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THE IMPACT OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN CONGO

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Abstract:
The purpose of this article on the Congo is to analyze the impact of public global expenditure and its functioning and investment components on economic growth. In order to achieve this, we used the error-correction model over a period covering the period 1980-2013. The series of data used to estimate the model come from the World Bank (World Development Indicators, 2013), except for the series on public functioning and investment expenditures that comes from the Head Office of the Budget. The results of our estimates reveal that, in the short term, public functioning expenditures have a negative contribution to economic growth in Congo. However, in the long run, overall public expenditure and its functioning and investment components have a positive impact on economic growth in the Congo. To this end, the Congolese Government must not use public operating expenditure to stabilize the economy. However, to put the Congolese economy on a path of sustainable growth, the Congolese Government can increase global public expenditure or its components.

Key words: Public global expenditure, public investment expenditure, public functioning expenditure, economic growth, Congo.

JEL Code: H50, H54, H59, 047, O55

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1. Introduction

In a context of endogenous growth, Barro (1990) indicates that productive public expenditures, assimilated to infrastructures, can generate sustained growth over a long period. Indeed, certain categories of public expenditures improve the productivity of the economy. These are public investments in health or education infrastructures (hospitals, schools and universities), communication infrastructures (roads, telecommunication networks) or current expenditures such as the protection of goods and people (police, justice and national defense) or property rights. For Barro (1990), these public expenditures are productive because they generate positive externalities favorable to the activities of private enterprises, and thus to economic growth. However, the Barro (1990) model has a limitation, in that neither the deficit nor the public debt is considered as a means of financing public expenditures. Based on the observation of reality, public expenditure is often financed by debt, the assumption that all public expenditure is productive in the approach of Barro (1990) can be relaxed. Indeed, the immediate consequence of considering deficits would be to observe unproductive public expenditures, in the form of interest payments on the public debt. In the same spirit, Barro and Sala-i-Martin (1995) distinguish productive public expenditures (defense, education, health, transport and communication) from unproductive expenditures (social security, recreation, economic services). Nevertheless, it should be noted that the logic of endogenous growth theorists lies in a long-term approach. However, in the short term, the monetarist school has highlighted the negative impact of an increase in the budget deficit on growth, due to the crowding out effect it has on private investment. In line with the monetarist school, Barro (1974) argues for the inefficiency of public expenditure in the short term as well as in the long term, and this, because of the effects of ousting by anticipation generated by a the budgetary expansion. In contrast, Keynesians support the idea that public expenditure can exert a significant counter-cyclical influence on the fundamental aggregates of economies. Thus, public consumption and investment are components of a country's domestic production. Their increase therefore has a direct and immediate stimulating effect on GDP, by multiplier effect.

On the empirical level, a vast empirical literature confirms the theoretical predictions. Ngakosso (2016), among others, has shown in an analysis of the Congo that public global expenditure, as well as current and capital public expenditures, have a positive effect on short-term and long-term growth. Although most theoretical models and some empirical applications have validated the role of public expenditure in the growth process, some studies suggest that public expenditure on economic growth is non-significant or even negative (Devarajan, 1996, Obad and Jamal, 2016 and Iheanacho, 2016). Some studies have demonstrated a non-linear relationship between state size and growth (Vedder and Gallaway 1998, Pevcin 2004, Chen and Lee 2005, Elkhider et al., 2004, Keho 2010, Mengue, 2013 and Lonzo, 2014).

This article is in line with the work on the linear effects of the relationship between public expenditure and growth. In other words, our article is part of the relatively scarce literature that analyzes the contribution to growth in public global expenditure, on the one hand, and government functioning and investment expenditure, on the other. Such an analysis seems appropriate for the Congolese economy, because of the high level of

the country's current debt[2]. It grows from period to period, under the effect of interest payable. Nevertheless, one of the solutions to circumvent the dynamic instability of the debt, is to sterilize the burden of the debt. In a more specific way, the government can decrease the primary expenditure to cure the increase in interests and, therefore, to improve primary budget balance. For this reason, the temptation of the governments is often large, in crisis period, to reduce the capital[3] expenditures to be able to maintain the expenditure current (Montoussé, 1999, page 82). Nevertheless, the reduction should not relate to the public expenditure in capital, considered productive in the optics of Barro (1990), because, they are sources of an increase in the growth, which constitutes a pledge for the improvement of the revenues from taxes, and consequently, of an improvement of primary budget balance. As the Congolese economy is in a context of high debt, an analysis of the contribution to growth of the components of public expenditure will indicate the nature of the expenditure that the Government can reduce during large-scale adjustments. To this end, the objective of this article is to determine the impact of global public expenditure and its components on economic growth in Congo. Based on the fact that Congo's high debt generates a high level of interest to pay, we assume that the contribution of public functioning expenditure to economic growth will be lower than that of public capital expenditure. The rest of this article is structured as follows. In a first section, we take stock of the literature dealing with the effects of public expenditure on growth. In a second section, we specify the model of determining the effects of public expenditure on growth. The third section is devoted to empirical analysis.

2. Review of the literature

Prior to the empirical discussion of the role of public expenditure in the growth process, we will present the theoretical debate on the subject.

2.1. Review of the theoretical literature

From a theoretical point of view, the literature on the contribution of public expenditure to economic growth is based on two approaches: short-term and long-term approaches. In the short run, the impact of the public expenditure on the growth is a bone of contention between the Keynesian ones, for which, a reduction of the budget deficits to a negative impact on the growth, and neo-classics, for which the budget deficits have a non-significant effect on the economic activity. For the new classical economists, the budget policy is not effective. Barro (1974) focuses on the principle of Ricardian equivalence, according to which a budget deficit has no effect on demand. Indeed, by anticipating a future increase in taxes, households spend the additional income generated by the budget expansion for the payment of future taxes. However, the limit that is recognized in the theory of Ricardian equivalence, which advocates deficit neutrality is the inability to help understand that the fiscal contraction may be

[2] Fin juillet 2017, les experts du FMI ont évalué la dette du Congo à 5329 milliards de francs CFA soit 110% du PIB (dette la plus lourde de la CEMAC).
[3] According to the classification of Barro (1990), the public expenditure of investment is in the category of the productive expenditure.

expansionary. This last point is supported by the anti-Keynesian theory, for which, a budgetary contraction is favorable to the economic activity.
In the long run, the macroeconomic approach to public expenditure, traditionally focused around the cyclical stabilization function has been broadened with recent theoretical developments on growth. Growth, according to new theories, has determinants that are endogenous; which makes legitimate certain interventions of the State. Indeed, new theories of growth or theories of endogenous growth take three directions. The first direction is developed by Romer (1986), the second by Lucas (1988) and the last direction by Barro (1990). Romer (1986) bases its analysis on the model of training of Arrow (1962), which models technical progress in the form of a externality coming from the accumulation of knowledge. For Romer (1986), the accumulation of knowledge is the principal vector of growth. According to Lucas (1988), it is the accumulation of human capital which makes it possible to obtain a durable growth. In filigree, the idea which shows through is that it is necessary to invest in the man to make it more productive. Thus, to support the accumulation of the human capital, the public expenditure must concentrate on the education system and the qualification of the health care system. Barro (1990), in a model similar to that of Romer (1986), introduces a mechanism centered on public infrastructures. Barro (1990) shows how productive public expenditure, assimilated to health or education infrastructure, communication infrastructure or current expenditures such as the protection of goods and people or property rights, generates sustainable growth.

2.2. Empirical discussion of the role of public expenditure in the growth process

There exists a vast empirical literature about the effects of the public expenditure on the economic growth in the developing countries. This literature can be burst in two working groups. The first group is made up by work which analyzed the impact of the total public expenditure on the growth (Devarajan and al., 1996; Nubukpo, 2007; Obad and Jamel, 2016). The second group consists of studies that analyze the effect of public functioning and investment expenditures on growth (Devarajan et al., 1996, Iheanacho, 2016, Abu, 2007, Nubukpo, 2007, Ngakosso, 2016 and Yovo, 2017). Different methods are used by the authors, ordinary least squares (Devarajan et al., 1996 and Yovo, 2017), the error-correction model (Nubukpo, 2007, Abu, 2007, Iheanacho, 2016 and Ngakosso, 2016) and the ARDL model (Obad and Jamel, 2016).
Indeed, Devarajan and al., (1996), could not highlight, in the case of the developing countries, a significant relation between the growth and the public expenditure (measured by their share in the GDP). The non-significant effect of the total public expenditure on the growth is also confirmed in the short run in a study carried out by Nubukpo (2007) in the majority of the economies of the UEMOA (Benign, Burkina Faso, Mali, Niger, Togo). However, the impact proves to be negative in Ivory Coast and in Senegal. The negative effect of the public expenditure on the growth is also corroborated by Obad and Jamal (2016) for the case of Morocco. However, well before Obad and Jamal (2016), Nubukpo (2007) show that in the long run, the impact of the global public expenditure on the growth in the African Western Union Economic and Monetary (UEMOA) is strongly differentiated by country: the negative effect in Benin and Niger, positive effect in Senegal and Togo, and non-significant effect in Burkina

Faso, in Ivory Coast and in Mali. On the other hand, Ngakosso (2016) in its analysis on the link public expenditure and growth, conclude that the global public expenditure has a positive contribution to the economic growth in Congo.

By analyzing the link composition of the public expenditure and economic growth in the developing countries, Devarajan and al., (1996) watch positive impact of the public expenditure of consumption on the growth on the one hand, and the negative effect of the public expenditure of investment on the growth, on the other hand. This last point is in phase with the conclusions of Iheanacho (2016) which had concludes that the capital expenditure has a negative and significant effect on the long-term growth. The results of this work contrast with those found by Abou (2007). This last, in an analysis of the effects of the public expenditure on the growth in the Countries of the UEMOA, concludes that the current expenditure has a negative effect on the growth, whereas the impact of the capital expenditures on the growth is positive. This conclusion ratifies that found by Nubukpo (2007). Indeed, for Nubukpo (2007), the public expenditure can support the growth of the economies of the UEMOA when they are intended for the investments, but is also likely to decrease it when the public consumption is privileged. In the same register the results of Yovo (2017) appear which validate for the case of Togo, the existence of a negative impact of the public consumption on the growth, on the one hand, and a positive effect of the public investment on the growth, on the other hand.

With regard to Congo, a study carried out by Ngakosso (2016) shows that the current public expenditure as well as the public expenditure of investment has a positive impact on the economic growth in short-term Congo, just like in the long run. This conclusion is also valid for the total public expenditure. By adopting a approach different with that from Ngakosso (2016), we try to see what it will result.

3. Empirical verification of the effects of public expenditure on economic growth

Prior to the presentation and interpretation of the results, we will first specify and estimate the model.

3.1. Specification of the model and its estimate

The literature relating to the effects of the total public expenditure and its components on the economic growth suggests a general empirical formulation of a function of growth which gathers borrowed empirical specifications of Barro (1990). By placing yourself in this dynamic, our basic equations selected are formulated while following the approach of Nubukpo (2007). Indeed, this last to avoid the problem of autocorrelation of the errors, by a separate analysis of the contribution to the growth of the public expenditure global and its components. For this purpose, our approach deviates from that of Ngakosso (2016). Thus, the equation which makes it possible to appreciate the effects of the global public expenditure can arise in the following way:

$$LGDP_t = \beta_0 + \beta_1 LDEPTOT_t + \beta_2 TINSCP_t + \beta_3 TXCHAN_t + \beta_4 TERME_t + \beta_5 IDE_t + \beta_6 FBCF_t + \beta_7 CE_t + \varepsilon_t \quad (1)$$

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LGDP, LDEPTOT, TINSCP, TXCHAN and TERM, IDE, FBCF and CE respectively represent the logarithm of the real GDP, the logarithm of the global public expenditure, the rate of registration to the primary education and the secondary, the value of exchange rate between the Dollar and the local currency, the commercial opening, the direct foreign investments, gross fixed capital formation and credit at the economy. While being based on the one hand, on the Keynesian theories as well as the endogenous theories of growth; in addition, on work of Nubukpo (2007) and Ngakosso (2007), one expects that the signs of the coefficients β_1, β_2, β_3, β_4, β_5, β_6, β_7 are all higher than zero.

To analyze in a finer way the contribution of the public expenditure, those can be disaggregated in functioning expenditure and investment. Consequently, our equation of the growth can be written in the following way:

$$LGDP_t = b_0 + b_1 INVPIB_t + b_2 DEPFPIB_t + b_3 SCPIB_t + \varepsilon_t \qquad (2)$$

LGDP, INVPIB, DEPFPIB and SCPIB respectively represent the logarithm of real GDP, public investment expenditure, public functioning expenditure and the trade balance. Based on Keynesian theories and endogenous growth, the signs of b_1, b_2, b_3 are expected to be positive.

3.2. Estimates and interpretation of the results

It is a question, first of all, of estimating the models (1) and (2) before carrying out the interpretation of the results.

3.2.1. Estimate of the models

The econometric tests are carried out starting from the data which come from the World Bank (World Development Indicators 2013). Except for the series on public functioning and investment expenditures that comes from the Head Office of the Budget. All these data have an annual dimension and cover the period 1980-2013. The choice of this period of investigation is imposed to us by the availability of the data on the components of the public expenditure. However, it is important to announce that the logarithm is introduced on the level as of total public expenditure and of the GDP. The other variables are exempted of this technique of smoothing, owing to the fact that their value expressed as a percentage, are already very weak.

To slice on the stationnarity of the variables selected, we carried out the test of augmented Duckey-Fuller (ADF), at the conclusion which, we noted that all the variables are integrated of order 1. The criteria of Akaike and Scwarz inform us that optimal Lag is equal to 1. Johasen cointegration test (1988) carried out on the variables of the model reveals the existence of a relation of cointegration. This report leads us to chosen the error-correcting model (ECM).

Indeed, this model specifies a relation between the series in level, known as relation of balance of long run, and a relation between the differentiated series, which is called relation of short-term. To arrive to its estimate, we use a technique popularized by Johansen and Hendry. This method enables us to consider a relation single of

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cointegration long-term, through which, the GDP is function on the one hand, of the total public expenditure; in addition, of the components of the public expenditure. Thus, the results that we present are a decomposition of error correction models close to that of Hendry. However, it is important to announce these results are extracted from the Vector Error Correction models[4]. Thus, the results of error correction models are shown in Tables (1) and (2).

Table 1: Results of estimation of the effects of overall public expenditure on growth

Short-term coefficients		**Long-term coefficients**	
D(LGDP(-1))	1	LGDP(-1)	1
D(LDEPTOT(-1))	-0.3236 [-1.3087]	LDEPTOT(-1)	0.4194 [21.9856]
D(TINSCP(-1))	0.002510 [0.95040]	TINSCP(-1)	0.0026 [12.5079]
D(TXCHAN(-1))	0.000309 [0.37716]	TXCHAN(-1)	-0.0002 [-4.8284]
D(LTERME(-1))	0.063384 [0.18738]	LTERME(-1)	0.3087 [12.9796]
D(IDE(-1))	0.008907 [1.54923]	IDE(-1)	0.0097 [12.8079]
FBCF	0.005147 [1.26902]	FBCF(-1)	-0.0006 [-19.8428]
CE	-0.002276 [-0.23797]	CE(-1)	0.0029 [3.9975]
		Value of the statistic	**t-statistic**
constant		0.067898	1.76188
CointEq1		-0.724108	-1.91151
R-squared		0.461511	-
Adj. R-squared		0.241220	-
Durbin-Watson stat		2.100976	-

Source: author from Eviews

[4] See appendices

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Table 2: Results of estimation of the effects of the components of public expenditure on growth

Short-term coefficients		**Long-term coefficients**	
D(LGDP(-1))	**1**	**LGDP(-1)**	**1**
D(DINVPIB (-1))	0.009 [0.8807]	DINVPIB (-1)	0.0192 [9.9543]
D(DFPIB (-1))	-0.0184 [-2.0189]	DFPIB (-1)	0.0136 [8.9160]
D(SCPIB (-1))	0.0036 [1.3696]	SCPIB (-1)	-0.0048 [-6.4085]
		Value of the statistic	**t-statistic**
constant		0.11298	2.98360
CointEq1		-0.010008	-2.53745
R-squared		0.365208	-
Adj. R-squared		0.243132	-
Durbin-Watson stat		2.180348	-

Source: author from Eviews

Following our estimates, the tests of stability of the model as well as the tests on the residues are carried out. The tests of stability of the models, the tests of CUSUM show on the one hand, that the two models are structurally stable, on the other hand, the test gives an account of what the models are punctually stable. Secondly, the residual tests show that there is no problem of correlation of the errors in the two models. White and ARCH tests show that the errors are Homocedastics. Jarque-Bera tests confirm the normality of the errors.

3.2.2. Interpretation of the results

The results of our estimates show that in the long run the influence of the total public expenditure on the economic growth is significantly positive. This conclusion corroborates the endogenous theories of growth which go up that any public expenditure is potentially effective when it supports the economic growth. Also, our results are in harmony with the conclusions of the work of Nubukpo (2007) and Ngakosso (2016) carried out respectively in the countries of the UEMOA (Senegal and Togo) and in Congo.

With regard to the effects of the components of public expenditure, the results of our estimates show that, in the short term, only public functioning expenditure has a significant and negative impact on growth. Such a result can be explained by the fact that the Congo is a major importer, an increase in functioning expenditure is reflected in an increase in external demand, to the detriment of domestic demand. These results

are contrary to the Keynesian view, but go in the same direction as those found by Nubukpo (2007) for the Ivory Coast, Mali, Niger, Senegal and Togo. In the long term, all the variables are significant. Operating and investment expenditures positively influence economic growth. However, it should be noted that the impact of public investment on economic growth is greater than that generated by public consumption. Nevertheless, the positive effect of the components of public expenditure is in phase with the endogenous theory of growth of Barro (1990) which supports that the public expenditure in capital and certain current public expenditure is productive. Our results are also in phase with those of Ngakosso (2016). However, our results contrast with those of Devarajan and al., (1996). The latter had highlighted the existence of a negative impact of the public investment on the growth. In the same way, our results are in contradiction with those of Abou (2007) and Yovo (2017) which had concludes on the existence of a negative effect of the public consumption on the growth respectively in the UEMOA and in Togo.

In addition, the results of our estimates distinguish two groups of variables. The first group consists of variables that have a positive impact on growth, namely, enrollment rate, trade openness, foreign direct investment and credit to the economy. The second group consists of variables that have a negative contribution to growth. It is exchange rate, gross fixed capital formation and the trade balance.

4. Conclusion and recommendation

The objective of our article was to determine the contribution of public expenditure and its components to growth. Using the error correction model, our results show that overall public expenditure has no effect on short-term economic growth. However, in the long run, the influence of overall public expenditure on growth is positive. Taking into account the components of public expenditure, the results of the estimates suggest that, in the short run, functioning expenditures have a negative impact on economic growth, while investment expenditure has no effect on growth. In the long run, public functioning and investment expenditure has a positive contribution to economic growth. However, the impact of public investment expenditure on growth is relatively larger than that generated by government functioning expenditures. In this respect, there are several implications for economic policy. First, it is inappropriate to use government functioning expenditures for cyclical stabilization purposes because of their negative contribution to growth. In the second place, to place the Congolese economy on a durable path of growth, the Congolese government can be based on the one hand, on the public investments; in addition on the functioning expenditure. More precisely, the Congolese government must increase the public investments in infrastructure of health, education of telecommunication and the expenditure current related to the protection of the goods and the people or the property rights.

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Appendices

Variables stationarity test results (ADF)

Variables	Test ADF			Order of integration
	Level ADF statistics	Statistics in first difference	Critical value of Mckinon	
LGDP	-2.125250	-6.539442	-3.552973	**I(1)**
DEPTOT	-2.224820	-4.328810	-3.568379	**I(1)**
DINVPIB	-0.810364	-5.401247	-2.954021	**I(1)**
DFPIB	-1.803243	-5.100161	-2.954021	**I(1)**
TINSCP	-1.949919	-5.307926	-3.557759	**I(1)**
TXCHAN	-1.717906	-5.013485	-3.557759	**I(1)**
TERME	-2.138562	-5.213509	-3.557759	**I(1)**
IDE	-2.652737	-8.545693	-2.957110	**I(1)**
FBCF	-1.977670	-6.933547	-3.562882	**I(1)**
CE	-1.750736	-4.780369	-3.557759	**I(1)**

Source: author from Eviews

Determination of Optimal Lag

VAR Lag Order Selection Criteria						
Endogenous variables: LGDP LDEPTOT TINSCRP TXCHAN LTERME IDE FBCF CE						
Exogenous variables: C						
Sample: 1980 2013						
Included observations: 32						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-646.9584	NA	82808830	40.93490	41.30133	41.05636
1	-381.3564	90.48387*	40211.90*	32.33477*	38.56415	34.39964*
2	-477.8725	243.0609	131747.0	34.36703	37.66494*	35.46019
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: author from Eviews

Determination of Optimal Lag

VAR Lag Order Selection Criteria						
Endogenous variables: LGDP DINVPIB DFPIB SCPIB						
Exogenous variables: C						
Sample: 1980 2013						
Included observations: 32						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-360.3475	NA	91152.59	22.77172	22.95493	22.83245
1	-269.1956	153.8188*	840.1170	18.07473	18.99081*	18.37838*
2	-251.0940	26.02108	776.0189*	17.94337*	19.59233	18.48996
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: author from Eviews

Johansen cointegration test results

Date: 06/24/16 Time: 20:10				
Sample (adjusted): 1982 2013				
Included observations: 32 after adjustments				
Trend assumption: Linear deterministic trend (restricted)				
Series: LGDP LDEPTOT TINSCRP TXCHAN LTERME IDE FBCF CE				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.908221	313.7587	187.4701	0.0000
At most 1 *	0.896359	237.3309	150.5585	0.0000
At most 2 *	0.858455	164.7927	117.7082	0.0000
At most 3 *	0.782331	102.2283	88.80380	0.0038
At most 4	0.537472	53.43526	63.87610	0.2749
At most 5	0.332142	28.76173	42.91525	0.5763
At most 6	0.282241	15.84398	25.87211	0.5051
At most 7	0.150836	5.232091	12.51798	0.5634
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

Source: author from Eviews

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Johansen cointegration test results

Date: 05/31/16 Time: 13:21				
Sample (adjusted): 1982 2013				
Included observations: 32 after adjustments				
Trend assumption: No deterministic trend (restricted constant)				
Series: LGDP DINVPIB DFPIB SCPIB				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.502454	57.99260	54.07904	0.0215
At most 1 *	0.492142	35.65446	35.19275	0.0446
At most 2	0.247098	13.97277	20.26184	0.2913
At most 3	0.141723	4.890527	9.164546	0.2956
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: author from Eviews

Result of the effects of global public expenditure on growth

Vector Error Correction Estimates	
Sample (adjusted): 1982 2013	
Included observations: 32 after adjustments	
Standard errors in ( ) & t-statistics in [ ]	
Cointegrating Eq:	CointEq1
LPIBN(-1)	1.000000
LDEPTOT(-1)	-0.579204
	(0.05036)
	[-11.5017]
TINSCRP(-1)	-0.003586
	(0.00055)
	[-6.54349]
TXCHAN(-1)	0.000327
	(0.00013)
	[2.52599]
LTERME(-1)	-0.426374
	(0.06279)
	[-6.79022]
IDE(-1)	-0.013467
	(0.00201)
	[-6.70043]
FBCF(-1)	0.008730
	(0.00084)

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	[10.3807]							
CE(-1)	-0.004037							
	(0.00193)							
	[-2.09127]							
@TREND(80)	-0.039996							
	(0.00334)							
	[-11.9653]							
C	-0.931525							
Error Correction:	D(LPIBN)	D(LDEPTOT)	D(TINSCRP)	D(TXCHAN)	D(LTERME)	D(IDE)	D(FBCF)	D(CE)
CointEq1	-0.724108	0.227066	-6.299862	-241.3868	-0.149922	32.72717	-16.12885	13.61653
	(0.37881)	(0.34729)	(29.9000)	(131.329)	(0.29371)	(13.6586)	(22.9930)	(6.58188)
	[-1.91151]	[0.65382]	[-0.21070]	[-1.83804]	[-0.51044]	[2.39609]	[-0.70147]	[2.06879]
D(LPIBN(-1))	0.347104	0.183036	26.34219	-24.85919	-0.354915	-8.925001	-14.54717	-9.129076
	(0.28396)	(0.26033)	(22.4131)	(98.4443)	(0.22017)	(10.2385)	(17.2356)	(4.93380)
	[1.22237]	[0.70309]	[1.17530]	[-0.25252]	[-1.61203]	[-0.87171]	[-0.84402]	[-1.85031]
D(LDEPTOT(-1))	-0.323620	0.263085	-34.53505	-34.77959	0.121156	19.03890	14.67258	10.11183
	(0.24728)	(0.22671)	(19.5182)	(85.7293)	(0.19173)	(8.91612)	(15.0095)	(4.29655)
	[-1.30870]	[1.16046]	[-1.76937]	[-0.40569]	[0.63191]	[2.13533]	[0.97755]	[2.35348]
D(TINSCRP(-1))	0.002510	0.002582	0.061997	0.646345	0.001280	0.039458	-0.138402	-0.029880
	(0.00264)	(0.00242)	(0.20843)	(0.91548)	(0.00205)	(0.09521)	(0.16028)	(0.04588)
	[0.95040]	[1.06668]	[0.29745]	[0.70602]	[0.62517]	[0.41442]	[-0.86349]	[-0.65124]
D(TXCHAN(-1))	0.000309	-0.000927	0.048441	0.591944	0.000803	-0.046168	0.002688	-0.009243
	(0.00082)	(0.00075)	(0.06456)	(0.28357)	(0.00063)	(0.02949)	(0.04965)	(0.01421)
	[0.37716]	[-1.23571]	[0.75029]	[2.08744]	[1.26578]	[-1.56539]	[0.05415]	[-0.65034]
D(LTERME(-1))	0.063384	0.266273	-12.08773	-156.5163	-0.111710	1.941845	-20.16849	14.18798
	(0.33827)	(0.31012)	(26.6999)	(117.273)	(0.26228)	(12.1968)	(20.5322)	(5.87746)
	[0.18738]	[0.85860]	[-0.45273]	[-1.33463]	[-0.42593]	[0.15921]	[-0.98229]	[2.41396]
D(IDE(-1))	0.008907	0.008245	0.637048	0.997386	0.002012	-0.195039	-0.338070	0.005678
	(0.00575)	(0.00527)	(0.45377)	(1.99310)	(0.00446)	(0.20729)	(0.34895)	(0.09989)
	[1.54923]	[1.56440]	[1.40389]	[0.50042]	[0.45139]	[-0.94091]	[-0.96882]	[0.05684]
D(FBCF(-1))	0.005147	0.000535	0.211975	-0.000813	-0.000550	0.302884	0.061187	-0.132800
	(0.00406)	(0.00372)	(0.32012)	(1.40606)	(0.00314)	(0.14623)	(0.24617)	(0.07047)
	[1.26902]	[0.14385]	[0.66217]	[-0.00058]	[-0.17497]	[2.07122]	[0.24855]	[-1.88454]
D(CE(-1))	-0.002276	-0.001238	1.272176	-5.127640	-0.020158	0.212362	-0.500948	0.176093
	(0.00956)	(0.00877)	(0.75494)	(3.31589)	(0.00742)	(0.34486)	(0.58055)	(0.16618)
	[-0.23797]	[-0.14114]	[1.68514]	[-1.54638]	[-2.71820]	[0.61579]	[-0.86289]	[1.05962]
C	0.067898	0.038572	-0.158374	6.304811	0.010988	-0.080459	0.537450	-0.173231
	(0.03854)	(0.03533)	(3.04175)	(13.3602)	(0.02988)	(1.38950)	(2.33910)	(0.66958)
	[1.76188]	[1.09175]	[-0.05207]	[0.47191]	[0.36773]	[-0.05790]	[0.22977]	[-0.25872]
R-squared	0.461511	0.269475	0.294915	0.395804	0.415918	0.522945	0.228997	0.437812
Adj. R-squared	0.241220	-0.029376	0.006471	0.148633	0.176976	0.327786	-0.086414	0.207825
Sum sq. resids	0.706683	0.593965	4402.639	84935.58	0.424824	918.7213	2603.532	213.3398
S.E. equation	0.179226	0.164312	14.14638	62.13460	0.138961	6.462203	10.87853	3.114043
F-statistic	2.095007	0.901705	1.022436	1.601336	1.740661	2.679584	0.726028	1.903643
Log likelihood	15.60051	18.38069	-124.1936	-171.5486	23.74303	-99.12198	-115.7882	-75.76044

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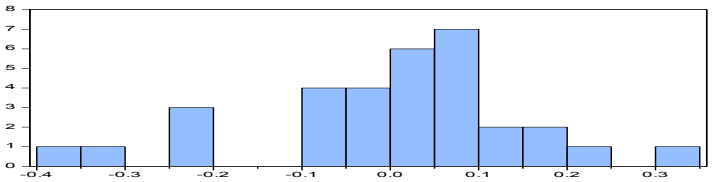
Akaike AIC	-0.350032	-0.523793	8.387101	11.34679	-0.858939	6.820124	7.861766	5.360028
Schwarz SC	0.108010	-0.065751	8.845143	11.80483	-0.400897	7.278166	8.319808	5.818070
Mean dependent	0.079802	0.076237	-0.325170	6.947143	0.000477	0.403141	0.488785	-0.190354
S.D. dependent	0.205752	0.161950	14.19237	67.34030	0.153175	7.881824	10.43693	3.498760
Determinant resid covariance (dof adj.)		12182.81						
Determinant resid covariance		608.0355						
Log likelihood		-465.8120						
Akaike information criterion		34.67575						
Schwarz criterion		38.75233						
F-statistic		2.095007	Durbin-Watson stat		2.100976			
Prob(F-statistic)		0.075843						

Source: author from Eviews

Jarque-Bera test result



Breusch-Pagan-Godfrey result test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.280972	Prob. F(16,15)	0.9919
Obs*R-squared	7.379000	Prob. Chi-Square(16)	0.9652
Scaled explained SS	4.316445	Prob. Chi-Square(16)	0.9982

ARCH test result

Heteroskedasticity Test: ARCH			
F-statistic	2.723039	Prob. F(1,29)	0.1097
Obs*R-squared	2.660975	Prob. Chi-Square(1)	0.1028

White test result

Heteroskedasticity Test: White			
F-statistic	0.266275	Prob. F(16,15)	0.9938
Obs*R-squared	7.078405	Prob. Chi-Square(16)	0.9717
Scaled explained SS	4.140608	Prob. Chi-Square(16)	0.9986

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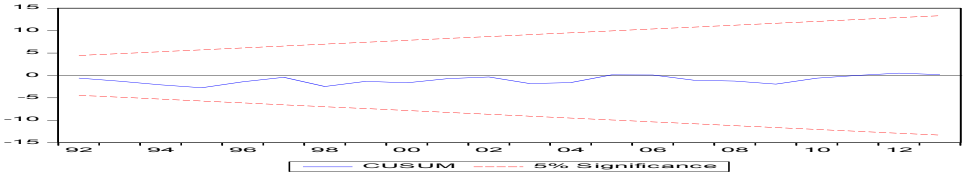
Cusum test



Results of the effects of the components of public expenditure on growth

Vector Error Correction Estimates				
Sample (adjusted): 1982 2013				
Included observations: 32 after adjustments				
Standard errors in ( ) & t-statistics in [ ]				
Cointegrating Eq:	CointEq1			
LGDP(-1)	1.000000			
DINVPIB(-1)	-1.919277			
	(0.48924)			
	[-3.92294]			
DFPIB(-1)	-1.357573			
	(0.38636)			
	[-3.51378]			
SCPIB(-1)	0.476434			
	(0.18864)			
	[2.52557]			
@TREND(80)	-1.490056			
	(0.33207)			
	[-4.48713]			
C	61.26790			
Error Correction:	D(LGDP)	D(DINVPIB)	D(DFPIB)	D(SCPIB)
CointEq1	-0.010008	0.015112	0.428135	-0.394981
	(0.00394)	(0.06815)	(0.10640)	(0.27636)
	[-2.53745]	[0.22176]	[4.02365]	[-1.42921]
D(LGDP(-1))	-0.540461	5.802208	8.356806	-31.26826
	(0.26303)	(4.54479)	(7.09630)	(18.4311)
	[-2.05475]	[1.27667]	[1.17763]	[-1.69650]
D(DINVPIB(-1))	0.009096	0.139038	0.408183	-0.097374
	(0.01033)	(0.17845)	(0.27863)	(0.72367)
	[0.88071]	[0.77916]	[1.46498]	[-0.13456]
D(DFPIB(-1))	-0.018351	0.081839	0.308733	-1.992604
	(0.00909)	(0.15706)	(0.24523)	(0.63694)
	[-2.01889]	[0.52107]	[1.25894]	[-3.12842]
D(SCPIB(-1))	0.003617	0.022509	-0.084435	-0.043308
	(0.00264)	(0.04563)	(0.07125)	(0.18507)
	[1.36955]	[0.49325]	[-1.18498]	[-0.23401]
C	0.112980	-0.478136	-0.925752	4.704444
	(0.03787)	(0.65429)	(1.02162)	(2.65343)
	[2.98360]	[-0.73077]	[-0.90616]	[1.77297]
R-squared	0.365208	0.160449	0.440795	0.352236

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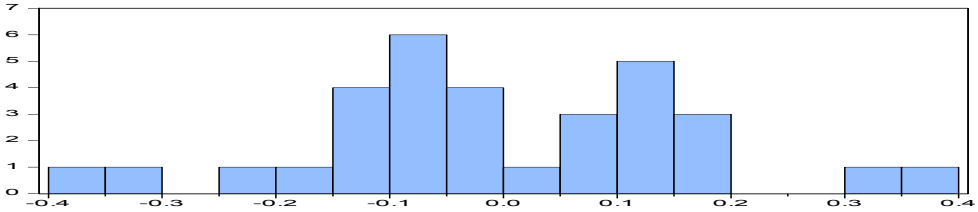
Adj. R-squared	0.243132	-0.001003	0.333256	0.227666
Sum sq. resids	0.833066	248.7123	606.3641	4090.443
S.E. equation	0.179000	3.092872	4.829254	12.54292
F-statistic	2.991655	0.993787	4.098918	2.827612
Log likelihood	12.96802	-78.21501	-92.47395	-123.0168
Akaike AIC	-0.435501	5.263438	6.154622	8.063550
Schwarz SC	-0.160676	5.538264	6.429447	8.338375
Mean dependent	0.079802	0.121132	-0.259575	2.463196
S.D. dependent	0.205752	3.091322	5.914260	14.27236
Determinant resid covariance (dof adj.)		329.1563		
Determinant resid covariance		143.4484		
Log likelihood		-261.0797		
Akaike information criterion		18.12998		
Schwarz criterion		19.45831		
F-statistic	2.991655	Durbin-Watson stat	2.180348	
Prob(F-statistic)	0.029031			

Source : L'auteur, à partir de Eviews

Jarque-Bera test result



Series: Residuals
Sample 1982 2013
Observations 32

Mean	-1.04e-17
Median	-0.016879
Maximum	0.370750
Minimum	-0.359447
Std. Dev.	0.163930
Skewness	0.090057
Kurtosis	3.069094
Jarque-Bera	0.049620
Probability	0.975495

ARCH test result

Heteroskedasticity Test: ARCH			
F-statistic	1.008500	Prob. F(1,29)	0.3236
Obs*R-squared	1.041822	Prob. Chi-Square(1)	0.3074

Breusch-Pagan-Godfrey result test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.996646	Prob. F(8,23)	0.4646
Obs*R-squared	8.237496	Prob. Chi-Square(8)	0.4106
Scaled explained SS	5.625901	Prob. Chi-Square(8)	0.6891

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White test result

Heteroskedasticity Test: White			
F-statistic	1.250211	Prob. F(8,23)	0.3160
Obs*R-squared	9.698113	Prob. Chi-Square(8)	0.2869
Scaled explained SS	6.623448	Prob. Chi-Square(8)	0.5777