Report

Comparative analysis of the determinants of economic growth in WAEMU and BRICS countries from 2005 to 2018

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Abstract

This study provides a comparative analysis of the determinants of economic growth in the West African Economic and Monetary Union (WAEMU) and the countries of Brazil, Russia, India, China and South Africa (BRICS). It was conducted using panel data over the period 2005-2018. Descriptive analysis of the databases was performed followed by econometric analysis using R software. All variables in the study are non-stationary in each of the two country groups. The model relationships in the study are obtained using ordinary least squares (OLS) estimators to control for the effects of short term variables. The results show that private investment, labor force, and government spending have a more positive impact on economic growth in the BRICS countries than in the WAEMU countries. Economic policies should therefore focus on job quality and good governance to strengthen human capacity, attract investors and improve public spending.

Keywords: WAEMU, BRICS, panel, economic growth, OLS.

Contents

1. Introduction

An important goal of any economic policy is to improve the living conditions and standard of living of individuals. Economic growth is a key factor that can contribute to this improvement. Growth is a fundamental process in the contemporary economy, based on the development of the factors of production. Achieving sustained and sustainable growth has been the main objective of governments and economic managers for decades. All countries, including the most developed ones, are constantly improving their economic performance in order to raise the standard of living of their populations. North [34] has shown that institutional frameworks are important in the growth process, for example the quality of public administration and the ability of political structures to resist corruption. He argued that the ability of the legal system to protect property rights and a stable political situation are powerful drivers of economic growth.

Since the economic recession of 1980, poverty and unemployment have been on the rise in sub-Saharan African countries, particularly those in the West African Economic and Monetary Union (WAEMU). These countries are struggling to achieve sustained growth despite their vast resources and potential, well-trained elites and economies that are fully open to the outside world. Moreover, the BRICS countries accounted for 26% of GDP (in terms of purchasing power parity with the U.S. dollar) in 2012, compared to 10% in 1990 [17]. Having also been a victim of the 1980 economic recession, they have been able to develop economic performances contributing significantly to the improvement of the standard of living and quality of life of their populations. They now occupy a very important place in the world economy.

Given these differences between the two groups of countries, it is necessary to highlight the factors that explain the economic growth of the BRICS countries in order to propose stimulus measures for balanced and sustained growth in the WAEMU countries. This study aims to conduct a comparative analysis of the determinants of economic growth in WAEMU countries and BRICS countries from 2005 to 2018.Therefore, the approach proposed in the development of this study will be based on three main points. First, we will briefly describe the theoretical background. Second, we will analyze the data collected, present the results, and finally we will formulate useful recommendations to stimulate economic growth in WAEMU countries.

2. Theoretical background

In this chapter we will first discuss the issues of the study (the statement of the problem, the interest of the study, the objectives, the questions and the research hypotheses); then, the literature review and finally, the research methodology of the study.

2.1 Issues of the study

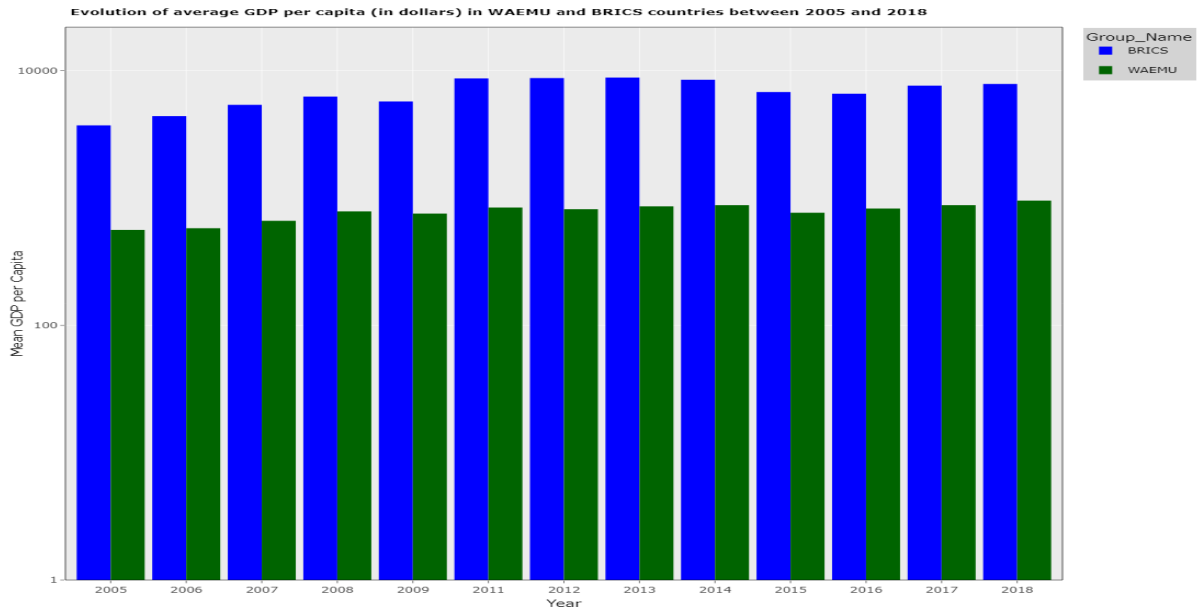
This section highlights the background and rationale for this study. Thus, this section states the problem and presents the interest of conducting such a study. The research questions, hypotheses and objectives are outlined.

2.1.1 Problematic

• Problem Statement

To finance industrialization through a highly productive agricultural base, East Asian countries such as Japan, Taiwan, and South Korea began to invest in rural infrastructure, agricultural reform just after the economic recession of 1980 [38]. As a result, its countries have gained a new impetus from developing countries (DCs), which differ significantly from underdeveloped countries even at the global level in terms of economic and social development. The BRICS (Brazil, Russia, India, China and South Africa) are a major global economic force, with assets representing 42.1% of the world's population and growing at an astonishing rate. Indeed, between 2000 and 2010, these countries experienced significantly higher growth rates than developed countries: Brazil (3.7%), India (8%), China (10.8%) and South Africa (3.9%) compared to 1.6% for developed countries [36].

On the other hand, WAEMU countries, victims of the same recession, have lagged behind. Despite reforms to improve the macroeconomic framework, growth rates in these countries remain erratic and below the levels estimated by the Sustainable Development Goals (>7%). Agriculture, the main sector in the evolution of economic growth in these countries, faces obstacles such as climatic hazards. Unemployment, poverty, and food insecurity continue to plague these countries. According to the World Bank's 1998/1999 World Development Report, the population of WAEMU was estimated at 66 million in 1997, with only 3 million people in the labor force, or 4.5% of the total population. More than one person in two is underemployed in rural areas. According to the 2013 Human Development Index (HDI) ranking by the UNDP, WAEMU countries are among the bottom fifty countries. It is with this in mind that the Economic and Monetary Community of Central Africa (CEMAC) and WAEMU are asking the various member states to embark on the path of development to achieve high growth [13].
Figure 2.1 shows the evolution of the average GDP per capita (in dollars) of WAEMU and BRICS countries between 2005 and 2018. It can be seen that the GDP per capita of the BRICS countries is, on average, much higher than that of the WAEMU.



Data source: World Bank data (2022).

Several economic, political and social factors are at the origin of this difference in GDP per capita observed between WAEMU and BRICS countries from 2005 to 2018. In order to help WAEMU countries implement policies to move towards balanced and sustained growth, it is therefore very important to analyze the growth factors of high-growth BRICS countries. Thus, the following question was asked: **How can the economic growth gap between the BRICS countries and the WAEMU countries be explained?**

- **Value of the study**

The importance of economic growth for a country no longer needs to be justified, particularly because it allows for: improved public services, investment, etc. The identification of the main characteristics of the emergence of the BRICS countries and a comparative analysis of their characteristics will make it possible to develop policies likely to boost economic growth in WAEMU countries. Thus, the study highlights the factors on which WAEMU should act to boost its growth. It is not enough to show the impact of variables on economic growth. Leaders must use this variable to achieve better economic results. For example, sustained and balanced growth in WAEMU countries requires an increase in private investment, gross savings and public spending would lead to higher output. Similarly, reducing the unemployment rate and improving people's living conditions are also a consequence of increased private investment.

2.1.2 Questions, Objectives and Assumptions

- **Research questions and objectives**

In order to answer the question "how to explain the economic growth gap between BRICS and WAEMU countries?", our main objective will be to explain the growth gap between BRICS and WAEMU countries using the explanatory variables in our study. Specifically, this will involve:

Objective 1: Estimate the effect of short-term private investment on economic growth in the WAEMU and BRICS countries, respectively.
Objective 2: Estimate the effect of short-term labor force on economic growth in WAEMU and BRICS countries, respectively.
Objective 3: Estimate the effect of short-term public spending on economic growth in WAEMU and BRICS countries, respectively.

- **Study assumptions**

Among the factors likely to have an influence on economic growth in WAEMU and BRICS countries, we can cite: private investment, public investment, the working population, the degree of trade openness, external debt, gross savings, credit to the economy, etc. In light of the objectives formulated, we formulate three hypotheses.

Assumption 1: Compared to WAEMU countries, private investment has a statistically more important effect on economic growth in the BRICS countries in the short term.
Assumption 2: The labor force has a statistically more important short term effect on economic growth in the WAEMU countries than in the BRICS countries.
Assumption 3: Government spending has a statistically more significant effect on economic growth in the short term in BRICS countries than in WAEMU countries.

2.2 Literature review

2.2.1 Definitions

The economic policy It represents the whole of the means implemented by the State to achieve the objectives which it set itself with an aim of improving the general economic situation of the country. Economic policy pursues various short- and long-term objectives. In the short term, these objectives are represented in a "magic square": full employment, price stability, balance of payments and growth [25]. These objectives seem difficult to achieve simultaneously, hence the expression "magic square". James [11] distinguishes between structural economic policies that aim to act in the short term on imbalances in the economic situation, using instruments within a given institutional framework. It includes: fiscal policy, monetary policy, exchangerate policy, income policy, employment policy, etc. Structural policies, which aim to act on the fundamental characteristics of the economy over the long term to improve the economy's performance.

Economic growth It can be defined as an increase over a long period of time in the production and characteristic dimensions of a country's economy, usually in one year. It translates into an increase in distributable income. For Bernier [10], economic growth is an increase in production over a long period. Economic growth refers in a broad sense to the increase in products and services produced in an economy over a given period. According to Perroux [37], economic growth is the sustained increase over one or more long periods of time in a dimensional indicator for a nation, the net

aggregate in real terms. In contrast to Perroux and Bernier, Garello and Naudet [18] add that economic growth is characterized by a sustained increase in production and in the main economic quantities such as Gross Domestic Product (GDP). Kuznets [28] explains "the economic growth of a country can be defined as an increase over a long period of time in its capacity to provide its population with an ever-expanding range of economic goods. This increasing capacity is based on technical progress and the institutional and ideological adjustments it requires. The fruits of growth are then spread to other sectors of the economy. There are two forms of growth: extensive growth and intensive growth. Extensive growth is proportional to the increase in the quantities of the factors of production. Intensive growth is linked to the increase in the productivity of labor or capital.

2.2.2 Economic growth factor

- **Overview**

Economic growth is a complex and multidimensional concept. It is based on a large number of theories. The first theories of growth were those of the classics. Smith [43] put forward the idea that the division of labor is a source of productivity. In his analysis, he emphasized economies of scale, specialization, and international trade. However, Smith [43] neglects technical progress in the growth process. According to Malthus [31], the main mechanism that conditions growth is the demographic pressure and the subsistence needs of this growing population. On the other hand, Ricardo [39], admits that technical progress can raise productivity in agriculture. Joining the classics, Marx [33] identifies technical progress as a factor of productivity and is one of the pioneers of recent theories on endogenous growth.
The first model of endogenous growth was the work of Romer [40] who considers that endogenous growth comes from an externality that is the source of increasing returns to scale. Following the classics, the neoclassical growth theory developed by Solow [44] offers a much more satisfactory approach than the model of Harrod [21] and Domar [15]. Moreover, Solow [44] identifies two sources of growth: an "endogenous" source, the accumulation of capital, and an "exogenous" source, the quantity of available labour. Subsequently, Solow's model was enriched by integrating the notion of investment in human capital. Under the impetus of Mankiw, Romer and Weil [32], the notion of investment in human capital is assimilated to a short-term investment. If training allows unskilled work to be transformed into more skilled work, and thus to use more complex equipment and to make better use of it, the technological level of the country increases at the same time its steady state and its growth rate.
Growth is a quantitative phenomenon that measures the evolution of the resources that are naturally and collectively available. In the macroeconomic sphere, the indicator that measures growth is the country's Gross Domestic Production (GDP). Schumpeter [1] emphasizes technical progress as a means of stimulating growth rather than capital accumulation. To this end, he totally rejects the analysis of Malthus and Ricardo concerning the constraint imposed by population pressure. For Schumpeter [1], research and development allows for an increase in productivity and innovation by creating new products through technology. We can thus state in a general way that variables such as: increase of the active population, qualified manpower, an accumulation of capi-

tal favored by public investments which attract those of the private sector, technical progress, progress of the division of work, innovation favor economic growth.

- **Private Investment**

According to Villieu [45], in everyday language, the notion of investment describes a multitude of operations: one invests in the stock market, in the purchase of a new car, in the education of one's children, in the acquisition of a house or in a new machine. He goes on to say that the economic definition is more precise but also more arbitrary: "investment is, in the broadest sense, the acquisition of production goods". The content of the notion of investment is the subject of two approaches: that of business accounting and that of national accounting. At the microeconomic level, private accounting identifies three main types of investment: tangible investments (land, buildings, machinery, tools, etc.), financial investments (equity investments, purchases of securities, etc.) and certain intangible investments (patents, licenses, trademarks, goodwill, etc.). At the macroeconomic level, the term investment is replaced in national accounts by the term gross fixed capital formation (GFCF), which is "the value of durable goods acquired by production units for use for at least one year in the production process" [45].
Private investment, on the other hand, refers to the set of operations consisting of investing savings or capital in long-term operations involving goods or financial assets with the aim of generating income and/or capital gains. It is income that is not consumed and that is intended to be maintained constant or to increase. According to Flamant (2003), investment is the use of capital held by firms to acquire the means necessary for its operation, which is translated financially by the allocation of this capital to long-term loans.

- **Public expenses**

Public investment refers to all the goods and services that make economic activity possible [23]. This particularly broad approach is taken up by Hansen [20], who distinguishes investment in social infrastructure, whose function is to maintain and develop human capital, from investment in economic infrastructure, whose characteristic is to participate in the productive process. More precisely, public investment is the gross fixed capital formation (GFCF) carried out by the general government.
The debate on the effect of public investment on economic growth has recently gained considerable momentum. Aschauer [5] and Barro [6] consider that government spending can enter either the production function of entrepreneurs or the utility function of consumers. While in the first hypothesis, substitution between public and private spending is probably strong, in the second, public spending is essentially complementary to private spending. Romer [40] suggests that public spending plays a productive role, while considering that growth is endogenous. The influence of public spending is therefore supply-side. The model of Barro [6], completed by Barro and Sala-I-Martin [7], is the prototype of this approach: "Public investment contributes to private productivity". Thus, without roads, what would be the productivity of a transport firm? In this perspective, Barro [6] enriches the endogenous growth model by integrating public spending.

Afonso and Furceri [2] explain that social security contributions and operating expenses have a negative effect on economic growth in European countries, while public investment expenses have a positive effect on growth, but the more volatile their level, the lower the growth level. Afonso and Furceri [2] arrive at the same results as Devarajan [14] regarding the effect of investment spending on growth for developing countries, which seems surprising if one adheres to endogenous growth theories that postulate that such spending is beneficial to the economy because of the externalities it produces. It is possible to interpret the results of Afonso and Furceri [2] by the existence of threshold effects implying that beyond a certain point, the investment of public funds in infrastructure is counterproductive if it is done at the expense of operating expenses.

- **External debt**

A country's external debt refers to all debts owed by a country, including the State, companies and individuals, to foreign lenders. Technically, external debt refers to all the assistance requested by a government from partners (bilateral, multilateral, financial institutions, financial markets, etc.) to finance development actions that could not be covered by the national budget. Sachs [24] found that the debt repayment capacity of a country is weakened by a high level of indebtedness, so the future costs of servicing the debt discourage national investment. This principle is known as the virtual debt burden or "debt overhang". This theory can be seen in the Laffer curve, according to which increasing debt reduces the probability of its repayment.
Singh [30], admits that a high level of public debt has a negative impact on growth and other indicators of economic development, and consequently on macroeconomic stability. Furthermore, Alesina and Guido [4] and Cerra, Meenakshi and Sweta [12] have demonstrated a relationship between increased debt and capital flight. Thus, countries with weak institutions tend to accumulate debt and thus discourage capital inflows while promoting capital flight. Kumar and Woo [27], in analyzing the components of growth, showed that the negative effect of high debt levels generally reflects a truce in labor productivity growth, mainly due to a decline in investment and a slowdown in the growth of the capital stock.

- **Human capital**

Human capital refers to the set of skills that can be valued economically. This notion was introduced by Schultz [42], who argues that knowledge and skills are a form of capital and that this capital is the product of a "voluntary investment". He shows that there is a link between growth in Western countries and investment in human capital, particularly in education. Bassanini and Scarpetta [8], have shown that an additional year of education at the middle level generates a ten percent increase in human capital. Moreover, human capital formation can have a lasting impact on productivity growth and accelerate the absorptive capacity of new technologies [41]. For Becker [9], human capital is a stock of productive resources embodied in the individuals themselves, made up of elements as diverse as the level of education, training and professional experience, and health status. Human capital, as a factor of production, includes all the people who contribute to the production of goods and services, namely: farmers, workers,

shopkeepers, teachers, etc., in short, all these people contribute to the elaboration of GDP [9]. According to Solow's model [44], growth comes, on the one hand, from the increase in the active population and, on the other hand, from the increase in the efficiency of the productive mix. Lucas [29] showed that growth is linked to human capital. Similarly, he has shown that knowledge generates positive externalities on production and the economy. Human capital is therefore at the heart of development strategies.

- **Gross savings**

The relationship between savings, investment and economic growth is very close, but it seems that the interpretation of this link of influence has not stopped evolving. In the classical school and according to the interpretations of Adam Smith and David Ricardo, savings are inevitably allocated in the form of consumption. The economic agent holds no residue and there are no preferences for liquidity. Savings can only be a direct reflection of investment and growth in this case. This relationship was verified during the industrial revolution, with a large portion of self-financing coming from savings in agriculture and trade. Also in countries such as China during communism and in certain time cycles of industrialized countries where an increased role of financial markets was observed for a return to growth [22].
On the other hand, Keynes [26] in his book "General Theory of Employment, Interest and Money" gave a whole new definition of savings: it is rather disposable income and the propensity to consume that determine consumption and indirectly savings, the latter being considered as a residue when demand is satisfied. Keynes thus opposes the classics, saving is largely independent of investment projects since the behavior of economic agents depends on other variables: income, the marginal efficiency of capital and the interest rate. High savings can generate low consumption and slow down growth, as it reduces aggregate demand [16]. Saving plays an important role in the evolution of per capita variables in growth models. Solow's [44] model, based on the neoclassical assumptions of diminishing factor returns, predicts that fully invested savings precede and cause an increase in the level of GDP per capita. However, Solow's analysis attributes the origin of this growth to exogenous factors, particularly technical progress. In contrast to Solow, Romer [40], famous for his first endogenous growth model of the AK type, explains growth by endogenous factors such as innovation and government intervention, but the idea of high savings as an engine of economic growth is still present in his model. Thus, savings can fuel additional investment, and thus income, provided that the law of opportunities is verified, i.e., any additional production is effectively transformed into income. In line with endogenous growth models in which innovation plays a determining role, a very recent study by Aghion and al. [3] analyzes the implicit effect of savings on economic growth. The main prediction of the (Schumpeterian) model developed in the article is that savings have a positive effect on growth if countries are far from the technological frontier, but it does not affect the growth of countries close to this frontier. The calibration of the model has shown that developing countries (far from the technological frontier) tend to increase their savings in the future in order to catch up with the frontier, which will ultimately imply an increase in the growth rate.

3. Data

3.1 Data Sources and Sample

This report is based on the seven WAEMU member countries, excluding Côte d'Ivoire due to missing data. The study was also conducted on the five BRICS member countries. The data used in this study comes from a World Bank database. Due to the unavailability of data on some of the variables in some countries, we were obliged to limit ourselves to the period from 2005 to 2018 and without taking into account the year 2010 in order to have a complete database of all the variables. The year 2010 was not taken into account because Guinea-Bissau, a member of the WAEMU, has a negative gross saving, which poses a problem for us in the regressions on a logarithmic scale. The dual dimension (temporal and spatial) of the information studied led us to use panel data. For the WAEMU countries, we have 7 individuals, 91 observations and 13 time series. For the BRICS countries, we have 5 individuals, 65 observations and 13 time series.

3.2 Variable identification and specification

- **Dependent variable**

This is economic growth as measured by **Gross Domestic Product per capita** (GDP_Habitat). GDP per capita is the gross domestic product divided by the mid-year population. Data are in current U.S. dollars.

- **Independant variables**

The variables used as determinants of economic growth in this report are: gross savings (EPARBRUT), private investment (INPRIV), The labor force (POP_ACT), External debt (DEBTEXT) and public expenditure (DEPUB).we also used inflation (Inflation) and The degree of openness (OUVCM) as independent variables but they were not taken into account in the rest of our study because of their stationarity.

Private investment (INPRIV) Gross capital formation (formerly called gross domestic investment) consists of expenditures for additions to the tangible capital assets of the economy, plus net changes in inventories. Data are in US dollars.

The labor force (POP_ACT) includes persons 15 years of age and older, who provide labor for the production of goods and services during a given period. This definition includes both workers and job seekers.

Gross saving (EPARBRUT) is calculated as gross national income minus total consumption plus net transfers. Data are in current US dollars.

Government Expenditures (DEPUB) (formerly known as General Government Consumption) includes all current government spending on purchases of goods and services (including employee compensation). Data are in constant US dollars.

External debt (DEBTEXT) Total external debt is debt owed to non-residents and repayable in foreign currency, goods or services. Total external debt is the sum of public and publicly guaranteed long-term debt, private non-guaranteed debt, the use of IMF credits, and short-term debt. Short-term debt includes all debt with an original maturity of one year or less and late interest on long-term debt. Data are in current US dollars.

Table 3.1 Variables Summary

Variables	Nature	Expected effects
POP_ACT	Quantitative	+
INPRIV	Quantitative	+
EPARBRUT	Quantitative	+
DEPUB	Quantitative	+\-
DEBTEXT	Quantitative	+\-

3.3 Descriptive Analysis

We performed a descriptive analysis of the variables in R. We used the summary function on the 6 variables of our model, revealing the mean, standard deviation, minimum and maximum observations of each group of countries. We have also realized the boxplots on a regression of each variable on the temporal dimension 2005 to 2018. But given that the boxplots are a lot we preferred to do it in the R Markdown.

3.4 Econometrics Analysis

The basic model used is the Cobb-Douglas growth function. The Cobb-Douglas model has the advantage of taking into account variables that better explain the evolution of GDP per capita growth in any country. It is presented as follows:
$\mathbf{Y}$ = F(A,K,L) = $AK^{\alpha}L^{\beta}$ with $\alpha \in (0,1)$; $\beta \in (0,1)$ and $\alpha + \beta = 1$

we linearize with logarithmic function and we have : $\ln \mathbf{Y} = \ln A + \alpha \ln K + \beta \ln L$
Here Y denotes output; K denotes capital stock; L denotes labor force; A denotes a scale parameter or technical progress; and α, β denote the elasticities of output to the different factors of production. In our model, Y will be approximated by GDP per capita (GDP_Habitat); capital stock will be approximated by private investment (INPRIV); labor force will be labor force variable (POP_ACT) in our model. We have:

$\log GDP\_Habitat = \beta_0 + \beta_1 \log POP\_ACT + \beta_2 \log INPRIV + \beta_3 \log EPARBRUT + \beta_4 \log DEPUB + \beta_5 \log DEBTEXT + v_i$ with $\beta_0 = \log A$

Panel data have two dimensions (spatial and temporal): one for individuals (or any observation unit) and one for time. They are usually indicated by the index i and t respectively. It is often interesting to identify the effect associated with each individual, that is, an effect that does not vary over time, but varies from one individual to another. This effect can be fixed or random. This model which expresses economic growth is written :

$$\log GDP\_Habitat_{it} = \beta_{0i} + \beta_1 \log POP\_ACT_{it} + \beta_2 \log INPRIV_{it} + \beta_3 \log EPARBRUT_{it} + \beta_4 \log DEPUB_{it} + \beta_5 \log DEBTEXT_{it} + v_{it}$$

The coefficients β_1, β_2, β_3, β_4, and β_5 of the explanatory variables of the economic growth in the WAEMU countries and in the BRICS countries will be estimated by: the ordinary least squares method, the regression within method, the first difference method and the generalized least square method.

To ensure the success of the model, we performed stationarity tests on the model variables as well as validity tests of the model.

- **Stationarity test**

We performed the Im-Pesaran-Shin unit root test. Their method consists in applying ADF stationarity tests separately for each country for the model. Test that takes into account the heterogeneity of the autoregressive root but also a heterogeneity when there is a unit root in the panel.The model is estimated without any modification if the results indicate that the series are non-stationary.

- **Model specification test**

We tested for the presence of individual or time effects in our model using the **Fisher Test**. Thus, we performed two Fisher tests. One with the hypothesis of no individual and time effects and the other with the hypothesis of no time effects, but assuming that there are individual effects.

In order to carry out estimations on panel data, we performed the **Hausman Test** allowing us to choose a model among the two types of models existing in panel data. The fixed effects model and the random effects model. The hypotheses of this test are as follows:
H0: The model is a random effects model
H1: The model is a fixed effects model
When the p-value associated with this test is higher than the conventional threshold of 5% ($P < 0.05$), we reject H0.

4. Results

4.1 Results Descriptive Analysis

Table 4.1 presents a summary of the averages of the variables in the WAEMU and BRICS countries. The table shows that the average of all the variables in the BRICS countries are well above those observed in the WAEMU countries. However, a certain tendency towards stability can be seen between the two groups of countries for variables such as: GDP per capita and the active population. That is, a respective gap of 30.12% in GDP per capita and 24.79% in active population.

Table 4.1: Summary of average variables in the WAEMU and BRICS (logarithm scale)

Moyennes	GDP_Habitat	POP_ACT	INPRIV	EPARBRUT	DEBTEXT	DEPUB
WAEMU	6.592	15.025	21.008	20.650	21.334	20.643
BRICS	8.578	18.751	26.761	26.745	26.567	26.270

4.2 Results Econometrics Analysis

- **Stationarity test**

After performing the Im-Pesaran-Chin unit root test, we deduce from all our variables that only the following variables are non-stationary: labor force, private investment, public expenditure, gross savings and external debt. Thus, these are variables that evolve over time.

- **Hausman test**

The Hausman test shows that the WAEMU countries have a statistic of 81,957 with a probability of 3,268e-16 below the conventional threshold of 0.05 (5%). There is enough statistical evidence to reject the H0 hypothesis, and the fixed effects model is therefore retained for further interpretation and analysis of the results for the WAEMU countries. On the other hand, the Hausman test in the BRICS countries reveals a statistic of 2.5084 with a probability of 0.7752 (77.52%), above the conventional threshold of 0.05 (5%). We therefore do not have enough statistical evidence to reject the H0 hypothesis. The random effect model is therefore retained for further interpretation and analysis of the results in the BRICS countries.

Table 4.2: Estimation results of the short-term relationship in the WAEMU and BRICS countries.

WAEMU (Fixed effect model)		
Variables	**Coefficient**	**P-value**
POP_ACT	0.6010	0.1524
INPRIV	-0.0102	0.8416
EPARBRUT	0.0504	0.0596
DEPUB	0.2219	0.0008
DEBTEXT	-0.0321	0.0983
R-Squared: 0.30671		
BRICS (Random effect model)		
Variables	**Coefficient**	**P-value**
POP_ACT	-0.7141	5.603e-09
INPRIV	0.0794	0.1333
EPARBRUT	0.2157	3.342e-05
DEPUB	0.6866	<2.2e-16
DEBTEXT	-0.0418	0.1155
R-Squared: 0.9935		

First, the estimation results show that, in the short run, in the WAEMU. The model is not globally significant, with a coefficient of determination that indicates that 30.67 percent of economic growth in the WAEMU is explained by the labor force, private investment, gross savings, public spending, and external debt **(Table 4.2).** Only public spending (DEPUB) is statistically significant at the 5% level. On the other hand, the variables: labor force (POP_ACT), private investment (INPRIV), gross savings (EPARBRUT) and external debt (DEBTEXT) do not have a significant effect on economic growth in the WAEMU. The model in linear form in the WAEMU is as follows:

$$\log GDP\_Habitat_{it} = 0.6010 \log POP\_ACT_{it} - 0.0102 \log INPRIV_{it} + 0.0504 \log EPARBRUT_{it} + 0.2219 \log DEPUB_{it} - 0.0321 \log DEBTEXT_{it} + v_{it}$$

Second, the estimation results reveal that in the BRICS countries, the model is globally significant, with a coefficient of determination that indicates that 99.35% of the economic growth in the BRICS countries is explained by the labor force, private investment, public expenditure, external debt and gross savings **(Table 4.2)**. The coefficients associated with the explanatory variables: labor force (POP_ACT), gross savings (EPARBRUT) and public expenditure (DEPUB) are statistically significant at the 5% level. On the other hand, the variables: private investment (INPRIV), and external debt (DEBTEXT) do not have an effect on economic growth in the BRICS because their respective coefficients are not significant at the 5% level. The model in the linear form for the BRICS countries the following:

$$\log GDP\_Habitat_{it} = -0.7141 \log POP\_ACT_{it} + 0.0794 \log INPRIV_{it} + 0.2157 \log EPARBRUT_{it} + 0.6866 \log DEPUB_{it} - 0.0418 \log DEBTEXT_{it} + v_{it}$$

To summarize, the results obtained after the estimation of the models reveal that over the period 2005 -2018 all the explanatory variables of the models do not have a significant effect on economic growth in the WAEMU and BRICS countries. Indeed, in the BRICS countries, private investment has a statistically positive effect on economic growth. A 1% increase in private investment leads to a 0.0794% increase in GDP per capita. In contrast, private investment does not have a statistically positive effect on economic growth in WAEMU countries. Indeed, a 1% increase in private investment leads to a 0.0102% decline in GDP per capita in WAEMU countries. This is contrary to the work of Ojo and Oshikoya [35] and Gura and Hadjimicheal [19] who found a positive and significant relationship between GDP per capita and private investment in African economies.

Human capital, as measured in this study by the active population aged 15-64, has a positive effect on GDP per capita in WAEMU countries, whereas in BRICS countries, this effect is not positive. According to the results of estimates in the short term, a 1% increase in the labor force leads to a 0.7141% decrease in GDP per capita in the BRICS countries compared to a 0.6010% increase in GDP per capita in the WAEMU countries.

Moreover, public spending has a significant influence on short term economic growth in both WAEMU and BRICS countries. Indeed, public spending has a more positive impact on economic growth in the BRICS countries than in the WAEMU countries, i.e., a 1% increase in public spending leads to a 0.6866% increase in economic growth in the BRICS countries compared to 0.2219% in the WAEMU countries. This result confirms that of Gueye and Diatta (2018).

Without forgetting the other variables, we can say that gross savings have a statistically significant effect on economic growth in the BRICS countries than in the WAEMU countries. That is, a 1% increase in gross savings leads to a 0.0504% increase in GDP per capita in WAEMU countries, compared to a 0.2157% increase in GDP per capita in BRICS countries. Similarly, external debt has a more negative effect on economic growth in the BRICS countries than in the WAEMU countries. That is, a 1% increase in external debt leads to a 0.0321% decline in GDP per capita in WAEMU countries, compared with a 0.0418% decline in BRICS countries.

5. Discussion

According to the results of our estimations, the positive effect of private investment on economic growth in the BRICS in the short term is linked to the favorable climate offered by the BRICS countries to investors on the market for raw materials, industrial equipment, food resources, etc., and to the lifting of restrictions on capital inflows and outflows. This is the example of China, which has implemented a relocation strategy by lowering institutional barriers thanks to the revival of economic reforms, the opening of new sectors and the increased possibilities of marketing on the domestic market. The negative effect of private investment observed in WAEMU countries in the short term can be justified by the fact that with the advancement of technology today, WAEMU countries do not offer a favorable environment for private investment. The deteriorated state of roads, difficulties in accessing the Internet, and inadequate railroads are all barriers to increased private investment in WAEMU. In addition, mismanagement, squandering, waste and all kinds of trafficking reign supreme in all political spheres in these countries. Thus, the hypothesis that private investment has a statistically greater effect on economic growth in the BRICS countries in the short term than in the WAEMU countries is confirmed.
The negative effect of the labor force on economic growth obtained in the BRICS countries in the short term is explained by the fact that these countries have reached an advanced level of technology and innovation to the point where the labor force has no effect on economic growth. Thus, the hypothesis that the labor force has a statistically significant short term effect on economic growth in the WAEMU countries than in the BRICS countries is confirmed.
As for public spending, the hypothesis that public spending has a statistically more significant effect on short term economic growth in the BRICS countries than in the WAEMU countries is also confirmed. This result can be explained by the effective management and adequate financing of the state's regalian activities (security, education and health). As an example we have the promotion of military expenditure in Russia for a better security system; a well improved educational system to maintain the literacy of the population until old age and even to bring them to contribute to the production of productivity factors.

5.1 Limitations and Challenges

We faced some difficulties, including:
- the lack of statistical data in some countries such as Ivory Coast;
- the non-availability of previous works related to our theme;

Concerning the limits of our study, we can say that the study was just focused on the short term. We did not estimate the long term relationships in order to see if the results remain unchanged or not. Another limitation of our study is the fact that we did not take many variables that could influence economic growth.

6. Conclusion

With more than 42.1 percent of the labor force, the BRICS (Brazil, Russia, China, and South Africa) dominate the world economy with remarkably high growth rates. This study conducted a comparative short term analysis of some of the determinants of economic growth in the BRICS and WAEMU countries. To do so, we used panel data from the World Bank database for the period 2005-2018 to estimate two short term models (fixed and random effects) for the UEMOA and BRICS countries, respectively. Five factors were selected: private investment approximated by physical capital, labor force over total population approximated by human capital, government expenditure, external debt and gross savings. Our study aims to compare the effects of private investment, the working population and public spending on economic growth between these two groups of countries. Comparative analysis of the determinants of economic growth has attracted much interest in the economics literature. This study therefore adds to the existing literature. To better understand why the BRICS countries have experienced sustained growth, it is necessary to consider all the variables that explain economic growth in these countries at the political, sociocultural, organizational, and financial levels.

7. References

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