alpha_5 Inf_{it} + \varepsilon_{it} \quad (6)$$

However, it would still be interesting to include the effect of debt servicing in accordance to work of Chowdhury et al. (2024) to take account the debt effect on the capacity of investment to bring about growth. Thus, models 7 and 8 below respectively take into account the debt effect on growth and the interaction of debt and investment on economic growth. Economic theory postulates that public debt, at reasonable rates, can promote economic growth, particularly in developing countries economic growth, such as those in the ECOWAS (Aqeeq & Chamadia, 2024). The use of borrowed funds for productive investments, as well as macroeconomic stability, are essential to ensure positive outcomes and poverty reduction (Egbetunde, 2012).

The interaction between public debt, investment and corruption on economic growth in the ECOWAS region presents complex challenges (Okwara & Egbu, 2019). While the existing literature has explored these elements individually, there remains a gap in research that comprehensively examines their interconnectedness, particularly in the ECOWAS context (Seyram et al., 2019). Filling this essential to fill this gap in order to inform policymakers and researchers about the multifaceted dynamics shaping economic growth in the region. In the context of WAEMU countries, understanding how public debt influences the relationship between investment and economic growth in the presence of governance indicators, policymakers can design effective strategies to promote sustainable growth and mitigate the negative effects of poor governance on socio-economic progress in WAEMU countries.

The dynamic forms of Equations (1) and (2) are given respectively as follows:

$$GDPH_{it} = \alpha_i + \alpha_1 GDPH_{it-1} + \alpha_2 I_{it} + \alpha_3 Gov_{it} + \alpha_4 CrPop_{it} + \alpha_5 Inf_{it} + \alpha_6 Debt_{it} + \varepsilon_{it} \quad (7)$$

$$GDPH_{it} = \alpha_i + \alpha_1 GDPH_{it-1} + \alpha_2 I_{it} + \alpha_3 Debt * I_{it} + \alpha_4 CrPop_{it} + \alpha_5 Inf_{it} + \alpha_6 Gov_{it} + \varepsilon_{it} \quad (8)$$

4. Results

4.1. Descriptive statistics

Descriptive statistics for the variables show a disparity between countries in terms of growth. GDP per capita averages 932 US dollars. Its variability from one country to another is around US\$455, ranging from US\$316 to US\$2349. Statistics also show that local investment varies from 5% of GDP from one country to another, averaging 20%. FDI varies by 2% of GDP from one country to another, with a ceiling of 24% of GDP. Governance indicators are weak, averaging −0.6 points on a scale of (−2.5 to 2.5) for low and high governance scores respectively. The other characteristics of the variables are presented in Table 5.

Table 5. Descriptive statistics for variables.

Variable	Obs	Means	Stand. dev	Minimum	Maximum
GDPH	128	932.7978	455.2272	316.3656	2349.07
Inv pub	127	19.73463	5.496375	5.885067	32.60701
FDI	128	0.4539334	2.462949	−4.139479	24.06153
Inflation	128	2.03469	2.666852	−3.233389	11.30511
CrPop	128	2.865463	0.44173	2.055435	3.867091
Debt servicing	128	5.335004	4.499733	0.7171289	31.19236
Corruption	128	−0.6857904	0.3792839	−1.597468	0.0588305
Efficiency gov	128	−0.8587473	0.3636233	−1.807464	−0.0613858
Stab pol	128	−0.6396863	0.6661839	−2.259529	0.5478926

Source: Author (2024), based on World Bank data (WDI, 2022).

Table 6. Estimates results of governance and investment effect on economic growth.

Variables	(1) GDPH	(2) GDPH	(3) GDPH
L.PIBSt	0.208*** (0.0367)	0.196*** (0.0371)	0.222*** (0.0412)
InvPubSt	0.0765*** (0.0263)	0.0667*** (0.0250)	0.0850*** (0.0297)
FDISt	0.000237 (0.00113)	9.57e – 05 (0.00104)	–0.000163 (0.00110)
Inflation	0.0191*** (0.00137)	0.0174*** (0.00192)	0.0187*** (0.00147)
CrpopSt	0.0396** (0.160)	0.0673*** (0.155)	0.0804*** (0.165)
CorrSt	0.0680** (0.0743)		
EffGouvSt		0.137** (0.0683)	
StabSt			0.0295*** (0.0195)
Observations	111	111	111
Number of ID	8	8	8
R-squared	0.8465	0.9610	0.7876

Note: Robust standard errors are in parentheses.

Source: Author (2024).

*** $p < .01$. ** $p < .05$. * $p < .1$.

Table 7. Estimates results of governance and investment interactions on economic growth.

Variables	(1) PIBSt	(2) PIBSt	(3) PIBSt
L.PIBSt	0.215*** (0.0331)	0.211*** (0.0351)	0.213*** (0.0377)
InvPubSt	0.0820*** (0.0286)	0.0915*** (0.0353)	0.0775** (0.0352)
FDISt	0.000468* (0.00130)	0.00234* (0.00155)	0.00121* (0.0122)
Inflation	0.0188*** (0.00157)	0.0184*** (0.0156)	0.0188*** (0.0154)
CrpopSt	0.0465** (0.156)	0.0458 (0.150)	0.0437** (0.147)
StatInv*Corr	0.0610* (0.0471)		
StatFDI*Corr	0.0376** (0.0195)		
StatInv*Eff		0.0904** (0.134)	
StatFDI*Eff		0.0570** (0.0300)	
StatInv*Stapol			0.00217 (0.0132)
StatFDI*Stapol			0.00290 (0.00759)
Observations	111	111	111
Number of ID	8	8	8

Note: Robust standard errors are in parentheses.

Source: Author (2024).

*** $p < .01$. ** $p < .05$. * $p < .1$.

4.2. Estimation results

Table 6 presents the results of the effect estimates of governance and investment indicators on economic growth in the WAEMU. The results show that the coefficient associated with the lagged variable is significant and positive. The evolution of GDP per capita is explained by its lagged value. The results showed a significant and positive effect of the coefficient associated with investment on economic growth. A 1% increase in investment leads to a 0.07% increase in economic growth, unlike FDI, which is not significant. The results also show an effect of governance indicators on GDP per capita. For example, the results show that a one-point deterioration in the corruption score leads to a reduction in GDP per capita of around 0.06 percentage points. The same applies to political tensions, which contribute around 0.03 percentage points to the decline in GDP per capita. Conversely, a one-point improvement in government efficiency increases GDP per capita by 0.13 percentage points.

The results show that the traditional growth variables are significant. A 1% increase in the coefficients associated with the inflation and population growth variables respectively leads to a 0.02% and 0.04 increase in GDP per capita.

Table 7 presents the estimates results of governance and investment interactions on economic growth. The results show that corruption and government efficiency affect public investment, while political stability affects FDI. Thus, controlling corruption and government efficiency improves the public investment and FDI effect on GDP per capita by around 0.06 and 0.04% points respectively. Government efficiency attenuate the public investment and FDI effect on GDP per capita by around 0.09% and 0.05%.

Table 8. Model estimation including debt servicing.

Variables	Model with service debt	Interaction between service debt and investment
L.PIBSt	0.115*** (0.0378)	0.120*** (0.0336)
InvPubSt	0.00669** (0.00302)	0.00974* (0.00571)
IDEST	0.00528 (0.00187)	0.000119 (0.00260)
Inflation	0.0170*** (0.00192)	0.0179*** (0.00215)
CrpopSt	0.0161*** (0.00545)	0.0384*** (0.0129)
Public Debt	−0.0425* (0.00111)	
StabInv*Debt		−0.00394** (0.00316)
StabIDE*Debt		−0.00344** (0.00163)
CorrSt	0.0454* (0.0482)	0.0376* (0.0359)
Observations	111	111
Number of ID	8	8

Note: Standard errors are in parentheses.

*** $p < .01$. ** $p < .05$. * $p < .1$.

5. Discussions

The results presented in the section above showed the contribution of institutional quality and investment to economic growth. The results using the DOLS (Dynamic Ordinary Least Squares) estimators showed a significant and positive effect of public investment on economic growth. This result is in line with the literature, which has shown that investment is an integral part of the factors essential to production and economic growth. Public investment in human capital, infrastructure and R&D would improve production capacity in all sectors of activity (Khang & Nguyễn, 2021). The weak effect can be explained by the fact that the public investment level in these countries remains low.

The results also showed the importance of institutional quality effect measured by governance on economic growth in WAEMU countries (Atangana Ondo, 2013). Examination of the results showed a significant and negative effect of corruption on growth (Uddin & Rahman, 2023). Improving governance conditions and, above all, the policies implemented to control corruption and improve government efficiency and political stability over the last few decades, would increase and secure investment and the attraction of FDI that could increase the level of growth. Analysis of the results, therefore, implies that governance needs to be improved and new policies put in place to increase growth in economic sectors. This is explained by the interactions between investment and governance results on economic growth. The results showed the relevance of the governance quality role in improving the investment effect on growth (Fatnassi & Et Gutate, 2023; Yacouba et al., 2023). This result is in line with that of Asamoah et al. (2019), for whom quality institutions must be put in place if the desired growth objectives are to be achieved. Thus, a low-quality institutional framework, with a notorious presence of corruption, high bureaucracy and rent-seeking, increases the transaction cost of doing business and stifles growth by discouraging investment (Fabro & Aixalá, 2009).

The results showed a positive and significant inflation effect on economic growth. The literature has long examined the relationship between inflation and growth (Barro, 2013; Eggoh & Khan, 2014; Hamadouche, 2017). Moderate inflation positively affects growth (Hodge, 2006), while galloping inflation leads to a slowdown in economic activity (Mandeya & Ho, 2021). In WAEMU countries, inflation is one of the convergence principles, which means that policies can be put in place to avoid price hikes. This situation can be explained by the fact that poverty levels are high in the WAEMU region, and that a rise in inflation could affect household consumption choices.

The public investment effect on growth can be lessened by the public debt presence. The economies of SSA countries, and more specifically those of the WAEMU, are highly externalized, and pay a heavy price in terms of debt. Yet, literature has shown that public debt has a negative effect on economic growth. As a result, these countries tend to use resources earmarked for investment to pay down debt. Table 8 presents the results of debt servicing on economic growth in WAEMU countries. The results show that debt servicing has a significant negative impact on economic growth. An increase in public debt servicing leads to a reduction in economic growth of around 0.042%. However, the results showed a small, significant increase in economic growth due to public investment of around 0.007% in debt servicing presence. The interaction test results show a significant and negative coefficient effect on economic growth. The results show that the increase in debt servicing attenuates the public investment effect on growth by around 0.003%. Yusuf and Mohd (2021) arrived at the same results in their study.

For Salmon (2021), on the other hand, the effect of public debt on economic growth becomes negative once a threshold is reached.

6. Conclusion and recommendations

This paper analyzed the institutional quality and investment effect on growth in WAEMU countries, taking into account the interactive effect between governance and investment over the period from 2005 to 2020. Examination of the results obtained by the Dynamic Ordinary Least Squares (DOLS) estimators revealed that public investment has a significant effect on economic growth in the zone. The same is true for governance indicators, which are also significant.

The quality of governance is a matter of concern in the sub-region, as the indicators are weak overall. Efforts must be focused on improving these indicators, which remain an essential factor in attracting FDI, and this would help accelerate efforts to achieve growth targets. Lastly, all objectives must be geared toward a policy of satisfying domestic demand by mobilizing domestic resources, thereby limiting recourse to external sources and the increase in debt, which acts as a brake on public investment. Following on from this article, future complementary research could focus on the transmission channels of FDI and analyze the threshold effect of FDI on economic growth.

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Data availability statement

Data and materials supporting the results or analyses presented in this paper available upon reasonable request.

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