

Government Spending and Economic Growth in Cameroon

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Abstract

Today, the role of government spending which is considered as the main instrument in the promotion of economic development is seen in the public investment budget (PIB). This study analyzes the role of the public investment spending in the economic growth of Cameroon. Specifically, it brings out the effect of Public and Private Investment on GDP growth in Cameroon. The role of the PIB as an instigator of economic growth should be clarified in order to justify government investment expenditure. Many studies have analysed the relationship between government spending and economic growth but the analysis of the composition of government spending and induced economic growth is an aspect of economic analysis which deserves more interest. This study analysis the effect of government investment spending on economic growth in Cameroon going from the components of the GDP⁵ and using VAR (Vector Auto Regressive) model. Our results show the intervals in which the various components of government spending have an effect on economic growth in Cameroon. We find that the lagged GDP and government investments have a positive effect on growth whereas private investments affect it negatively.

Keywords: Economic growth, government spending, investment, Cameroon.

I- INTRODUCTION

Government spending is traditionally regarded as a factor that stimulates economic growth. At the origin of public finance lies the need to ensure that government spending is supported. Since the mid-80s, the effectiveness of state intervention has been under debate and a movement of

⁵ Also written GDP in the empirical analysis, the terms GDP and PIB are used in an interchangeable manner

disengagement created without it being reflected by a significant reduction in the size of government spending.

In June 2016, the OECD suggested that European countries use public investment to stimulate growth: "In many countries, there is a set of manoeuvres enabling the mobilization of budgetary policy to reinforce activity using public investment, particularly because long-term interest rates permit an increase the size of the budget" (OECD, 2016).⁶

Today, the role of government spending, considered as the main instrument in fostering economic development is established by the Public Investment Budget (BIP). States are generally faced with the problem of increasing social charges and the continuous quest for increasingly scarce means for the realization of projects of general interest. This is in line with the Keynesian logic according to which government spending can exert a significant counter cyclical effect on the fundamentals of the economy, particularly on consumption and investment.

At the theoretical level, the classical, Marxist and Keynesian thoughts are opposed. According to classical economists, the interventionism of the State is a source of market disequilibrium due to the crowding-out effects related to the increased national debt and the interest on this debt while the Marxists advocate for an increase in public investment in the face of the outdated infrastructures in order to increase the social supply. For the Keynesians, the State should play a key role in the process of economic growth through government spending.

At the political level, different personalities like Donald Trump, Hilary Clinton or Justin Trudeau in Canada agree to increase government investment spending. In this same reasoning, Larry Summers, former secretary at the American treasury, and Paul Krugman, Nobel Prize in economics, join the IMF to advocate for massive plans of public investment which, through their effect on growth and in the presence of quasi null rates, would be able to finance themselves.

Thus, when the national income drops and private spending decreases, the State should support the economy by carrying out additional spending. This additional spending will increase the effective demand which in turn affects the level of production and employment. It is this multiplier principle which is at the heart of Keynesian thought. However, in a situation of overshooting of the economy, when the national income increases and prices increase or that investment exceeds saving, the State should reduce the pressure by limiting government spending.

6 OECD, 2016, «Stronger growth remains elusive: Urgent policy response is needed», *Interim Economic Outlook*, February.

At the empirical level, the controversy at the level of results is even greater. Empirical studies on the relationship between government spending and growth can be grouped into five categories:

- A first category finds that the effect of government spending on economic growth depends on the composition of government spending (Landau [1983]; Romer [1986,1990]; Barro [1990]; Barro and Sala-i-martin [1992,1995]; Levine and Renelt [1992]; Easterly and Rebelo [1993]; Devarajan et al., [1996]; Tanzi and zee [1997]; Kneller, Bleaney and Gemmell [1999]; Knight et al.. [1999]; Fan, Zhang L. and Zhang X. [2002]; Wagstaff [2002]; Nabukpo [2007]; Mansouri [2003]; Savage Schlottman and Wimmer [2006]; Afonso and Furceri [2010]; Chakraborty and Nandi [2011]).
- A second category finds a long and short run relationship between the government spending and economic growth (Ram [1986]; Aschauer [1989]; Morley and Perdakis [2000]; Ashipala and Haimbodi [2003]; Kacou [2004], and Ben Hassad [2006]).
- A third category holds that government spending does not contribute to growth (Kormendi and Meguire [1985]; Easterly and Rebelo [1993]; Agell, Lindh and Ohlsson [1997]; Abizadeh and yousefi [1998]).
- A fourth category finds a bi-directional causality relationship between the two variables (Cheng and Wei [1997]; Ouattara [2007], and a one-way causality from growth towards government spending (Ghali [2000]; Islam [2001]; Aregbeyen [2008]; Chimobi [2009], and Tang 2010).
- Finally, a fifth category on the basis of the components of government spending: government consumption, education, investment, military and health spending have non-linear effects on economic growth and these effects are only positive above a given threshold (Fouopi, Nsi Ella, Epo and Mbomon 2013; N'guessan, 2007).

The question of the role of government spending in the economic growth has therefore been the object of many studies. It's consideration into recent models of endogenous growth sufficiently shows that its efficiency is not unanimous in the eyes of scientists and decision makers.

Why this return of government investment spending into economic debates? The pronounced low level of interest rates, gains in productivity and growth are all factors which act in favour of an increase in government investment spending. Firstly, the costs of financing investments are so low that many projects now have an economic and social output higher than their cost of financing. Secondly, government investment projects enable the putting in place of conditions for a recovery of productivity through education, the diffusion of digital technologies or an increase in mobility. Lastly, these

government investment projects have a positive impact on short-run activity because of spillover effects.

This study being based on Cameroon, the issue of government spending should be addressed in a concrete and pragmatic manner in order to conceive an effective spending plan in Cameroon, a point of departure of this study in a country in which the relationship between government spending and growth does not seem to be verified as shown in the data of MINEPAT (2017) which shows an increase in the public investment budget from 28.28% to 29.57% between 2011 and 2013, with the vice of under-consumption as from the year 2014.

In addition, the financial resources intended for public investment in Cameroon will for the first time exceed 1000 billion CFAF following the launching of the three year plan for the reduction of poverty and the building of sites linked to the organization of the 2016 and 2019 African Nations Cup of football. These resources amounted to 1246 billion CFAF in 2015 (representing 31.2% of the total amount), and 1525 billion CFAF in 2016, i.e. 36% of the total budget (MINEPAT, 2017).

Government investment spending affects economic growth in Cameroon through its long-run effects on education, health, theoretical scientific research and physical infrastructures. This is based on the fact that the public investment budget, besides private investment, is one of the engines of economic growth wealth creation. The resources of the public investment budget are massively dedicated to the financing of major structural projects (roads, hydro-electricity dams, Kribi deep-sea port....) as well as social micro-projects (classrooms, bore-holes and wells, health centers) that improve the living conditions of the population.

In Cameroon, the actions to be carried-out converge towards the resolution of the problems of production, distribution and transportation on the basis of the three Musgravian functions of the State which are: the function of allocation of the resources, the function of distribution (redistribution and transfer of welfare) and the function of stabilization (regulation and economic policy).⁷ The carrying out of these missions is done by means of the State budget which includes the set of government income and expenditure. This new approach is primarily reflected through the increased autonomisation of the public investment budget as an instrument for the achievement of the policies of the authorities.

Despite the fact that public investment spending attained 35% in the total State budget, the target necessary to fuel growth as defined in the GESP is not yet achieved. The IMF recently carried out a detailed study on the importance of government investment. This study shows that after one year, a growth in

⁷Musgrave (1959) 7 cited by Tsafack Nanfosso in "*50 ans de politique économique au Cameroun*" p 25-33.

public investment equivalent to 1% of the GDP leads to an increase in GDP of 0.4%. After four years, this impact reaches 1.5% (the IMF, 2014). The share of public investment in the public investment budget of the State of Cameroon witnessed a growth of 124.38% between 2011 and 2016, bringing to 36% the share of public investment in the total government spending 2016 (see table 1).

Table 1: The distribution of the general budget expressed as a percentage of the Public Investment Budget (PIB) and the growth rate of the PIB (2011-2016).

Nature of the spending	2011	2012	2013	2014	2015	2016
PIB	680	792,2	957	1000	1150	1525,8
Total budget	2800	2571	3236	3312	3746	4234,7
Share of the PIB in the budget	24.3%	30.8%	29.6%	30.2%	30.7%	36.0%
Growth rate of the PIB	-	16.50%	20.80%	4.49%	15.00%	32.68%

Source: MINEPAT (2017)

Also, it appears that the PIB does not considerably affect growth in Cameroon. Although it has been neglected for long to the benefit of the operational budget which makes up 80% of the general government budget, the share of the PIB in the state budget increased between 2014 and 2015 where it reached 30% of the total budget and 36% in 2016 due to investments in infrastructure. It is within this framework that an increase in the PIB is seen as a necessary measure for the achievement of economic growth.

However, in a quantitative manner and according to the GESP, the growth rate should reach an average of 5.5% in the 2010-2020 period, under-employment fall from 75.8% to less than 50% in 2020 and the rate of monetary poverty from 39.9% in 2007 to 28.7% in 2020.

Ten years after reaching the completion point of the HIPC initiative, the macroeconomic situation is not that which one would have desired. Cameroon did not attain the reference rates of the scenario of the GESP even once in the first five years. In 2011, the real growth rate stood at 4,1% instead of 4.9% as required; in 2012, Cameroon attained a growth rate of 4,6 instead of 5,6, between 2013 and 2015, the rates are 5,6%, 5,9% and 5,8% instead of a three year average of 7.3%. In addition, the number of the poor increased in absolute value in 2014 relative to 2007, in the labour market "*the rate of employment of people older than 15 years reduced by almost 10 points, going from 79,5% in 2007 to 69,6% in 2014*".⁸

These results are insufficient given the objectives of the government who significantly increased the PIB to reach 32% of the state budget in 2013. This brings to mind the question of the correlation between government investment spending and economic growth in Cameroon.

We therefore stipulate the following main research question: What role should government investment spending play in the economic growth of Cameroon? Specifically, this question leads to the following questions: **Which**

⁸National report on the millennium development objectives (2015).

categories of government investment spending positively affect economic growth in Cameroon? And what are the levers of growth that can be activated in order to stimulate the PIB and increase it?

To answer these questions, we organise our reasoning on the following methodological aspects: The objective of this study is to analyse the share of government investment spending in the economic growth of Cameroon. It is a question of showing that government investment spending affects economic growth and increases the wellbeing of the population. The lever of economic growth that instigates the PIB should be identified in order to justify government investment spending.

In order to do this, we adopt the following research hypotheses on government investment spending: Government investment spending has a positive effect on growth in Cameroon. In the same manner, the economic growth of the country is boosted by a higher rate of execution of the public investment budget through public investments.

In line with the interventionist view of government spending which considers that government spending can improve the framework for the creation of wealth and promote growth, we think that the PIB must have as final objective, economic growth in the sense of Simon Kuznets (1966; 1971). There should be an increase in goods more than proportional to the increase in the population. This is an important aspect of this study which intends to reveal the various aspects of the relationship between the public investment budget and growth in Cameroon.

As concerns the methodology, the analysis of the effect of government investment spending on the GDP⁹ is done using a VAR¹⁰ model. The specification of the model is inspired by William E. Cullison (1993)¹¹. Unlike his model, on the one hand, we limit ourselves to three variables: GDP, government investment spending and private investments. On the other hand, instead of using the growth rates of the GDP, public and private investment spending, we use the logarithm of these variables. The estimated coefficients are thus interpreted as elastic ties. The data used comes from *World Development Indicators*, 2016. The period of study runs from 1977 to 2014, i.e. 38 years. In the rest of this study, after a short review of the literature (second section), we discuss the methodology in the third section. The fourth section presents the main results and their discussion and the last section the conclusions of the study.

9 Also written GDP in this study, the terms GDP and PIB are used in an interchangeably in this study.

10 Vector Auto Regression

11 WILLIAM E Cullison (1993), "SAVING MEASURES AS ECONOMIC GROWTH INDICATORS" *contemporary economy policy*,: January 1993 *Full publication history Pages 1 –8 Volume 11, Issue 1*

II- Literature review

We present the theoretical and empirical debates on the effects of government spending on economic growth.

II.1. Theoretical review of the literature

The debate on the relationship between the government spending and economic growth is not new. It was the center of the concerns of the classical economists who saw the intervention of the State in the economy through government spending as a source of market disequilibrium. For them, the State should be confined to its regulatory functions of defense, justice and diplomacy and take care of the supply of public services essential to the community and which cannot be provided by private individuals.

This restrictive vision of the State is at the opposite end of Keynesian thought. The Keynesians give the State a major role in the process of the economic growth by the means of government spending. They focus on the multiplier effects associated with the increase in government spending or a reduction in the tax rate. Thus, when the national income drops and private spending decreases, the State must support the economy by increasing government spending. This increase goes to boost the effective demand, which impacts the level of production and employment. On the other hand, when the economy is overheating, the State must reduce the pressure by limiting its spending.

New theories of growth developed after the works of Romer (1986) who insists on the fact that the accumulation of physical capital in a company leads to positive spillover effects on other firms. Romer highlights the importance of research and development which has positive externalities on the rest of the economy. Lucas (1988) justifies the role of investment in human capital in the process of economic growth. In this aspect, the State should finance education expenditure when "the social productivity of the expenditure is higher than the private productivity". Also, the State has to finance public infrastructures (Barro,1990).

These new theories henceforth integrate an explicit analysis of the long-term determinants of the increase in productivity which was formerly ignored by the basic model of Solow [1956]. The variety of the traditional factors of production taken into account in the formalization of the model was extended to include the effects of training, human capital, public infrastructures... The technical conditions of obtaining a truly endogenous growth were not underestimated (constant returns on the combinable factors of production) as well as the positive externalities related to investment in the factors of production and the role of knowledge in the growth of productivity. Thus, endogenous growth models integrate the positive or negative externalities related to the accumulation of knowledge or innovation (Helpman,1992).

In addition, Barro and Sala-i-Martin (1995) distinguish productive government spending (defense, education, health, transport and communication) from unproductive spending (social security, leisure, economic services).

Going from the above literature, many studies are carried out nowadays to understand if the composition of government spending through the PIB can lead to economic growth.

II.2. Empirical review of the literature

The results of empirical studies on the causality between government spending and growth remain controversial. These results can be classified in five categories.

In **the first category** of studies, government spending has a positive effect on economic growth. The positive impact of government spending on economic growth is highlighted by RAM [1986] who studies the impact of the size of the public sector on economic growth (measured by the growth rate of the GDP) for 115 countries in the years 1960-1980. According to this study, the global impact of the size of the public sector on growth is generally positive during this period.

Morley and Perdakis [2000] show the existence of a positive long run effect of overall government spending on growth in Egypt. Reinikka and Svensson (2004) also find that economic growth is significantly explained by government spending in a time series study carried out in Uganda. Using a methodology which differs from the preceding ones, Sahn and Younger (2002) using a microeconomic analysis, find a positive effect of government spending on the evolution of GDP per capita by considering economic agents having specific characteristics of African countries. Also, Kacou (2004), using the Granger test shows that government spending causes growth in the Ivory Coast.

An increase in the national wealth is thus positively related to an increase in government spending by public authorities motivated by a desire to modernize and increase the basic public services for a greater comfort of the populations. However, in the economic literature, government spending does not always have a positive effect on growth.

Oyo and Oshikoya (1995) and Oyo and Shibata (2001) find that a rise in government spending significantly reduces the growth of the GDP per capita in a two sector economy. Folster and Henrekson (2001) study the determinants of economic growth for the period 1970 to 1995. To avoid selection bias, they retain the wealthiest countries. They use two distinct measurements of the size of the public sector: the "input" measure takes into account the sum of taxes as a percentage of GDP, whereas "output" measure uses the amount of government spending as a percentage of the GDP. The analysis shows a

negative effect of the size of the public sector on economic growth using the two measures.

In the same manner, Dar and Amirkhalkhali (2002) examine the role of the size of the public sector in the explanation of differences in economic growth rate in 19 OECD countries for the period 1971 to 1999. The relative size of the public sector is measured as the government spending of the State expressed as a percentage of the GDP. The authors adopt the traditional Solow [1956] model where the growth rate is a function of the accumulation of capital and labour (two main factors of production), as well as the total productivity of factors. The countries are then classified in three groups according to the amount of government spending. The estimates are made using panel data two stage least squares. The results of the study show that the size of the public sector negatively affects economic growth for the complete sample of countries. The specific coefficients are negative and significant at the 5% level or less for the majority of the 19 countries.

Clements et al. (2003) and Button et al. (2003) hold that while government spending procures satisfaction or utility to households, they reduce the economic growth because of the crowding out effect. This crowding out effect is also highlighted by Ott (2002) in the United States.

The second category finds a bi-directional causality relationship or a one-way causality from growth towards government spending.

Cheng and Wei (1997) find a bi-directional causality between economic growth and government spending in South Korea over the 1954-1994 period.

In the same manner, Ouattara (2007) finds using causality tests that economic growth and government spending affect each other in the West African Economic and Monetary Union (WAEMU).

Ghali [2000] uses the Granger causality test to show that the hypothesis according to which government spending causes economic growth is rejected in the Tunisian economy. Thus, tax policy aimed at controlling budget deficits proves to be ineffective.

The study by Islam [2001] on American data for the 1929-1996 period strongly supports the one-way causality from growth towards government spending using the Engle-Granger (1987) error correction method.

Tang, Tuck Cheong (2001) finds a one-way causality from the national income towards government spending in the case of Malaysia.

Aregbeyen (2008) finds a one-way causality from the national income towards government spending using Granger causality test for the case of Nigeria and this result is confirmed by Chimobi (2009).

The study by Tang (2010) highlights a uni-directional causality going from the real income towards government health spending and no causality in the opposite direction.

Akonji, R.D. et al. (2013) study the relationship between government spending and economic growth by testing the law of Wagner and find that the total capital expenditure and the GDP follow the Wagner law through the granger causality test and find a one-way causality.

On the other hand, the global spending for the period and the GDP have a bi-directional causality. But the bond between the global spending for the period and the GDP is stronger.

In **the third category** of studies, it is the composition of government spending that explains economic growth. According to endogenous growth theorists, government spending can affect economic growth through two main channels.

Through the first channel, they increase the stock of capital of the economy through government investment in economic and social infrastructures or through the investment of public companies. Through the second channel, government spending indirectly affects economic growth by increasing the marginal productivity of the factors of production supplied by the private sector through spending on education, health and other services which contribute to the accumulation of human capital (Tanzi and Zee, 1997).

Devarajan et al., [1996] and Ventelou [2002] distinguish between productive and unproductive government spending and show that the increase in the growth rate does not depend only on the productivity of the two types of spending, but also on the optimal choice of the composition of government spending.

Thus, Devarajan et al. (1996) do not find any significant relationship between growth and the level of spending of public services in the United States. Herrera (1998a) examine the effects of government spending on education on economic growth in the long run,, while resorting to a model of endogenous growth by accumulation of human capital in only one sector. The author finds that the dynamics of growth is impelled by the State, whose choices in the allocation of the budget determine the rhythm of accumulation of human capital.

In the same manner, Dessus and Herrera [2000] arrive at the conclusion according to which government physical capital spending has a positive effect on economic growth. To arrive at this conclusion, they use a panel with data on 29 Latin-American, African and Asian countries observed over an 11 years period, 1981 to 1991. The adopted model appears as a system of simultaneous equations which includes the determinants of the GDP and stocks of public and private capital. The estimation is done using three stage least squares with fixed effects.

Empirical studies on the relationship between government spending and economic growth in African countries lead to contrasted results. The findings of Ashipala and Haimbodi (2003) show two long run relationships

between the level of economic activity measured by the GDP and government and private investment in Namibia. These long run relationships show on the one hand, that an increase in government investment has a positive effect on economic growth, and on the other that government and private investments are complementary. Mansouri (2003) finds that in Morocco, government capital spending has an effect of drive on private investment and real economic growth. Using a time series model estimated by ordinary least squares; the author shows that government consumption spending crowds-out private investment and slows down economic growth because of wastage.

Dumont and Mesplé-Somps (2000) analyse the impact of government infrastructures on the competitiveness and the growth of the Senegalese economy within the framework of a computable general equilibrium model. They find that an increase in government spending on infrastructures leads to a better commercial performance and economic growth. In the WAEMU countries, Nubukpo (2007) evaluates the impact of government spending on the growth of WAEMU countries from 1965 to 2000. The author uses a model where the real GDP is explained by the gross enrolment in secondary schools, the growth rate of the working population, the share of government spending in the GDP, the index of the terms of trade, real private investment and inflation. Using an error correction model, the author finds that the government spending does not have a significant effect on economic growth in the majority of the economies of the Union. In the long run, the impact of government spending differs by country.

In a study based on causality tests with annual data from 1970 to 2005, Chimobi [2009] finds that there is no long run relationship between government spending on health and education and the national income in Nigeria. However, the author emphasizes that government spending plays a driving role in economic growth.

Afonso and Furceri (2010) show that spending on social contributions and administrative expenditures have a negative effect on growth in European countries while government investment spending through their volume, have a positive effect on growth but, the more this volume is volatile, the lower the level of growth is. They also find that percentage point increase in government spending in terms of GDP would decrease growth by 0.13 percentage points. These authors arrive at the same results as Devarajan et al. (1996) as concerns the effect of capital spending on growth for developing countries; a result that appears surprising if one considers the endogenous growth theories which postulate that this spending is beneficial to the economy because of the externalities which they produce. It is possible to interpret the results of Afonso and Furceri (2010) by the existence of threshold effects, implying that beyond certain threshold, investing public funds in infrastructures is counter-productive if it is done to the detriment of administrative expenditures.

Nbukpo (2007) also advances, going from his results, the hypothesis according to which there is a non-linear relationship between the size of the State (government spending expressed as a percentage of the GDP) and economic growth.

In the same manner, Fouopi et al. (2013) find a non-linear relationship between government spending and economic growth through the components of government spending, using a Panel Smooth Threshold Regression (PSTR). Their results also specify the margins in which the various components of government spending can have a positive and significant effect on economic growth in the countries of the Central African Economic and Monetary Community (CEMAC).

The fourth category of studies finds that the government spending does not have any effect on growth. The inefficiency of government spending has been highlighted through the theory of political markets. According to Buchanan and Tullock (1961), the State is not the representative of the general interest as it is often considered. These authors show that the authorities are economic agents who seek to maximize their satisfaction through an election or a re-election and that the government decisions are the result of the aggregation of private decisions such as electoral promises. The politicians thus seek to honour electoral promises rather than the efficiency or productivity of government spending. In the same manner, the theory of bureaucracy stipulates that agents or bureaucrats seek to maximize their incomes or power. This leads to an unjustified increase in government spending (Bleralt, 1991); Muller, 2005).

In an empirical study on 98 countries, Barro (1990) finds that the effect of government spending on economic growth is negative. In fact, on the basis of an endogenous growth model, he finds that the components of government spending such as educational, health and security spending do not have statistically significant effects on the level of the economic growth.

Shantayanan Devarajan et al. (1996) apply ordinary least squares to data on 43 countries and find that government spending has a positive and significant effect on economic growth, but that the relationship between the components of government spending and the growth of capital is negative. According to these authors, the excess use of productive spending can be unproductive. These results confirm the poor allocation of government spending in favour of capital expenses.

Dhanasekaran (2001) and Martinez-Lopez (2005) show the very weak correlation existing between government spending and the growth rate of the GDP in India and Spain. Using countries of the Organization of Economic Co-operation and Development (OECD), the results of Dar and Amirkhalkhali (2002) do not make it possible to support the hypotheses according to which

government spending positively affects economic growth since the coefficients are not statistically significant.

Agell et al. (1999) question the capacity of the usual regression methods to produce reliable conclusions concerning the effects of the public sector on growth. They highlight the most significant limits of these studies in terms of the data and methods, particularly the specification of econometric models. By re-estimating the growth equations of Folster and Hendrekson (1999), they find that the effects of government spending on economic growth are statistically non-significant.

By taking a broader period, Aghion et al. (2007) study the various factors of economic growth using data on a panel of 17 OECD countries for the 1985 to 2003 period. The growth indicator used is the total factor productivity. The study seeks to determine the levers of growth using variables like human capital and rigidity on the goods and labour markets. The size of the public sector intervenes in the estimates as a component of rigidities on the goods and labour markets. The results of this study do not make it possible to conclude that the public sector has significant positive effects on economic growth.

Nubukpo (2003) using a standard growth model concludes that in the short run, the total government spending does not have significant effects on growth in the majority of WAEMU countries. In the long run, the effect of the global government spending on growth differs largely between countries. The authors also conclude that government consumption spending exerts an overall negative effect on the GDP in the short and long-run in the UEMOA and that government capital spending has a positive effect in the long run on the GDP of the UEMOA.

Keho (2008) finds that in the long run, there is an absence of causality between the GDP, government spending and the indicators of education.

Okoro A.S. (2013) in a study on government spending in Nigeria concludes that in the long run, there is an equilibrium between government spending and economic growth and that the short-run dynamics adjusts the long-run equilibrium at a rate of 60 % per annum.

Ales Kuhar et al. (2005) in an input-output model in a study in the periphery of Slovenia arrives at results which show that government funds can stimulate economic growth in the peripheries of Slovenia. However, the comparison at the national level shows that there are backward regions. Ali Sulieman (2014) in a study on government expenditure in Jordan finds that education and capital spending does not lead to economic growth because education is expensive. However, expenditure in health and economic affairs impact on economic growth.

Lastly, **the fifth category** of studies treats government spending as a driver of growth and the competitiveness strategy of an economy. All spending

related to publicity or marketing, especially in the traditional sectors make it possible to increase or preserve market shares in a competitive environment. This makes it possible to increase the domestic or external demand which is the engine of economic growth. Moreover, this makes it possible to increase the popularity of a company and thus increase its non-price competitiveness.

The training, research and development spending enables companies not only to maintain and improve their level of technology, but also carry positive externalities. Followers of the endogenous growth theory (Robert Solow 1955, 1956b, 2000, 2002; Robert Barro 1995, 1998, 2002, 2004; Robert Barro et al., 2003; Robert Lucas Junior 1969; 1975, 1977¹²) and the macroeconomists (Bernard Guerrien, 2015; Benchimol and J. Fourcans, 2012) highlight the role of training in the explanation of differences in rate of growth between countries.

Guessan (2007) in a simple accelerator model in which it is supposed that the technology of production is characterized by a fixed relationship between the stock of desired capital and the level of production reaches results that make it possible to establish the existence of an effect of drive of government investment on private investment in the Ivory Coast, Togo, and to a lesser extent, in Niger. However, the effect of drive could not be highlighted in Benin, Burkina Faso, Mali, and Senegal. The decomposition of government spending proves to be important in the dynamics of the growth in the WAEMU union.

It is undeniable that material or immaterial investments promote economic growth, not only as the second component of domestic demand and a flow of expenditure leading to a distribution of incomes, but they increase supply and thus stimulate demand.

In addition, any investment comprises a great part of uncertainties on their profitability. This is why managers take into account their financial means and the state of the economy. Thus, economic growth also affects investment and the public investment budget.

The absence of consensus in the results of the studies above leads us to consider that a linear approach is probably not adapted to the analysis of the relationship between government spending and economic growth. This leads us to consider using a more stable econometric modeling the VAR (Vector Auto Regressive) model inspired by William E. Cullison (1993). This model is an econometric framework that enables the taking into account of this non-linearity.

¹²Lucas, R. E. Jr (1977), "Understanding Business Cycles", Carnegie Rochester Series Conference on Public Policy, vol. 5, pp. 7-46. It is in these articles that he exposes his theory of cycles and his famous criticism, known as the Lucas critique

III. METHODOLOGY

In the literature, many variables have been used to capture economic activity. As a proxy of economic activity, researchers generally use either the Gross domestic product (GDP), or the Gross national product (GNP) and in certain cases, the national income or industrial production. In the case of this study, we use the GDP.

The analysis of the effect of government investment spending on economic growth in Cameroon is done in this study on the basis of the components of the GDP¹³ using a VAR (Vector Auto-Regression) model. The VAR specification is simple and easy to estimate. It makes it possible to build a certain number of tools which prove to be useful in the making of forecasts, the study of dynamic relationships between variables and the propagation of shocks within an economic system. The study that popularised this VAR approach is the article by Sims (1980).¹⁴

The specification of our model is inspired by William E. Cullison (1993).¹⁵ Unlike this author, on the one hand, we limit ourselves to three variables: GDP, government investments (InvPub) and private investments (InvPri). Going from the model: $Y = C + I + G + (X-M)$ Where: Y: GDP; C: consumption; I: private investment; G: government spending; X: exports; M: imports.

Also, instead of using the growth rates of the GDP, government and private investments, we use the logarithm of these variables. The estimated coefficients are thus interpreted as elasticities.

In fact, $y_t = (y_{1t}, \dots, y_{kt})$, follows a Vector auto-regressive process of order p, or VAR(p), if:

$$y_t = c + \Phi_1 y_{t-1} + \Phi_2 y_{t-2} + \dots + \Phi_p y_{t-p} + u_t$$

On the basis of this equation, our model is specified with our three key variables:

GDP = F (Invpub, InvPri) such that:

$$GDP_t = c + \Phi_1 InvPub_t + \Phi_2 InvPri_t + \mu_t, \quad (1)$$

For the econometric equation, we need an error term (μ) and this error term makes GDP a random variable and since we have three variables, we are in the presence of a VAR model of order $p \geq 2$. We suppose initially that the studied processes are stationary.

13 Also written GDP in the empirical analysis, the terms GDP and PIB are used in an interchangeably

¹⁴Sims (1980), Macroeconomics and reality, published in 1980 in *the Econometrica* journal

¹⁵ Cullison, William (1993), Public Investment and Economic Growth, FRB Richmond Economic Quarterly, vol. 79, No 4, Fall 1993, pp. 19-33. Available At SSRN: <https://ssrn.com/abstract=2129245>

By linearizing, we obtain:

$$\text{Log GDP}_t = C + \Phi_1 \text{LogInvPub}_t + \Phi_2 \text{LogInvPri}_t + \mu_t \quad (2)$$

With, C = the constant and Φ_1 , Φ_2 = parameters. InvPub, InvPri respectively stand for the public investments and Private investments.

III.1- Data

The data used comes from *World Development Indicators 2016* (WDI, 2016). The period of study goes from 1977 to 2014, i.e 38 years.

III.2- Descriptive Statistics of Variables

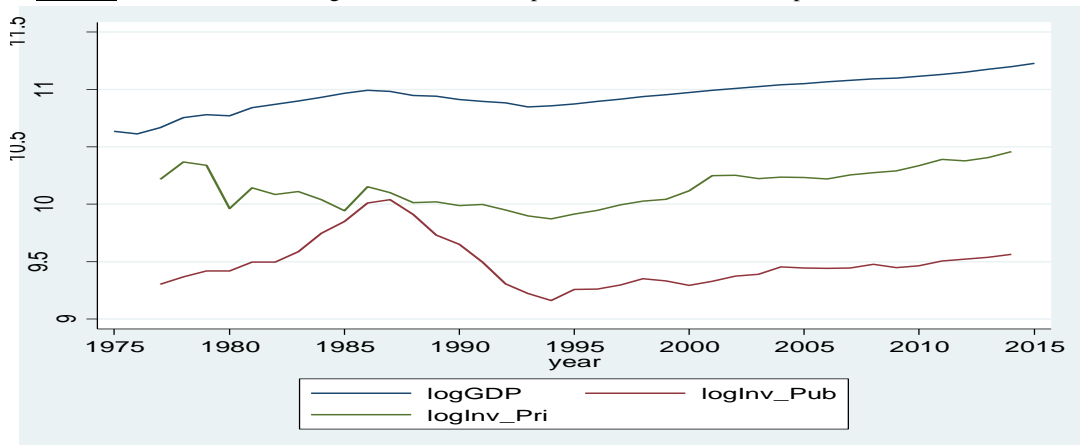
Table 2 below shows the descriptive statistics of the variables used. Figure 1 presents the evolution of the variables of study over 1977-2014 period. We observe that this evolution shows the main phases of the economic evolution of Cameroon.

Table 2: Presentation of the descriptive statistics of the variables used

Variables	Mean	Standard deviation	Minimum	Maximum
Log(PIB)	10,961	0,122	10,669	11,2
Log(Inv_Pub)	9,485	0,209	9,163	10,042
Log(Inv_Pri)	10,144	0,164	9,874	10,46

Source: Authors using Stata 13 and WDI 2016.

Figure 1: Evolution of the logarithm of the GDP, public investments and the private investments



Source: Authors using Stata 13 and WDI 2016.

The first phase known as that of fast economic expansion goes from 1977 with the beginning of oil exploitation at the beginning 80s. During this period, the country records high growth rates. The figure shows that this period is also characterized by a strong expansion of public investments. The second phase known as the phase of crisis goes from 1986 to 1994. During this phase, the country records negative growth rates and a large drop in public

investments. The third phase which is that of recovery starts in 1994 when the country starts registering positive GDP growth rates. After 1994, the curve of government investments regains a positive slope. Figure 1 thus makes it possible to reveal the link between the evolution of the GDP and that of government investments.

Private investments do not show an evolution related to that of government investments and the GDP. Its evolution can be analyzed in two phases. The first which goes from 1977 to 1994 during which the curve of the private investments presents a downward trend. The second phase starts in 1994, during which the curve of the private investments has a positive slope.

III.3- Estimation of the VAR

The methodology falls under the line of studies using unit root tests which enable researchers to determine the existence of non-stationarity, the Augmented-Dickey-Fuller (ADF) test, cointegration tests, and Granger causality tests. Studies on the same topic have been carried out by other economists who do not take into account private investments. In this study, we integrate this aspect.

The estimation of our VAR model starts with the unit root tests. Table 3 below summarizes the results of these tests.

Table 3: Summary of the unit root tests

Variables	Log(GDP)	Log(Inv_Pub)	Log(Inv_Pri)
Level of integration	I(1)	I(1)	I(1)

Source: Authors using Stata 13 and WDI 2016.

Secondly, we determine the optimal number of lags. For this, three criteria of information are generally used: the Aikake information criterion (AIC), the Schwarz bayesian information criterion (SBIC) and the Hannan and Quinn (HQIC) information criterion. Two of these three criteria (HQIC and SBIC) indicate an optimal number of lags of 2 (see table 3). We thus retain 2 as the number of optimal lags.

Table 4: Determination of the order of the VAR

Selection-order criteria

Sample: 1981 - 2014

Number of obs

=

34

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	79.1418				2.3e-06	-4.47893	-4.433	-4.34425
1	195.466	232.65	9	0.000	4.1e-09	-10.7921	-10.6084	-10.2534
2	228.326	65.72	9	0.000	1.0e-09	-12.1956	-11.8741*	-11.2529*
3	238.479	20.306*	9	0.016	1.0e-09*	-12.2635*	-11.8042	-10.9167
4	244.162	11.365	9	0.251	1.3e-09	-12.0683	-11.4712	-10.3175

source: Authors using Stata 13 and WDI 2016.

IV-RESULTS AND INTERPRETATIONS

The results of the VAR estimation are presented in table 5 below:

Table 5: Estimation of the VAR model

VARIABLES	(1) D_logGDP	(2) D2_logInv_Pub	(3) D_logInv_Pri
L2D.logGDP	0.616 *** (0.144)	-0.690 (0.646)	0.744 (0.594)
L2D2.logInv_Pub	0.0858 ** (0.0405)	-0.0304 (0.181)	0.0327 (0.167)
L2D.logInv_Pri	-0.115 *** (0.0339)	0.0690 (0.151)	-0.0774 (0.139)
Constant	0.00557 * (0.00315)	0.00882 (0.0141)	0.00598 (0.0129)
Observations	34	34	34
R2	0.431	0.035	0.047

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors using Stata 13 and WDI 2016.

These results show that the lagged GDP and government investments have a positive effect on growth whereas private investments affect it negatively (see column 1). These results indicate that a 1% increase in the lagged GDP increases the GDP by 0,6%. An 1% increase in government investments induces an increase in the GDP of 0,09%. A 1% increase in private investments induce a reduction of the GDP of 0,11%. The negative effect of private investments on the GDP is unusual but can be justified by the downward trend observed between 1977 and 1994, thus inhibiting the economic growth of the country.

The second and the third columns show that there is no effect of the GDP and the private investments on public investments on the one hand (column 2). In addition, that there are no effects of the GDP and government investments on private investments. The Granger causality tests (table 6) confirm these results. They show that there is a 96,6% possibility that government investments affect the GDP (3,4% chance that it does not have an effect on GDP) and 99,9% possibility that private investments affect the GDP (0,1% of chance that it does not have an effect on GDP).

Table 6: Granger causality test

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
D_logGDP	D2.logInv_Pub	4.4822	1	0.034
D_logGDP	D.logInv_Pri	11.623	1	0.001
D_logGDP	ALL	12.923	2	0.002
D2_logInv_Pub	D.logGDP	1.1395	1	0.286
D2_logInv_Pub	D.logInv_Pri	.20764	1	0.649
D2_logInv_Pub	ALL	1.1405	2	0.565
D_logInv_Pri	D.logGDP	1.568	1	0.211
D_logInv_Pri	D2.logInv_Pub	.03834	1	0.845
D_logInv_Pri	ALL	1.6734	2	0.433

Source: Authors using Stata 13 and WDI 2016.

On the other hand, there is a 28,6% possibility that the GDP does not have an effect on government investments and 64,9% possibility that private investments do not have an effect on public investments. There is a 21,1% possibility that the GDP does not have an effect on private investments and 84,5% possibility that government investments do not have an effect on private investments.

The analysis of the impulse response functions (**figure 2 in appendix**) show possible that the effect of government and private investments on the GDP is not permanent. It is temporary and of very short duration. In fact, the impact on growth of a shock on government or private investments becomes marginal at the end of two or three years. These results enable us to better appreciate the impact on the GDP, public investments public and private investments.

As concerns the impact on the GDP, a shock on the GDP has an impact of 1% at the initial period. A shock on the private investments or government investments would have a null impact on the GDP in the initial period and period one.

As concerns the impact on private investments, a shock on private investment would have an impact of 5% in the initial period. A shock on the GDP would have an impact of 3% on private investment in the initial period. And a shock on government investments would have an impact of 1,6% on private investments in the initial period.

Concerning the impact on government investments, a shock on government investment would have an impact of 6% in the initial period. A shock on the GDP would have an impact of 3% on government investments in the initial period. And a shock on private investments would have a null impact

on government investments at the initial period and the first period. **Table 7** and **figure 3** (see appendix) enable us to appreciate the stability of our VAR model.

We observe that the eigenvalues are all lower than one. In other words, they all are inside the unit circle (see figure 3). We can thus conclude on the stability of our VAR model.

An analysis of the statistics in the tables show that the government investment spending in Cameroon largely exceeds the threshold of 33,9 % from which the sensitivity of growth becomes negative.

V CONCLUSION AND RECOMMENDATIONS

It proved to be significant in this study, to analyze the impact of government investment spending on economic growth in Cameroon. This study is justified in a context where the country benefitted from the cancellation of the debt through the HIPC initiative. Moreover, in the face of the millennium development objectives, we notice that the insufficiency and non-availability of control engineers constitute two different issues for the country. "We find that more financial needs to be granted to sub-contractors who have to follow-up the execution of contracts but who always do not have the means of follow-up" MINEPAT (2013).¹⁶Opacity in the execution of projects by the decentralized authorities comes to add to these ills. As for the corrupt contractors, they are being judged along with those who abandon contracts or execute them badly.

Besides these exogenous factors, the sector of public contracts of the country suffers from several ills whose main diagnosis is centered on bad-governance, administrative bureaucracies and the approximate application of texts governing public contracts.

According to the growth and employment strategy paper (GESP), Cameroon must use the public investment budget as a major tool boost its economy. Previous decades testify to the many reforms which produced and continue to produce changes in the Cameroonian economy. After a theoretical and descriptive analysis, we find that increase in government investments lead relatively stable and positive phase of economic growth and downward movements correspond in their turn to negative growth rates.

This result lets predict a positive contribution of government investment expenditure to economic growth. To measure in a formal way this contribution, we use an appropriate economic model. The great challenge in the public investment budget (PIB) is at two levels: the elaboration and application of the growth and employment strategy paper (GESP) and the application of program budgets.

¹⁶Colloquium on the execution of the public investment budget organized on August 20, 2013 by MINEPAT

In this line, it is no longer a question of doing what is authorized with the public funds, but one of doing it in the best possible manner at lowest cost. It is thus a question of mastering the use of public funds to provide a service adapted to the expectations of citizens on the basis of objectives and pre-defined indicators of budgetary performance set in terms of investment. This requires an efficient system of control of government investment spending. The approach to the concept of government investment in the Cameroonian context should therefore be a progressive and institutional learning one, interactive and permanent, as well as a continuously improved process.

In this context, the Cameroonian government should put in place actions destined to mitigate these various insufficiencies. These actions can only be effective if studies on disaggregated data (that distinguish investments in physical infrastructures from social investments) make it possible to take effective action. Furthermore, the private public partnership should no longer be an illusion, but a reality because it is obvious that today these tools are efficient only when the framework and environment correspond with the necessary data, the human resource factor having a priority.

We conclude this study by stating some principles:

- The principle of learning; experts and civil servants in charge of the budget must hold in a permanent manner, periodic recycling of the executives in public finance.
- The principle of coherence. This principle preaches the good management of the State budget which suffers from a major defect: that of inconsistency both at the level of the administrators of the various ministries in charge of this tool and at the level of legislations in place and even in the organization of public finance in general. Management requires good governance, and also consists in administering and forecasting. It is in this wise that government action must imperatively be in adequacy with the social background, and there should exist areas for structuring or of production of coherence within the administrative and political system. The greatest efficiency of government spending is achieved when the integration and harmony of the various actors is reached.
- Then comes the principle of clarity. This principle lies at the center of the system of budgetary control because it is the politician who holds the leitmotiv of government policies and the management of the public investment budget. It is necessary that the competences of each actor intervening in the sector of the investment budget are clearly defined, identified and specified within the framework of the government investment spending.

- Lastly, comes the principle of regulation which constitutes a fundamental element in the management of government investment spending. It is the item which maintains the trajectory of government investment spending in the process of economic growth.

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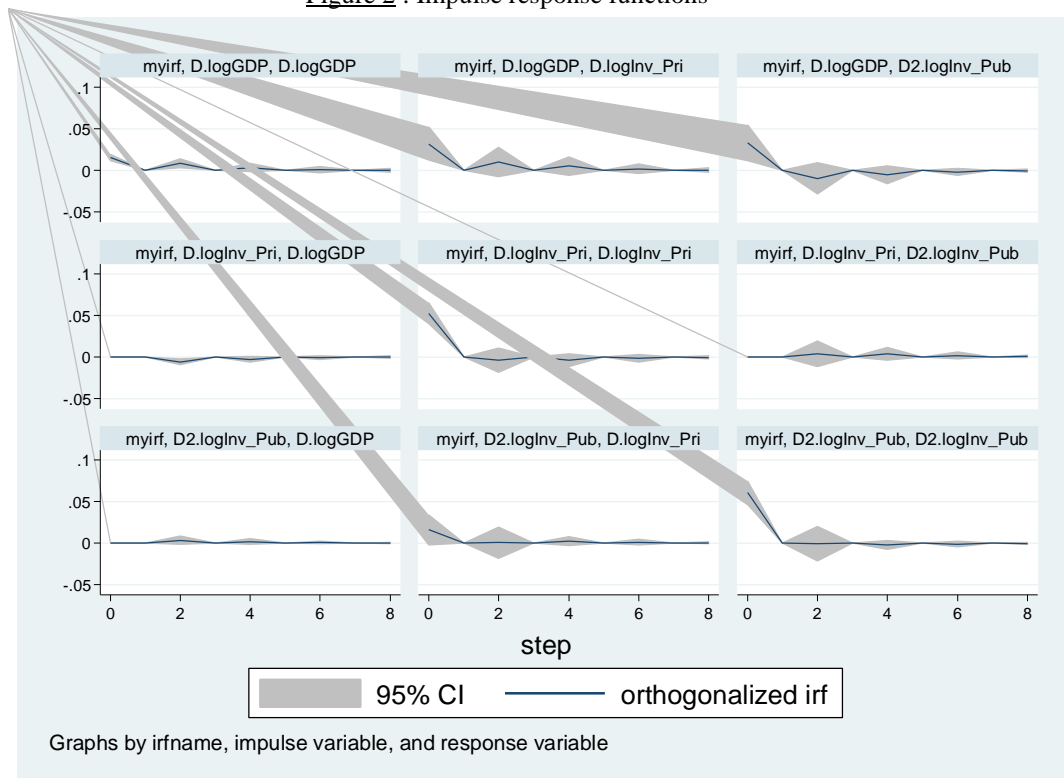
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APPENDIX

Figure 2 : Impulse response functions



Source : Authors using Stata 13 and WDI 2016.

Table 7: Analysis of the stability of the VAR model

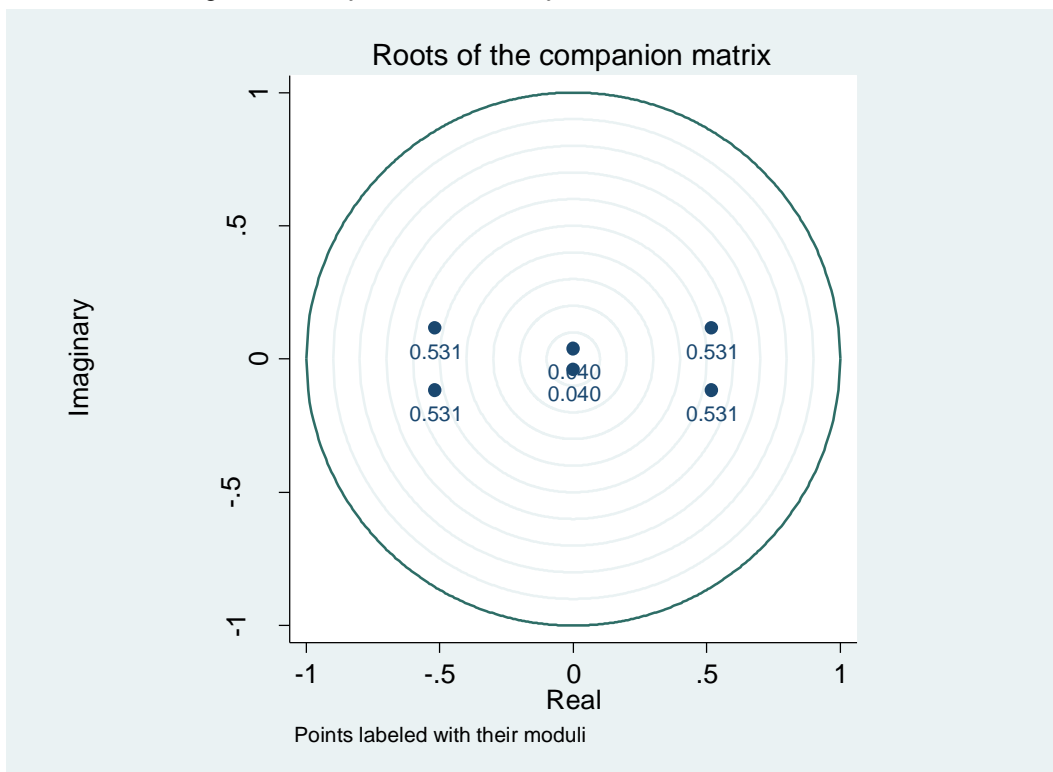
Eigenvalue stability condition

Eigenvalue	Modulus
$-.5182223 + .1159943i$.531045
$-.5182223 - .1159943i$.531045
$.5182223 + .1159943i$.531045
$.5182223 - .1159943i$.531045
$-4.239e-17 + .04001473i$.040015
$-4.239e-17 - .04001473i$.040015

All the eigenvalues lie inside the unit circle. VAR satisfies stability condition.

Source : Authors using Stata 13 and WDI 2016.

Figure 3 : Analysis of the stability of the VAR (1) model



Source : Authors using Stata 13 and WDI 2016.

Unit roots tests

Logarithm of GDP

Selection-order criteria

Sample: 1979 - 2015

Number of obs = 37

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	27.9407				.013649	-1.45626	-1.44091	-1.41272
1	91.8754	127.87	1	0.000	.000455	-4.85813	-4.82743	-4.77105
2	96.9376	10.125	1	0.001	.000365	-5.07771	-5.03166	-4.94709*
3	97.0449	.21452	1	0.643	.000383	-5.02945	-4.96806	-4.8553
4	99.9226	5.7554*	1	0.016	.000347*	-5.13095*	-5.0542*	-4.91326

Endogenous: logGDP

Exogenous: _cons

Source : Author using Stata 13 and WDI 2016.

Phillips-Perron test for unit root Number of obs = 40
Newey-West lags = 4

Test Statistic	Interpolated Dickey-Fuller			
	1% Critical Value	5% Critical Value	10% Critical Value	
Z(rho)	-7.251	-24.420	-19.040	-16.320
Z(t)	-2.018	-4.242	-3.540	-3.204

MacKinnon approximate p-value for Z(t) = 0.5917

logGDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
logGDP					
L1.	.901273	.0624846	14.42	0.000	.7746671 1.027879
_trend	.0009088	.0007501	1.21	0.233	-.0006111 .0024287
_cons	1.076627	.6701481	1.61	0.117	-.2812219 2.434476

Source : Auteur à partir de Stata 13 et WDI 2016.