

## Public Expenses and Economic Growth in Congo

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### Abstract

This article aims to proceed an econometric appraisal of the connection between the total public expenses and their components (capital from public expenses and current ones) and the economic growth in Congo from 1960 to 2013. We have therefore analyzed the links of causality according to GRANGER's view and have carried out the valuation of the design on the long term and the pattern for correcting mistakes using the ordinary least square method (OLS) between those expenses and the economic growth. We have found out a mutual causality bond between the current public expenses and the economic growth. However, no causal link has been established between the investment expenses and the economic growth. But, according to GRANGER's point of view, the total public expenses determine the economic growth. Moreover, our results point out that the investment expenses, the current and the total ones have positive impacts during a short term as well as in a long one when dealing with the economic growth in Congo.

**Keywords:** Total Public Expenses; Economic Growth; Causality, Cointegration; Capital Expenses; Current Expenses; Positive Effects.

### I. Introduction

One of the main issue about the economic growth approach concerns whether the rise of public expenditures can generate economic growth. In fact, new growth theories dubbed endogenous growth theories, then public expenditures rise in OCDE countries to cope with the financial crisis that broke out in 2007 has aroused interest on the debate regarding the relation between public expenditures and economic growth. Under theoretical consideration, the contemporary literature on this relation is focused on two kinds of analysis namely the causality analysis of the two variables and the analysis of the effect of public expenditures upon economic growth.

Dealing with causality, the debates confront two strongly opposed schools. Firstly, Wagner Law (1890) formulated during a particular context that of developed countries, stipulates that public expenditure is an endogenous variable. Its rise is justified in order to meet a new demand. In this respect, public expenditure is rather a consequence than a cause of national income. Yet, it grows more rapidly than national income. Secondly, Keynesian approach which admits that public expenditure is an exogenous variable which can be used as an effective tool for budget policy to rise up national income. It advocates that the causality relation between the two variables goes from public expenditures to national income.

On the effect of the public expenditures n economic growth, one can distinguish short run effects based on Keynesian regulation policy and long run effects highlighted by economic development theorists (Hirschman, 1958, Roseinstein-Rodan, 1943)<sup>2</sup> on the one hand, and one the other hand endogenous growth theorists such as Baro (1990) that focuses the debate on public infrastructure capital only without taking into account the impact of public expenses.

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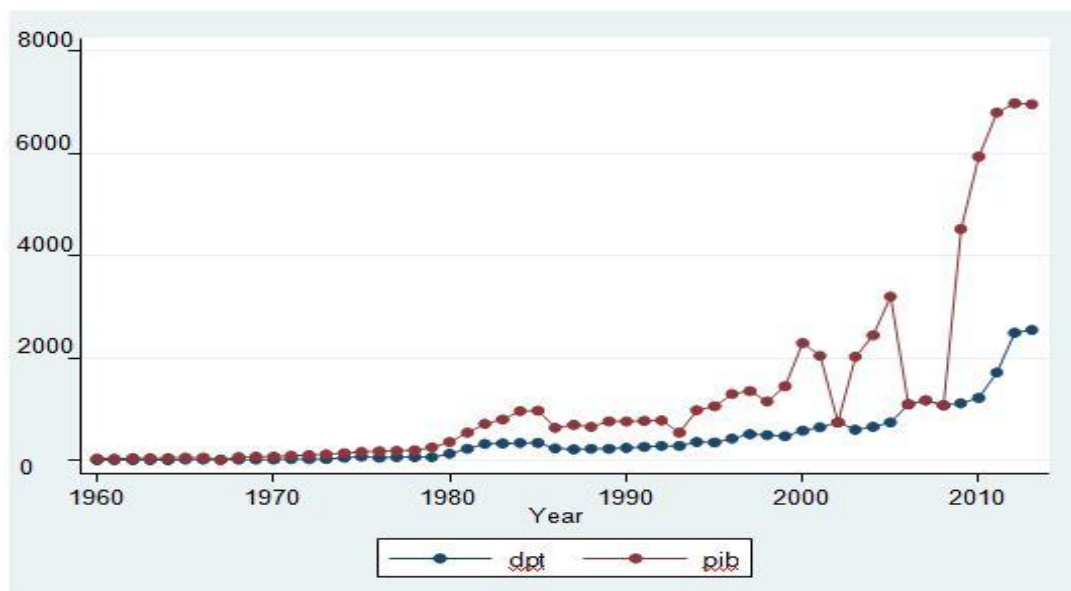
<sup>2</sup> For these theorists, public capital as an environment fact causes economic and social growth of a country through positive externals.

If during a short term period public expenditures affect economic growth through a public expenditure multiplier and that of transfers, they can in long run affect economic growth by two channels at least (Tanzi and Zee, 1997) in increasing directly economy capital stock through public investment in infrastructure or public enterprise investment, in increasing indirectly marginal productivity of production factors provided by private sector through education, health, and other services expenditures which contribute to the accumulation of human capital.

Under empirical side, results diverge concerning either the causality sense or effects. Regarding the sense of causality, public expenditures cause economic growth (Kacou, 2004), the national income cause public expenditures (Aregbeyen, 2008, Tang, 2010), public expenditures and growth influence each other, that is, a bidirectional causality (Ouattara, 2007, Cheng and Wei, 1997), economic growth causes public investment (Keho, 2009). Concerning empirical studies on the effects of public expenditures on economic growth, results are rather controversial than those dealing with theoretical aspects. There is no strong evidence to support a possible significant relation between public expenditures and economic growth. So, it resulted from some studies that the impact of public expenditures upon economic growth is negative or not significant (Landau, 1983; Taban, 2010; Vu Lee and Suruga, 2005) whereas other pointed out positive and significant effects (Komain and Brahmastre, 2007; Alexiou, 2009). In decomposing public expenses, Barro (1997) found out that consumption public expenditures<sup>3</sup> according to GDP percentage were negatively correlated to growth while Devarajan, Swaroop and Zoo (1996) had shown a positive relation between consumption public expenditures and economic growth. Easterly, Loayza and Montiel (1997) had not found any significant effect between consumption public expenditures and economic growth in Latin America. In considering the nature of public expenditures in terms of both volume and volatility, Afonso and Furceri (2010) clearly demonstrated that social contribution expenditures and function expenditures have a negative effect upon economic growth in European countries. These contradictory results can be accounted by in consideration of country differences, analytic methods and the selected public expenses.

So the issue about the relation between public expenditures and economic growth is no longer closed. In this respect, it is open to new consideration either for theoretical or empirical reasons. A survey of the relation between the two variables is more than needed for a developing country like Congo which has shown a relative increase of its net expenses. Chart 1 shows the evolutions of total GDP public expenditures of Congo from 1960 to 2013.

**Chart 1:** The evolutions of total GDP public expenditures of Congo from 1960 to 2013



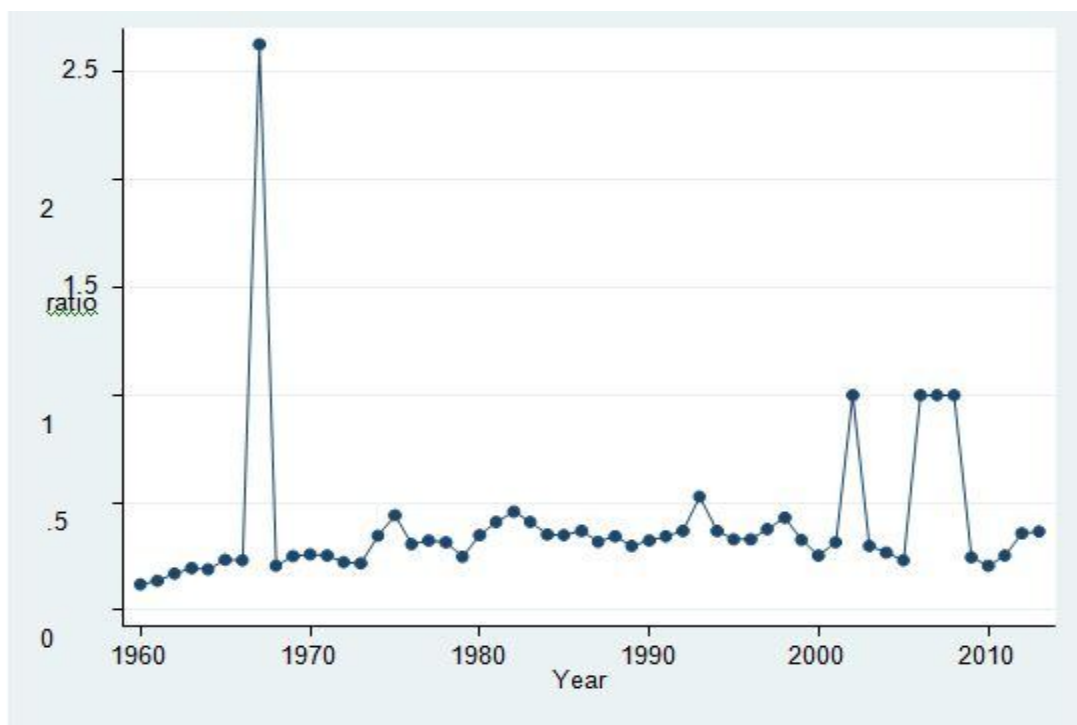
**Source:** Author's data processed based on different regulation law data from 1960 to 2013 and WDI

The Congolese growth according to GDP value is relatively stable from 1960 to 1980. From then, GDP generally increases in the second half of this period. The evolution of the total public expenditures follows that of GDP from 2010.

<sup>3</sup>Public and defense expenditures are excluded.

One should then conclude that there is a relation between the two variables so that public expenditures should determine GDP, and hence growth. To better grasp this cause and effect relation, it is worth signaling out the ratio evolution between public expenditures and GDP value from 1960 to 2013 (cf. chart 2 coming).

**Chart2:** The evolutions of public expenditures ratio upon GDP value in Congo from 1960 to 2013



**Source:** Ratio processing and author’s table based on different regulation law data from 1960 to 2013 and WDI

This ratio (expenses, GDP), that is, public expenditures elasticity in connection to GDP, overpasses the unit for 1960- 1970 decade and 2000-2010 period. This shows that total public expenditures develop more rapidly than GDP. Yet, between 1970 and 2000, GDP developed more rapidly than total public expenditures because public expenditure lasticity in connection to GDP is low to unit.

**Table 1:** Descriptive statistics of total public expenditures in terms of FCFA billions

Variables	1960-1970	1971-1980	1981-1990	1991-2000	2001-2013	1960-2013
Obs	10	10	10	10	14	54
average	46	10	259	370	1175	431
gap type	20	4	71	100	655	567
Min	20	4	125	246	584	4
Max	72	17	340	509	2555	2555

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI

Table 1 enables to see that the average of public expenditures decrease during the second decade (1971-1980). In the contrary, this average is characterized by a rise tendency till 2013. Minimal and maximal total public expenditures values follow the same evolution.

**Table 2:** Descriptive statistics of GDP in terms of FCFA billions

Variables	1960-1970	1971-1980	1981-1990	1991-2000	2001-2013	1960-2013
Obs	10	10	10	10	14	54
Average	152	44	709	1015	3384	1232
gap type	56	18	182	301	2378	1783
Min	76	5	360	543	745	5
Max	255	69	970	1450	6989	6989

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI.

It appears that after the first decade (1960-1970), there is a decrease of economic growth average. But after the second one, we observe a rise of the evolution of the average up till 2013. This also holds for minimal and maximal GDP values.

The main goal of this paper is to empirically analyse the relation between the different types of public expenditures and economic growth in Congo driving data from 1960-2013 period. There are very limited number of studies that deal with the effects of disintegrated public expenditures upon economic growth in sub-Saharan African countries. The use of data related to public investment expenditures and current expenditures is advantageous as it sheds light on the role of each element of public expenditures under the economic growth process in Congo.

This research paper's organization presents that in the section 2 deals with research methodology, empirical results are the concern of section 3, while conclusion closes the work.

## 2. Research methodology for the estimation of the relation between public expenditures, its components and economic growth in Congo

After having adopted econometric model, we lean towards cointegration theory which is of paramount interest to develop an accurate and rich analysis of the long run relations that links these macroeconomic variables.

### 2.1. The specification of the econometric model between public expenditures and econometric growth

The specification of the model aims to define a production function which is inspired from available literature studies between public expenditures and economic growth. The goal is to analyse the effect of the different types of public expenditures upon economic growth. If the latter is represented by GDP value, we can select Cobb-Dougllass production function as a basic equation to estimate, for it more adequate for our data representation. It looks as follows:

$$GDP = F(DPT, DPI, DPC)$$

$$PIB = DPT^{a1} * DPI^{a2} * DPC^{a3}$$

$$\text{Log}PIB = a_1 \text{Log}DPT_t + a_2 \text{Log}DPI_t + a_3 \text{Log}DPC_t + \mu_t$$

Whereiff:

- **PIB**, Gross Domestic Product,
- **DPT**, total public expenditures: owing to the diversity of empirical results related to the impacts of public expenditures upon economic growth, it can a priori be difficult to decide on the expected sign of this variable. We claim that total public expenditures have a positive effect upon economic growth. This hypothesis is attested by a number of available literature (...)
- **DPI**, public investment expenditures: we also hypothesize that these expenditures positively affect economic growth. Some studies hold the same point of view (...)
- **DPC**, current public expenditures: these expenditures also have a positive impact on economic growth.
- **a1, a2, and a3** are marginal coefficients for total public expenditures, investment expenditures, and final consumption expenditures respectively.
- $\mu_t$  refers to error term.
- Log: Neperian logarithm.
- Index t represents the year.

**2.2. Method for the evaluation of the relation between public expenditures and economic growth in Congo**

Cointegration test and error correction model are used to analyse the causality relation between public expenditures and economic growth in Congo. Our method is threefold. The first step consists in checking chronological series properties (stationary) through dickey-Fuller, Phillips-Perron (PP) unit root test. The second is based on Engle and Granger (1987) cointegration test to study the short term and long term relation between gross domestic product and economic growth. Finally, the third step, we opt for Granger causality test to determine the causality direction between GDP and public expenditures and the estimation of error correction model.

**2.2.1. Stationary tests on macroeconomic variables**

Our analysis first step implies stationary tests and unit root presence on explained and explanatory variables. A series is stationary when it is finite average and constant over time; linear links among past, present and future values of these variables are independent of time factor and its variance is finally fixed over time.

The specification of the model requires that variables be stationary, and thus avoiding fallacious regression risks. There are several tests to determine the series integration order. It is thus important to notice that all tests include bias, what subtends that the determination of integration order should not be rigorous from one test. This is the reason why we resort to several tests. The first test is Dickey-Fuller (ADF) unit root test. This test only takes into account the auto-correlation presence of series. The null hypothesis is about the presence of unit root (non-stationary). In addition to ADF, there is Phillips-Perron (PP, 1988) test. This last test is based on non-pragmatic correction of Dickey-Fuller statistics to take into account heteroskedasticity errors.

**2.2.1.1 Dickey-Fuller test on macroeconomic variables**

This test permits to give prominence to the stationary or non-stationary feature of a series. The stationarity of a series supposes that there is no unit root. Yet, there is unit root when there is non-stationarity. We have used Mackinnon critical values available at STATA 11.

ADF statistic values and the critical values of a survey variable are obtained thanks to a test in the following table. If ADF value is above or low to critical value, so the unit root hypothesis is accepted, this concludes that the series is not stationary. If contrary, that is, ADF value is low to the critical value, we will assume that the series is stationary.

The significance level  $\phi = 5\%$  is selected for this test.

**Table 3:** Unit root test results on macroeconomic variables

Variables	At level		in first difference	
	ADF Statistics	MACKINNON Critical value	ADF Statistics	MACKINNON critical value
LogPIB	-1,28	-2,93	-2,92	-0,83
LogDPT	-1,48	-2,93	-3,57	-1,21
LogDPC	-2,45	-2,93	-2,92	-2,41
LogDPI	-0,95	-2,93	-3,56	1,78

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI.

LogPIB, LogDPI, LogDPT, and LogDPC variables are non-stationary to this level because the test statistics are above critical value. There is unit root in data generating process. For instance, LogPIB, critical value (-2.93) is low to statistic value (-1.28). However, the series is stationary under first difference since critical values are above ADF statistic values and there is no unit root. In fact, for LogDPI, the critical value (1.78) is above statistic value (-3.56).

**2.2.1.2 Phillips –Perron test**

Phillips and Perron (1988) suggest another test to depict temporal series non stationarity. This test is a non parametric adaptation of Dickey-Fuller test in order to solve the problem of auto-correlation and/or heteroskedasticity or errors. It is thus a general test with minimal hypotheses on innovation sequence.

The implementation of Phillips-Perron test is identical to that of Dickey-Fuller. We choose the same decreasing sequential strategy stepping from constant and tendency model estimation. It is worth selecting in advance truncate parameter 1 as well as the number of delays p for ADF case study. The null test hypothesis shows there is unit root as for ADF test. The significance fixed level is 5%. Tables 4 provide information on the results of this test.

**Table 4:** The results of Phillips-Perron test.

Variables	At level			At first difference		
	test Statistics	MACKINNON value	critical	Test statistics	MACKINNON value	critical
LogPIB	-1,64	-13,32		-3,57	-2,92	
LogDPT	-1,31	-13,32		-3,58	-2,92	
LogDPC	-1,69	-18,65		-3,05	-2,92	
LogDPI	-2,34	-13,32		-3,56	-2,92	

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI.

For all series at level, we see that statistics are above Mackinnon critical values. GDP value is thus non-stationary and includes at least one unit root. Variables LogPIB, LogDPI, LogDPT, and LogDPC are stationary for first difference, since test statistics are low to critical values. The conclusion about Phillips-Perron test is akin to that of ADF test for all macroeconomic variables.

**2.2.2 The estimation of short and long term relation between GDP and explanatory variables**

Based on Ordinary Least square (OLS) method, we initially estimate the specified model between explained variables and explanatory variables in Congo. This approach allows estimating the regression coefficient of the right trend which represents the impact of the economic growth of a unit variation of explanatory variables (public expenditures) from observations. Table 5 illustrates these results.

**Table 5:** The results of the estimation of a long term relation

Number of obs		54				
Prob> F		= 0.0000				
R-squared		= 0,91				
AdjR-squared		= 0,91				
LogPIB	Coef.	Std. Err	T	P>t	[95% Conf. Interval]	
LogDPT	0,88	0,037	23,62	0	0,80 0,95	
LogDPC	0,94	0,04	20,85	0	0,85 1,04	
LogDPI	0,62	0,037	16,94	0	0,55 0,70	
_Cons	1,66	0,5	3,33	0,002	0,66 2,67	

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI.

The estimation by OLS provides the following results:  
 $LogPIB = 0.88LogDPT + 0.94LogDPC + 0.62 LogDPI + 1.66$

We observe that total public expenditures variables (DPT) and current public expenditures (DPC) have expected positive marginal impact on economic growth. In fact, their respective coefficients are equal at 0.88 and 0.94. This means that the rise of total public expenditures and final consumption expenditures at 1% should lead to a rise of GDP to 0.88 and 0.94 in Congo respectively.

An argument supporting a positive effect of public investment expenditures on economic growth is attested by our results, since their marginal coefficient (0.62) is positive. This presupposes that a rise of 1% of public investment expenditures should lead to an increase of 0.62% of economic growth. This positive result corroborate with some previous studies (...).

Coefficient R<sup>2</sup> (0.91) and adjusted R<sup>2</sup> (0.91) indicate a good quality of adjustment. Linear regression explains up to 91% the variation of economic growth in Congo. DPT, DPI, and DPC coefficients are significant to 5% level. Cointegration test is our concern in the next section.

### 2.2.3 Cointegration tests

It is important to check if there is a long term relation between the selected variables (cointegration) before embarking on estimation. We are here concerned with Engle and Granger test (fraction unit root test, 1987), Johansen test (1990) and Pesaran et al test (2001).

#### 2.2.3.1 Engle and Granger cointegration test: fraction unit root test

According to Engle and Granger (1987), cointegration test is set up to process a fraction unit root test. Truly speaking, after the estimation of ordinary least square approach on the long term relation between GDP and public expenditures aforementioned, we take fractions upon which we realize ADF test. The null hypothesis is about the occurrence of unit root. There is cointegration when fractions are stationary. Given that fractions are already estimated, the values to be used are Mackinnon critical values and ADF statistics. Table 6 below gives the results which are significant to 5% level.

**Table 6:** The results of Engle and Granger unit root test on fractions.

Variables	At level			At first difference		
	ADF Statistics	MACKINNON value	critical	ADF Statistics	MACKINNON value	critical
Fractions	<b>-6,33</b>	<b>-2,93</b>		<b>-5,32</b>	<b>-2,93</b>	

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI

At due level and first difference, we see that ADF fraction values (-6.33 and -5.32) are respectively low to Mackinnon critical values (-2.93). Fractions are thus stationary and there is not unit root. We come to the conclusion that there is cointegration relation. Otherwise, variables are cointegrated, that is, there is a long term relation between GDP and total public expenditures, current expenditures and investment expenditures in Congo.

#### 2.2.3.2 Johansen cointegration test

Johansen test enables to know whether there are cointegration relations even with regressions having several explanatory variables further to Engle and Granger fraction test. But Engle and Granger test is too restrictive. In fact, this test is only used in case of one and unique cointegration relation (so one cointegration vector). Furthermore, it raises normalization problems; it can lead to different results. Johansen cointegration test is used as an alternative to Engle and Granger approach. This test permits to determine the number of long term equilibrium relation between integrated variables of the same order whatever the selected normalization be. The results of Johansen test are shown in table 7 below.

**Table 7:** The results of Johansen test

HO	H1	Trace (95%)	Critical value	$\lambda - \max -95\%$	Critical value
r = 0	r = 1	53,12	28,4	47,21	27,07
r = 1	r = 2	34,91	22	29,68	20,97
r = 2	r = 3	19,96	15,67	15,41	14,07
r = 3	r = 4	9,24	9,24	3,76	3,76

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI

The two statistics of the test formulated by Johansen to determine a cointegration relation are **trace** and  **$\lambda - \max$** . We observe that these statistics are above critical values. For example, the null hypothesis r =1, **trace** and  **$\lambda - \max$**  statistics (34.91 and 29.68) are above values (22 and 20.97) respectively.

It appear that there is at least one cointegration relation between economic growth value represented by GDP and total public expenditure explanatory values, investment and consumption expenditures.

The occurrence of a cointegration relation got through Johansen test is in conformity with Engle and Granger fraction test. The representation theorem of these results demonstrate that non-stationary series, particularly those with unit roots, must be represented under error correction model if they are integrated, i.e. if there is a stationary linear combination between them.

### 2.2.3.3 Pesaran et al cointegration test

Checking a long term cointegration relation between explained and explanatory variables is carried out based on Pesaran et al (2001) F-statistics test before estimating error correction model. Table 8 summarizes these results.

**Table 8:** The results of Pesaran et al cointegration test

Variables	F-Statistics	Critical value at 5% significant level	Conclusions
LogDPT	12,35	5,12	Cointegration
LogPIB	6,49	3,32	Cointegration
LogDPC	9,15	4,23	Cointegration
LogPIB	14,16	8,5	Cointegration
LogDPI	10,39	6,58	Cointegration
LogPIB	18,94	4,34	Cointegration

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI

It results from the above table that the direction of cointegration goes from GDP towards total public expenditures (DPT) since F-statistic value is above critical value ( $6.49 > 3.32$ ). The long term relation is significant at 5% level. There is reverse cointegration relation. Statistic values for DPC and PIB are above critical value (9.15 and 14.16 above 4.23 and 8.5 respectively). This result shows that there is a bidirectional cointegration relation between GDP and current public expenditures. These two long run relations are significant.

We have the same result between GDP and public investment expenditures. In fact, F-statistic values are above critical values (10.39 and 18.94 above 6.58 and 4.34 respectively). There is a bidirectional cointegration relation between GDP and public investment expenditures. More, the two long run relations are significant at 5% level. The occurrence of Pesaran et al (2001) cointegration relation is in accordance with Johansen, Engle and Granger test results. An error correction model that enables to integrate variation and level variables is relevant. The use of this model aims to get more reliable previsions than the long run results which are fake due to the non stationarity of series.

### 2.2.4. Granger causality test between explained and explanatory variables.

If there is causality between two variables, there must be a correlation between the evolution of the two variables. For example, there is a causality between X and Y variables, so if X increases, so does Y. according to Granger, causality can be defined as follows: a variable X causes a variable Y if past values of X have a statistic impact upon current or future value of Y.

Within the scope of this study, we are going to look for an eventual correlation between explained variable (economic growth) and explanatory variable (public expenditures). Supposing that total public expenditures and their components cause, according to Granger postulation, economic growth represented by GDP, Granger test results reflected in table 9 below try to check this hypothesis.

**Table 9:** The results of Granger causality test

The null hypothesis	Observations	F-Statistics	Probability
LogDPT does not Granger Cause LogPIB	54	6,85	0,033
LogPIB does not Granger Cause LogDPT	54	2,92	0,23
LogDPC does not Granger Cause LogPIB	54	6,65	0,036
LogPIB does not Granger Cause LogDPC	54	7,57	0,023
LogDPI does not Granger Cause LogPIB	54	1,64	0,44
LogPIB does not Granger Cause LogDPI	54	9,99	0,35

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI



The significant level is 5%. If probability is above 5%, the null hypothesis is accepted. We observe that DPC Granger cause PIB for probability is low 5%. However, PIB does not Granger cause DPT since probability is above 5%. Consumption expenditures and GDP mutually Granger influence as probability is low 5%. The upcoming section deals with the estimation of error correction model.

**2.2.5. The estimation of error correction model**

This approach conjointly models short term dynamics (represented by first difference variable) and long run (represented by level variables). Short term dynamic has the following layout:

$$\text{LogPIB}_t = b_0 + b_1\text{LogPIB}_{t-1} + b_2\text{LogDPT}_t + b_3\text{LogDPT}_{t-1} + b_4\text{LogDPI}_t + b_5\text{LogDPI}_{t-1} + b_6\text{LogDPC}_t + b_7\text{LogDPC}_{t-1} + v_t$$

Long term dynamic looks like the following:

$$\text{LogPIB}_t = a_0 + a_1\text{LogDPT}_t + a_2\text{LogDPI}_t + a_3\text{LogDPC}_t + \mu_t$$

The error correction model is issued from short term dynamic:

$$\Delta\text{LogPIB}_t = \alpha (\text{LogPIB}_{t-1} - a_1\text{LogDPT}_{t-1} - a_2\text{LogDPI}_{t-1} - a_3\text{LogDPC}_{t-1} - a_0) + c_2\Delta\text{LogDPT}_t + c_3\Delta\text{LogDPI}_t + c_4\Delta\text{LogDPC}_t + v_t$$

Whereiff:

- $\Delta$  Represents first difference operator;
- $c_1, c_2$  and  $c_3$  coefficients represent short term dynamic;
- $\alpha$  represents a long run relation adjustment speed towards long term equilibrium. The value of this coefficient is supposed to be positive;

The estimation of error correction model provides the following result, the delay number is set at  $p=1$ .

**Table 10:** The results of error correction model

Number of obs			54
Prob F			= 0,232
R-squared			= 0,6352
AdjR-squared			= 0,6352
<b>Variables</b>	<b>Coefficients</b>	<b>Std. Err</b>	<b>T</b>
<b>LogPIB (-1)</b>	1		
LogDPT (-1)	-0,75	0,43	-12,6
LogDPC(-1)	-1,15	0,59	1,07
LogDPI(-1)	-0,85	0,36	13
<b><math>\Delta\text{Log(PIB(-1))}</math></b>	1	0,12	6,9
$\Delta(\text{LogDPT}(-1))$	0,32	0,28	8,12
$\Delta(\text{LogDPC}(-1))$	0,19	0,46	2,1
$\Delta(\text{LogDPI}(-1))$	0,55	0,97	6,8

**Source:** Results processed from data based on different regulation laws in Congo from 1960 to 2013 and WDI

The coefficients of first difference variables and those of first difference variations represent a short term dynamic. It comes out that gross domestic product fluctuations are explained at 63.52% by model variables. The term parameter for error correction is negative and significant in GDP equation thus confirming a long term relation between public expenditures and economic growth. The value of this parameter illustrates that in case of short term equilibrium, public expenditures seem to slowly come back to equilibrium condition.

We also observe that lag values of an investment public expenditure period ( $\Delta\text{DPI}$ ) and current public expenditures ( $\Delta\text{DPC}$ ) are sources of gross domestic product increase in short term. In fact, if these expenditures (DPI and DPC) have a 1% level of increase, this would lead to 0.55 and 0.19 % increase of economic growth respectively.

We get best results with public investment expenditures. Regarding total public expenditures, they should positively impact economic growth in short term with a coefficient equal to (0.32). A one percentage increase of DPT should increase GDP growth to 0.32 % level.

### 3. Discussions of results and their economic policy implication

We are firstly going to discuss results prior to suggesting an economic policy implication in case of Congo.

#### 3.1 Result discussions

The econometric evaluation consists in the one hand to analyse causal relations between public expenditures and economic growth in Congo and one the other hand to examine the effect relations between the two variables.

Regarding causality relation, we have come to the conclusion that public expenditures and economic growth influence each other in Congo. Such a double direction causality relation has previously been stated by Cheng and Wei (1997) based on South Korea on (1954-1994) period and by Ouattara (2007) for West Africa Monetary and Economic Union countries. It is obvious that for Congo both Keynesian effect of public expenditures upon economic growth and Wagner law are verified.

It also appears that the relation between the different public expenditure categories (DPT, DPI and DPC) and economic growth is positive and significant in Congo.

Though many previous studies have found out a negative correlation between current public expenditures and economic growth (Ouattara, 2007), this relation is positive for Congo indeed. In fact, many studies have argued that in most developing countries, such expenditures (current expenditures) in connection to State functioning and public expenditures for socio-economic interventions (consumption, production or export subvention) are very often idle<sup>4</sup>. They do not directly impact economic growth of a country. We put forward a contradictory argument for Congo, that is, a positive result in conformity to Devarajan, Swaroop and Zoo (1996) results. These authors approve Easterly and Rebelo (1993) and later Tanzi and Zee (1997) results which advocate for a differentiation between direct and indirect effects of public expenditures upon economic growth. In principle, current public expenditures support demand and cause a short term GDP increase through Keynesian multiplier effect. Nonetheless, in an open economy, the impact of multiplier effect upon economic growth is rather low than import marginal tendency which is above.

Investment public expenditures also have a positive impact on economic growth in Congo: expenditures related to village track rehabilitation, road construction, bridges and dams and infrastructures actively contribute to the increase of economic growth rate. These results suggest that, in Congo, all public expenditure categories are important to economic growth even though they do not have all the same impact.

It also appears that the impact of public expenditures on economic growth is positive in short term as well as in long term. The coefficient associated to the reminding force is negative. This results confirms that in a long term period, imbalances between public expenditures and gross domestic product illustrate that the two series have similar evolution. This has an economic policy implication notably public expenditure optimization to meet a national income growth.

#### 3.2. Economic policy implication

These results permit to point out economic policy implications that follow for Congo. Firstly, in contrast to most developing countries, Congo current public expenditures cannot be said to be idle. They significantly contribute to economic growth. The Congolese authorities must work hard to preserve this policy and get strategies to make the government functioning more efficient, for instance in minimizing current idle expenditures. Under this consideration, the debate on the public expenditure optimal size becomes crucial.

Secondly, investment public expenditures also have a positive and significant impact on economic growth. An argument in support of this hypothesis is that, in Congo, investment activities carried out public authorities positively affect economic growth in accordance with endogenous growth theory. The State should intensify its productive investment efforts to the country consumption capacity level.

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<sup>4</sup>According to Barro and Sala-i-Martin (1995), idle spending includes social security, leisure and economic service expenditures.

Thirdly, as suggested in previous and current studies, Congo potential growth is also impacted by total public expenditures and public investment expenditures, that is, spending which contributes to the creation of productive capital and/or increase of productivity. Under this condition, budget policy rules that cause the government reduce this type of spending can prove inefficient for Congo and twice inefficient: not only they can lead to budget policy procyclicality variations, but also to low down the potential economic growth line.

### Conclusion

This paper's aim was to shed light on the effect of public spending (final, capital or total consumption) on economic growth in Congo. The results demonstrate that economic growth in Congo is positively accounted by in terms of investment public spending and current public spending in short and long terms. This arguments also hold for total public expenditures.

Following Granger, current public spending and economic growth mutually affect each other. Yet, no causality relation has been established between investment public spending and economic growth. Total public spending Granger causes economic growth. Our results are akin to Keynesian law and Wagner hypothesis. They also tally with previous results in the literature. However, they almost let intact the debate on the prevalence of Keynesian law and Wagner hypothesis on the relation between public spending and economic growth.

It is worth stating that this paper does have look at qualitative assess of public spending. This is certainly important in case of rarefication of public spending finance sources. It is relevant to strongly care about effective use of public spending in priority sectors in long-run period (education, health, infrastructure, transportation ...).

In this paper, I have chosen to give priority to macroeconomic impact of public spending. A future research investigation will be carried out on microeconomic and sectors for an exhaustive overview of the impact of public spending on economic growth in Congo.

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