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ЭКОНОМЕТРИЧЕСКОЕ ИССЛЕДОВАНИЕ ВЛИЯНИЯ ГОСУДАРСТВЕННЫХ РАСХОДОВ, НАПРАВЛЕННЫХ НА КОНЕЧНОЕ ПОТРЕБЛЕНИЕ, НА ЭКОНОМИЧЕСКИЙ РОСТ АЛЖИРА

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Ключевые слова: экономический рост, государственные расходы, множественное эконометрическое моделирование.

Определяется степень влияния на экономический рост тех государственных расходов, которые направляются на конечное потребление, ввиду высокой значимости подобного показателя в плане сравнения уровней эффективности экономической политики различных стран. Кроме того, данный показатель позволяет оценить социально-экономическую ситуацию внутри отдельно взятого государства.

Introduction

The government sector is considered as an effective part in the general equilibrium situation of the income and GDP with its impact on The general level of aggregate demand, Via monetary policy tools, among them the government expenditures (consumption and investment), the government could by controlling the size of government spending organize its contribution in the aggregate demand in a way that will assure the arrival of the latter to the income level which brings best use of the available resources. Knowing the governments role in the economy can particularly be seen through its direct interventional impact represented in the spending usually directed to fulfill the publics needs, there are different aspects of this spending and numerous effects on the national economy performance, As part of the practical study to the research we try to focus on the government spending's impact directed to the final consumption on the economic growth through a standard study applied on the Algerian economy during a period of time.

So the **problem** presented here is, what are the aspects of the government spending's impact directed to the final consumer on the economic growth?

The research significance

The importance of the search is in the following considerations:

♦ The issue of economic growth is considered the primary central task of the economic authorities that is constantly paid to search for its increase and continuation.

♦ The economic growth is considered the key to the society's development in all sectors; it's the source of the income increase, investment, consumption, employment and development in scientific, technical and artistic fields.

♦ The government spending is an important role in the developing countries for financing economic activities and growth.

♦ The quantitative techniques contribute in achieving a realistic approach credible to the suitability of the spending size with the economic activity's requirements and adjust the contribution of the various spending elements in the size increase of the economic growth.

The research objectives

We envisage through this search to achieve numerous important objectives:

♦ To stand on the government sector's role through various spending aspects in determining the overall economic activity indicators.

♦ Explain the importance of the government final consumption spending and its place among the other government spending aspects.

♦ Attempt to adjust the quantitative impact of the government final consumption spending

* Мекид Али, профессор, председатель ученого совета Факультета экономики и управления. - Университет г. Медеа, Алжир. E-mail: mekid_a@yahoo.fr.

on the economic growth and estimate its contribution to the GDP growth.

♦ Identify the experience of the public sector in Algeria and its role in stimulating demand and resulting totals and the contribution of final consumption spending of this sector to economic growth.

Study Methodology

Due to the nature of the study, we will rely on the descriptive analytical method, in order to analyze the concept of economic growth also highlight various aspects of the relationship between it and the government spending, we will resort on the other hand to quantitative techniques and standard methods to adjust the contribution of the government final consumption spending indicator to economic growth.

I. The concept of economic growth and government spending

1. Definition of economic growth

Most definitions revolve around the increased aggregate economic complex: GDP or national income, in addition to the individual's share of them, and to determine this we review the following definitions:

Economic growth is "a continuous increase in the GDP, in order to achieve an increase in the individual's average share in the real national income"[1].

According to the Economist S. Kuznets: "Economic growth is the increase in long-term capacity of the national economy and its ability to supply the population with varied goods"[2].

But according to economists, Samuelson and Nordhaus: "Economic growth is the expansion of GDP expected during resources fully employment, or the gross national product of a country"[3].

Economic growth is calculated mathematically as follows[4]:

$$Tc = \frac{PIB_t - PIB_{t-1}}{PIB_{t-1}} \times 100,$$

where Tc - the economic growth rate; PIB - **GDP**; T - time (the relevant year); t-1 - the year preceding immediately the relevant year.

2. The four components of economic growth

This item is a short answer to the following question: How can economic growth be achieved? We point at first that in spite of that fast-growing countries may be different in their own ways in which they can achieve rapid economic growth, However they share certain common features, the operation is essential for economic growth and development which has helped reach the success of both Britain and Japan, its the same process that we are experiencing the time being applied to developing countries, as in both China and India. In fact, the economists who have studied the process of economic growth have concluded that its necessary for the countries leaning on the development tractor to follow the same four components regardless of the wealth of these countries, and those four components for economic growth are as follows:

♦ Human resources (labor supply, education and training, regulation and incentives).

♦ Natural resources (earth elements, mineral, fuel and environmental quality).

♦ Capital formation (mechanization, factories and roads).

♦ Technology (science, engineering, management and business).

Economists usually deal with the relationship between the four components, according to the total production function, linking the GDP with production factors and technology, its algebraically function is formulated as follows

$$Q = A.f(K, L, R),$$

where Q - production; K - the capital's productive services; L - labor elements; R - natural resources elements; A - the technology level in the economy; f - production function.

3. Definition of public expense (government spending)

It's referred to as "The amount of cash the State or competent administrative authorities spend in order to satisfy the public needs"[5].

It appears from this definition, there should be three elements: spending amount of cash, the expense issued by a general juristic person, uses this expense to achieve public benefit. So that we can say its a public expense[6].

II. The government Consumption spending

Government consumption is a subset of the total government spending it includes all levels

of the government sector, Within the extensive definition it includes goods and services provided by the government to the public, it does not include subsidies and cash transfers, such as pension payments for the elderly or interest paid on the public debt, whereas in the narrow definition, its known as the actual government consumption, and restricted to spending on community services that benefit society as a whole without specific individuals or groups[7].

In order to perform its function the state spends money on the management of public facilities. The state purchases consumption services such as: health services, defense services, security and justice. That's what's called government consumption. And by it the state is considered a consumer when spending to fulfill the public needs, same as an individual is considered a consumer when spending on he's own needs. The government consumption is presented as purchasing goods and services relating to the performance of public function or commits to public employees or public facilities workers, in illustration the spending the state pays for cleaning, aluminizing and fixing its governmental buildings or public bodies, and the expenses paid to purchase devices, machinery and raw materials necessary for the public production. As well as there are times when the state provides food and clothing for its employees, like: food and clothes expenses for members of the armed forces, food expenses for teachers, transfer expenses of certain categories of employees and government workers, considering they're necessary for the public function's performance[8]. Such expenses are considered consumption, and no matter what type of government spending on goods and services it is, it definitely will lead to a change in direction or the uses of economic resources available to the community, and from there a change in the size and componants of the GDP, and as long as the state's spending on purchasing goods and services is willing to change the the size and componants of the GDP it became clear that it's able to use such type of public expense on the economic development and stability, and to reduce the sharp disparity between incomes[9].

Terminology about Consumption spending

The public spending is one of the ways that in which measures the national income, public spending includes both individuals consumption spending, government consumption spending, gross domestic investment[10]. We distinguish several types of consumption spending:

1. Intermediate consumer spending

We show several types in this context:

A. Intermediate consumption to producers of goods and services: This includes non-durable goods and services used in production, including the reform of capital assets, research and development , exploration and any other indirect payments relating the capital formation's financing sources, such as The cost of obtaining loans.

B. Intermediate consumption to producers of government services: it includes new purchases of goods and services on the current account minus net sales of second-hand goods and scrap (the remnants of the old goods) including durable goods purchased for military purposes.

C. Intermediate consumption to producers of private non-profit services: it includes new purchases of goods and services nondurable minus net sales of second-hand goods and scrap that have been received for the purpose of distribution to the families without modification or changing them[11].

2. Final consumption spending

Is the sum of productivity goods and services (food, clothing, furniture, transport ...) used to directly and immediately satisfy the needs of the resident non-producing agents. And matched by productive or intermidiate consumption which is defined as the sum of goods (other than equipment goods) and production services (produced or imported) used by the production units during the production process in the under study period[12]. The distinguished types are as follows:

A. Final consumption spending for families in the local market: it includes resident and non-resident families spending on durable goods and services minus net sales of second-hand goods and scrap or waste.

B. Private final consumption spending: it includes final consumption spending of private non-profit institutions serving households and Consumption spending for resident families. To illustrate more the final consumption spending of private non-profit institutions includes the value of goods and services produced for own use in current activity, it is equal to the total production value of these bodies minus net sales

of marketed and non-marketed, while the final consumption spending of the resident families includes spending of resident families on new durable and non-durable and service spending minus net sales for second-hand goods[13].

C. The government final consumption spending: (Final consumption spending of the public departments) is measured by the difference between the purchase of goods and services other than those involved in the accumulation of raw fixed assets and the necessary to operate the public administrations, and sales of goods and services that are not taken in the production branches. The so-called net consumption of management[14].

It is recalled that the government units or departments are divided into two sections: revenue units, which its revenue exceeds its spending, such as customs services, and the second section is the non-revenue units, which have small and limited revenues often spend on health and education[15].

The consumption spending falls within what the state spends on health, education, social inssurance, first aide, all these spending aime for the state to directly provide goods and services to members of the community, The individuals benefiting of these submissions are those who meet the conditions specified by the legislator, The important thing here is to look for the impact of these spending on economic growth. However, it should be noted that the part of the consumption spendind which is not an easy part though its called consumption spending it is in fact investment spending that will increase production capacity in the future and therefor increase the rate of economic growth, Although the impact on GDP in the short term is intangible. Spending on education, for example, would provide the economy with that guarantee him technological progress, which is the main factor of economic growth, In addition to supplying experted and necessary labor forces in the applied field in the economy of his goal or is seeking to take full advantage of the product of technological progress[16].

III. Production function used in the study

The starting point in this study of the other various models begins from the neoclassical production function, this function is commonly used in various studies, including what has been mentioned earlier in previous studies, and this to determine the relationships between government spending and, in particular, the final government consumption expenditure and gross domestic product for Algeria out of a considerable period, and study this relationship in various aspects.

This function takes the following shape

$$y = f(K, L, G),$$

so that y - gross domestic product; K - total fixed capital formation; G - the final government consumption expenditure.

So that f is characterized by the following features:

$$f_K, f_L, f_G > 0$$

$$The\ first\ partial\ derivatives;$$

$$f_{KK}, f_{LL}, f_{GG} < 0$$

$$The\ second\ partial\ derivatives.$$

We should point out that there is a very important point which consist of the differences in the various studies about the amount the value of government expenditure, in its final consumption part, which is entered in production function, therefore some studies determines the value of public expenditure as a percentage from the gross domestic product (G/y) like in this study of (landau 1986), some others determines the value of government expenditure as a ratio in government expenditure ($\partial G/G$) as like in the study of (Ram 1986), (Karrs 1989), nevertheless (Conte & Drrat 1988) has clarified that both methods can be used to determine the amount of government expenditure so it measures (G/y) the effect of public expenditure on the long run, whereas ($\partial G/G$) measures its impact on the short run[17].

In our study we take both effects, the first which is long run, and then we move to the model of short run which will conclude it from the first model, through following mathematic operations.

1. Presentation of the used long run model/

A. Mathematic construction of the model:

The long run equation can be written (government expenditure oriented toward final

consumption, as a percentage of gross domestic product) as the following:

$$y = f(K, L, g), \quad g = \left(G/_y\right),$$

$$f_g > 0, \qquad f_{gg} < 0.$$

Multi-model could be written:

$$y = \alpha + b_1 K + b_2 \left(G/_y\right) + b_3 L + \varepsilon_t$$

$$\boxed{y = \alpha + b_1 K + b_2 g + b_3 L + \varepsilon_t}.$$

B. The importance of the model in the study:

this model is considered to be multi standard model, including gross domestic product as follower variable explained by three independent variables, which are capital the amount of expenditure and employment, so it explains for us the long run relationship between domestic product and independents variables in a general and public expenditure specifically, taking it into account as a percentage from the product that is to say the effect of the increase of this expenditure comparing to the real domestic product. On the other side we use (Karrs) model for the short run as the following.

2. Display of the short-term user model

A. Mathematical derivation of the model:

In order to get this model we must go out starting from the previous model (Boxed on top), by taking the differential of this equation to time and then dividing it by (y):

Before differentiating (deriving) we point out:

Continued derivative -function's function: If $y = f(u)$ where (u) Is dependent to the variable mediator (x), the derivative of this Continued y to (x), is equal to derivative y to (u) multiplied by derivative (u) to (x).

We can symbolically formulate this as follow:

$$y = f(u)\,,\ u = f(x)\,,\ \frac{\partial y}{\partial x} = \frac{\partial y}{\partial u} \cdot \frac{\partial u}{\partial x}.$$

This reference is important, especially in the macro-economic models, and those that we are going to view, since the dependent variables are a function in the independent variables, which in turn (independent variables) are dependent in time variable (t).

Now we embark on the differential of the previous equation (Boxed) to time, We recall that the independent variables in the model to be differential, is a dependent (in time) to **(GDP)** dependent:

$$\frac{\partial y}{\partial t} = \frac{\partial y}{\partial K} \cdot \frac{\partial K}{\partial t} + \frac{\partial y}{\partial L} \cdot \frac{\partial L}{\partial t} + \frac{\partial y}{\partial g} \cdot \frac{\partial g}{\partial t}.$$

We divide the equation obtained on y, and neglect the time changing symbol (short-term =1):

$$\frac{\partial y}{\boldsymbol{y}} = \frac{\boldsymbol{\partial y}}{\boldsymbol{\partial K}} \cdot \frac{\boldsymbol{K}}{\boldsymbol{y}} + \frac{\partial y}{\partial L} \cdot \frac{\boldsymbol{L}}{\boldsymbol{y}} + \frac{\partial y}{\partial g} \cdot \frac{\boldsymbol{g}}{\boldsymbol{y}}.$$

We do some logical operations and some notations used in Economic Sciences:

$$\frac{\partial y}{y} = (\boldsymbol{PmK}) \cdot \frac{\partial K}{y} + \frac{\partial y}{\partial L} \cdot \frac{\partial L}{y} \cdot \frac{\boldsymbol{L}}{\boldsymbol{L}} + \frac{\partial y}{\partial (\boldsymbol{G}/_{\boldsymbol{y}})} \cdot \frac{\partial g}{y}.$$

Because the marginal productivity of capital (P_{mK}) equals $\frac{\partial y}{\partial K}$:

$$\frac{\partial y}{y} = (PmK) \cdot \frac{\partial K}{y} + \frac{\boldsymbol{\partial y}}{\boldsymbol{\partial L}} \cdot \frac{\boldsymbol{L}}{\boldsymbol{y}} \cdot \frac{\partial L}{L} + \frac{\partial y}{\partial (G/_y)} \cdot \frac{\partial g}{y};$$

$$\frac{\partial y}{y} = (PmK) \cdot \frac{\partial K}{y} + \left(\boldsymbol{E_{L/y}}\right) \cdot \frac{\partial L}{L} + \frac{\partial y}{\left(\frac{\boldsymbol{\partial G \cdot y - \partial y \cdot G}}{\boldsymbol{y^2}}\right)} \cdot \frac{\partial g}{y}.$$

Because labor flexibility $E_{y/L}$ equals $\frac{\partial y}{\partial L} \cdot \frac{L}{y}$:

$$\frac{\partial y}{y} = (PmK) \cdot \frac{\partial K}{y} + (\boldsymbol{E_L}) \cdot \frac{\partial L}{L} + \frac{\partial y}{\left(\frac{\boldsymbol{\partial G \cdot y}}{\boldsymbol{y^2}} - \underbrace{\frac{\boldsymbol{\partial y}}{\boldsymbol{y^2}} \cdot \boldsymbol{G}}_{\sim 0}\right)} \cdot \frac{\partial g}{y};$$

$$\frac{\partial y}{y} = PmK \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + \frac{\partial y}{\left(\frac{\partial G}{y} - 0\right)} \cdot \frac{\partial g}{y};$$

$$\frac{\partial y}{y} = PmK \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + \frac{\partial y}{\partial G} \cdot \partial g;$$

$$\frac{\partial y}{y} = PmK \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + (PmG) \cdot \partial g.$$

Because the marginal productivity of government final consumption spending $Pm\,G$ equals $\frac{\partial y}{\partial G}$.

$$\frac{\partial y}{y} = PmK \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + + PmG \cdot \partial g \cdot \frac{g}{g};$$

$$\frac{\partial y}{y} = PmK \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + + PmG \cdot \frac{\partial g}{g} \cdot g;$$

$$\frac{\partial y}{y} = (PmK) \cdot \frac{\partial K}{y} + E_{y/L} \cdot \frac{\partial L}{L} + + PmG \cdot \left(\frac{\partial g}{g}\right) \cdot \left(\frac{G}{y}\right);$$

$$\boxed{\frac{\partial y}{y} = (PmK)\left[\frac{\partial K}{y}\right] + \left(E_{y/L}\right)\left[\frac{\partial L}{L}\right] + + (PmG)\left[\frac{\partial g}{g} \cdot \frac{G}{y}\right]}.$$

And it's the custom form for the short-term, which is estimated in the midst of its parameters on the study applied, To illustrate the structure of the form (boxed) "its kind, its parameters and variables" we show:

♦ Independent variables are all between the two square brackets in the last equation. The dependent variable is the rate of GDP growth $y = PIB$.

♦ As between the parentheses model parameters (constants after evaluation).

B. The importance of the estimated model in the study:

The evaluation of the previous model (short term model) will enable us to answer two important questions presented respectively:

Is government spending directed to final consumption, in Algeria productive or nonproductive?

The hypothesis that we seek to validate or prove to be incorrect and Versus are as follows:

♦ **The null hypothesis**: Government spending directed to final consumption in Algeria is productive, which means that the marginal productivity of government final consumption expenditure equals zero.

♦ **The first alternative hypothesis:** Government spending directed to final consumption in Algeria is productive, which means that the marginal productivity of government final consumption expenditure is greater than zero[18].

♦ **The second alternative hypothesis:** This spending inhibitor (yield negative) to economic growth, when its marginal productivity is negative.

So the analytical base for this test takes studying the possibility of increasing total output by adding units of government final consumption expenditure, Or not. If the total output increases with the increase of add-on modules of this spending. This is proof that spending contributes in economic growth, regardless of whether the increase is diminishing or increasing the total output (the subject of the second test). If the productivity does not respond to the increase in spending, we say that it's nonproductive. Or that the increase was an economical waste and does not affect the economic growth.

Is the size of government spending directed to final consumption in Algeria appropriate in terms of macro-economic?

We put the hypotheses posed to the test as follows:

♦ **The null hypothesis**: Government spending directed to final consumption in Algeria is appropriate, meaning that the marginal productivity of this spending is equal to one, and this is called the (Barro R.) law.

♦ **The first alternative hypothesis:** The spending concerned, in Algeria is more than should be, this is from the standard side, Means that the marginal productivity is less than one.

♦ **The second alternative hypothesis:** This spending is less than it should be, and as standard proof on this is that the marginal productivity is larger one[19].

Naturally that pass through the first test is necessary so that we can make the second test, in one case, we can only progress when doing the first test which is when we prove the first alternative hypothesis (in contrast prove the

negation of The null hypothesis and second alternative hypothesis).

The case of non-passage of the second test (the rejection of the first alternative hypothesis in the first test) gives us a judgment on the next test automatically by accepting the first alternative hypothesis for this test (the second test), this is regarding the experimental method.

Regarding the economic analysis of the nature of this test, it involves on marginal analysis strategy comparing with the one, spending an additional unit dragges three possibilities:

♦ Increase GDP (occurrence of economic growth) one unit, that is, spending appropriately.

♦ Increase GDP (occurrence of economic growth) less than one unit, it means the increase in government spending goes down depending on the yield, and therefore the government expenditure is greater than it should be. (Ignoring the situation where the increase in national output is negative and thus the lack of economic growth, because this is the subject of the first test.)

♦ Increase GDP (occurrence of economic growth) more than one unit, meaning the government spending is a good Stimulator to economic growth and thus is less than it should be and does not reach the required level.

3. Sample determining the optimal size of spending.

A. mathematical structure of the model:

So as to get the optimal size of government spending, we assume that the value of the marginal productivity of government spending is equal to the correct one $(PmG = 1)$ to continue we put the following formula:

$$PmG = \frac{\zeta}{g}.$$

Where:

$$\zeta = \frac{\partial y}{\partial G} \cdot \frac{G}{y};$$

$$g = \frac{G}{y}.$$

To verify:

$$\frac{\zeta}{g} = \frac{\frac{\partial y}{\partial G} \cdot \frac{G}{y}}{\frac{G}{y}} = \frac{\partial y}{\partial G} = PmG.$$

Rationally:

$$MpG = 1 \Leftrightarrow \zeta = g.$$

Reformulating the short term model:

$$\frac{\partial y}{y} = (PmK)\left[\frac{\partial K}{y}\right] + E_{y/L}\left[\frac{\partial L}{L}\right] + (PmG)\left[\frac{\partial g}{g} \cdot \frac{G}{y}\right];$$

$$\frac{\partial y}{y} = (PmK)\left[\frac{\partial K}{y}\right] + E_{y/L}\left[\frac{\partial L}{L}\right] +$$

$$+\left[(PmG)\left(\frac{G}{y}\right)\right] \cdot \left(\frac{\partial g}{g}\right).$$

Compensate the amount formerly named "Zeta" we get:

$$\boxed{\frac{\partial y}{y} = (PmK)\left[\frac{\partial K}{y}\right] + E_{y/L}\left[\frac{\partial L}{L}\right] + \zeta\left[\frac{\partial g}{g}\right]}.$$

This other model from three independent variables are also required to estimate, as the framed formula shows that all what between the two square brackets is the independent variables. And its transactions are constants estimation, whereas the dependent variable is the rate growth in GDP.

B. The use of the model from economic terms:

The importance of this model is in the parameter *Zeta* And which reflects the the optimal size of government spending directed for final consumption of GDP.

After estimating ζ Within estimating the model as a whole, and comparing it with an average optimal size of government spending directed for final consumption in most countries of the world, which hits according the study by (*Karrs*) about 23% .

IV. The inventory and measure the variables of the study applied

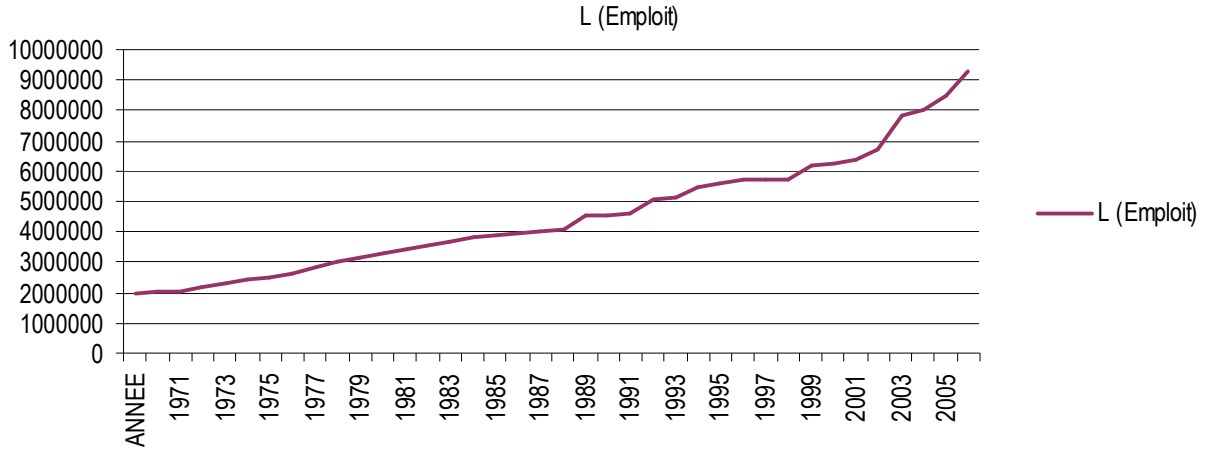
In this section we address the definition of the basic variables (prior to any conversion) used, and then illustrate the calculations that we make from the raw data; Parallel to explain the sources of these data.

1. Labor and other nominal variables, in Algeria.

A. Labor in Algeria:

The National Bureau of Statistics O. N. S. provides the annual data of labor in Algeria, where we relied on a statistical series extended from a year 1970 up to 2007. The following is a graphical representation of this series, which give us a quick idea about the development of the annual labor in Algeria in the period in question (shape 1).

We note that labor operated in Algeria, witnesses a constant rise, but from 1970 to 1990,



Shape 1. **Graphical representation of the labor force in Algeria**

Source: Prepared by the researcher depending on the ONS data /STATA.11 program.

was less volatile, but the period from 1990 to 2007, has seen fluctuations ranging between stability and increase, with the absence of any reduction, noting that after the year 2000, Labor began to rise with greater rates compared to previously.

Nominal variables used

These variables were collected under this heading because valued by the Algerian dinar, and therefore considered nominal variables, including price inflation, and this raises the need to fix this issue, which we address it later, and there is three variables, mention as follows:

♦ **Gross Domestic Product (PIB):** Depending on leaflets of the National Bureau of Statistics, we gathered statistics on the values of GDP, valued by the Algerian dinar, in addition to relying on the National Bureau of Statistics online to complement the statistical series, the fact that the publications obtained stop in 2004, and thus became the chain obtained extends through the period 1970 until 2007.

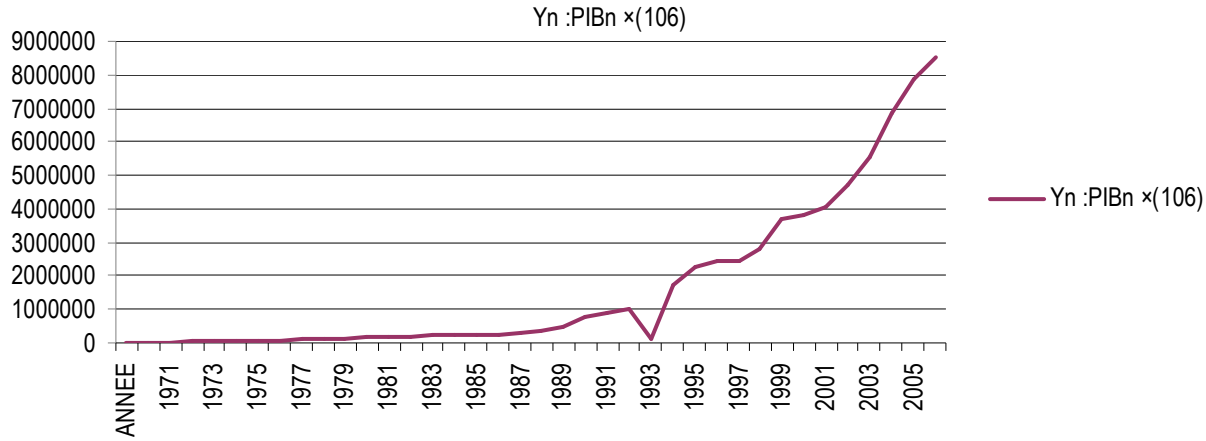
To give a fictitious idea of the evolution of this economic indicator in Algeria we represent it graphically according to time (years of study) as shown in Figure (shape 2).

Through the curve, it appears that the GDP distinguish annual simple altitudes, With a more stable trend, but it clearly shows, this decline in the mid-nineties, then began to rise with its highest rates and no decrease mentioned.

♦ **Fixed capital (K):** This indicator offset in Algeria the accumulation of fixed capital, which is symbolized by ABFF, data were obtained from the index tables national overall accounting, And located in the National Bureau of Statistics publications, in addition to the use of the National Bureau of Statistics site on the Internet.

It is worth noting that it is intended by **accumulate raw fixed assets ABFF:**

Spending by producers of goods and services and producers of government services and private entities that are non-profit institutions and serve households, addition to



Shape 2. **Graphical representation of GDP in Algeria**

Source: Prepared by the researcher depending on the ONS data /STATA program.

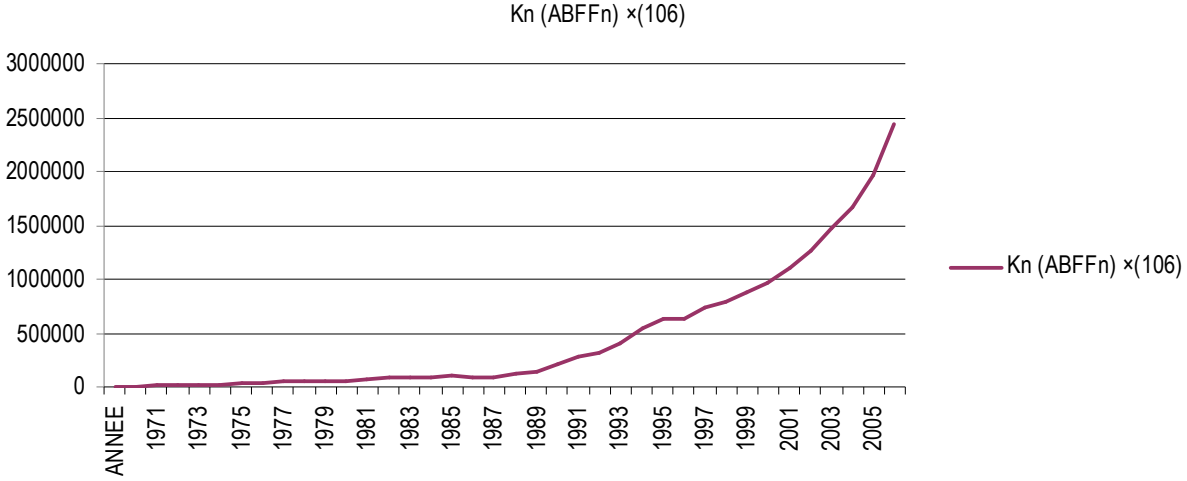
capitals whether purchased or self-produced minus net sales from used assets and scrap (waste) not including spending on durable goods for military purposes, It also includes operations under implementation, construction projects and capital repairs, and spending on improving the land and agriculture, which lasts for more than a year not including the purchase price of land.

We represent this indicator in simulation to previous indicators, the results are shown in the following figure (shape 3).

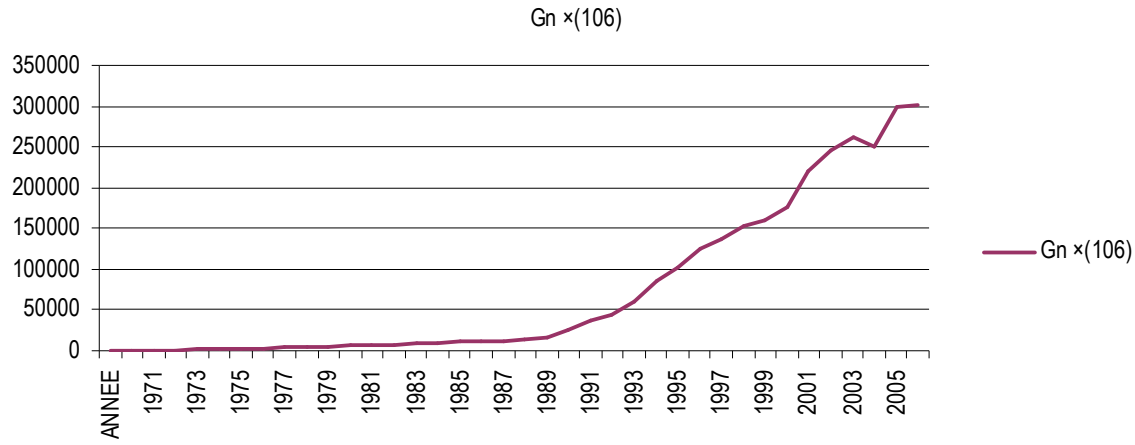
From the former curve we can distinguish two main stages in the evolution of accumulation of gross fixed capital formation (ABFF), the first phase starts from the year 1970, to the beginning of the nineties, and the second phase starts from the beginning of the nineties until 2007, or we can say to the present days, where the second stage was characterized by annual heights in a row, and much stronger than the first phase, which was characterized by its stable tendency and weak growth rates for fixed capital.

♦ **government final consumption expenditure (A)**: we obtained the data for this variable from macroeconomic table TEE of national accounting, and in the publications of the National Bureau of Statistics, which cleared prior long periods, Or through its website for the modern periods; and we decided to take the final expenditure corresponding to the public administrations to express government consumption spending, according to the provided by these tables, as is the case in previous variables this period has been covered of the variable in the period 1970 to 2007, the most recent period that we were able to manage ,and which prevented to update the period of study more as well as the labor variable in Algeria, which in turn, there was a difficulty in finding them in recent periods.

In the following figure is a graphical representation showing the evolution of government spending directed for final consumption in Algeria (shape 4).



Shape 3. **Graphical representation of the accumulation of raw fixed capital in Algeria**
Source: Prepared by the researcher depending on the ONS data /STATA program.



Shape 4. **Graphical representation of the government final consumption expenditure in Algeria**
Source: Prepared by the researcher depending on the ONS data /STATA program.

We apply to this curve what had been said about the curve previously only some slight differences, as the post-nineties the growth rates of government spending directed for final consumption promoted, and accelerated in a very strong way, after it was characterized by stability and weak growth rate, in the second stage we register a simple drop, in the middle of the first decade of the second millennium (the previous decade) quickly went back to the same frequency of the previous increase.

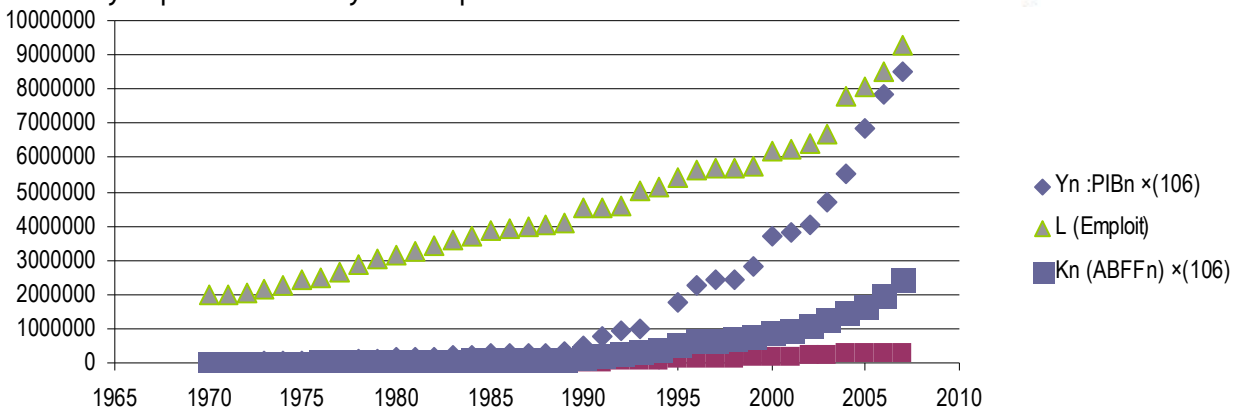
For a quick comparison, between these variables with the exception of labor due to the different units of measurement, we represent the three variables measured only by the Algerian dinar , in one graph to illustrate the various annual developments , and the result appears as follows (shape 5).

The figure shows structural changes in each of these variables, and generally paints a two phases with clear landmarks, which are phase 1970-1990, and phase 1990 and beyond, the first phase was characterized by severe relative affinity between these variables in terms of quantity, but in 1990, formed the source from which it exploded different variables and gained a tendency to rise rapidly, abandoning its slow-growing tendency, This is due to the improvement in oil prices after the crisis of 1986, especially since the Algerian economy depends extremely on the proceeds of fuel, of course, the GDP exceeds both other variables , followed by fixed capital, and in the latter comes government spending directed for final consumption, which constitutes a small percentage if compared to others.

B. Some descriptive standards of the basic data:

By drawing on some measures of descriptive statistics, to give a simplified and summarized idea on the previous variables, and among standards, we rest on the arithmetic average (to describe the central tendency), standard deviation (to describe the dispersion), the minimum value, and the maximum value, and this is for each of the variable, in addition to the number of samples , we summarize all this in the following table.

We observe that the sample size (years of study) reaches 38 samples which is long enough for standard studies, All variables reaches their lowest level in 1970, its the beginning of the study period, with a greater level in the year 2007 and this is due to the continuous rise in each variable as we have seen previously. The table shows the arithmetic average, and by comparing the standard deviation of the measured variables by the Algerian dinar , we note that the PIB, distinguish the largest deviation, followed by L, then G If we go down



Shape 5. **Graphical representation of the combined nominal variables. Measurement unit: Algerian dinars (DZ.A)**

Source: Prepared by the researcher depending on the ONS data / Excel program.

A descriptive summary of the original variables

	PIB	L	K	G
average	1653975615789	4531997	462486792105	74055344737
Standard deviation	2357245498158	1921387	614356935431	97753786454
Minimum	21210200000	1983200	8160400000	649400000
Maximum	8523745600000	9300000	2444911700000	300236500000
Number of samples	38	38	38	38

Source: Prepared by the researcher /Excel outputs.

a little deeper in the meaning of each of the arithmetic average and standard deviation, we offer the following, so that we can understand the table realistically:

The arithmetic average as a value keeps the sample measurement unit, It shows total samples divided by its number, and thus it shows the equal share per-sample, and its importance increases because it is used in other accounts, And therefore the interpretation of the standard deviation, so it should be noted that the standard deviation is preferred over disparity as a means of measuring the dispersion, because the standard deviation unit is the same as the of in the sample measurement unit , the question here, how do we explain the standard deviation as a way to explain the dispersion of data?

In this regard "Tchebysheff " proved that any set of data that At least 75% of samples should rest within two standard deviation units (2σ). Away from the average $(\bar{x} \pm 2\sigma)$ and that at least 89% of samples should rest within three standard deviation units from the average In general, it has proved to be at least $100\left\{1 - \left({}^{1}/_{K^2}\right)\right\}\%$ of samples should rest within *K* standard deviation units from the average, meaning: $(\bar{X} \pm K \cdot \sigma)$[20].

2. Conversion to real variables (variables at constant prices).

As noted earlier, the nominal variables that are subject to inflation in prices, which we have to convert to real variables, by dividing it on the number of consumption prices (IPC).

As Based on statistical series, extending from 1970 until 2007, in particular consumer price index, the basis is the year 1989, (IPC1989 =100%) we converted the variables that are subject to the impact of the price, or the so-called inflation, they are called nominal variables Which of those measured in Algerian dinars, or at current prices without taking into account the decline in the purchasing power of the currency (the Algerian dinar), and therefore our goal of this treatment is the transformation of nominal variables, to real variables by extracting the impact of the price, and get an overall indicator with better reflect on the status of the variables involved.

That produces three real variables, which are real GDP, and real government final consumption expenditure, in addition to the accumulation of real capital.

The labor is a variable which isn't measured by money, (but it may be measured sometimes in monetary units such as wages, for example, but there are many reservations about this method, as a factor of inflation, for example), and therefore are measured per unique workers, which are one of the views the is approved to use as measure in this area, where there is also for example, measuring hours of work that is also not subject to the change in prices, but each method has drawbacks and positive aspects, here we chose measuring per unique worker due to the nature of the data available to us, that is published by the National Bureau of Statistics, and is better than the other methods when speaking at the aggregate level.

This is on the basis that any macroeconomic indicator is calculated at current prices if its quantities are multiplied by the price on the same date, and it becomes by constant prices, by multiplying the amount in current prices divided by the price index[21].

V. Some of the effects of the government final consumption expenditure

To see some of the effects of government spending directed for final consumption for economic growth, we estimate the models described above and for this purpose, which are collecting models, as follows:

1. The impact of the volume of government final consumption expenditure on output.

As a reminder of the model required appreciation we write as follows:

$$y = \alpha + b_1 K + b_2 g + b_3 L + \varepsilon_t,$$

$$g = \left({}^{G}/_{y}\right).$$

Through this model we study the impact (effect) of the volume of government final consumption expenditure as a percentage of gross domestic product (GDP), in the latter, which is one of the different approaches to measure the volume of this impact.

The outputs of the program **STATA.11**, for estimating this model are showed in supplement n° 1, and writing it to the model are summarized as follows:

$$y = (-1531.599) + (2.10210)K -$$
$$t: \quad (-8.13) \qquad (7.96)$$
$$F = 510.69 \qquad DW = 1.128$$
$$-(10475.91)g + (0.00077)L.$$
$$(-9.75) \qquad (8.42) \quad ;n = 38$$
$$R^2 = 97.83\% \quad \overline{R^2} = 97.64\ \%$$

♦ **Economic evaluation of the model:**

The signal of parameters for both labour and capital is showed positive, this signifies the acceptation of the model economically, while the negative sign of parameter of the second independent variable, which expresses the ratio of the government final consumption expenditure of gross domestic product (GDP), can be explained that the increase of this kind of spending compared with other aspects of government spending leads to a negative impact on GDP.

♦ **Statistical evaluation:**

As usual, before any statistical evaluation, we must prove the multiple correlation, using multiple correlation coefficient which equals here, $R = 98.81\%$ $(\sqrt{0.9764})$, this indicates a strong correlation between the dependent variable on a hand and the independent variables on the second hand, and on other hand the coefficient of determination debugger R= 97.64 % shows that the independent variables explain, in large rate, the changes in the dependent variable, we measure the total significance of the model using Fisher statistic which shows that $F_{CAL} = 510.69 > F_{Tab} = 2.87$, which proves that the model as a whole is significant and not random, going to Student statistics, these calculated statistics in absolute value exceed $t_{Tab} = 2.03$, so all the parameters are significant from the statistical point, thus the related independent variables actually contribute to the interpretation of the dependent variable on a hand, on the other hand the test Durbin-Watson shows a correlation of errors certain positive, because $d_L = 1.32 > D\text{-}W_{Cal} = 1.128$.

After modifying variables in a Durbin manner, we use it in new estimate, maintaining the same model, the outputs of the statistical program, appear in supplement n° 2, we write as follows abbreviated form of the regression model:

$$y = (-900.6864) + (2.03444)K -$$
$$t: \quad (-5.43) \qquad (5.86)$$
$$F = 267.60 \qquad DW = 1.682$$
$$-(9267.74)g + (0.00078)L.$$
$$(-10.92) \qquad (6.33) \quad ;n = 37$$
$$R^2 = 96.05\% \quad \overline{R^2} = 95.69\ \%$$

♦ **The economic study:**

The model is generally acceptable in economic terms, because both of labour and capital are positive, and shows that both labour and capital influence positively GDP. However, the parameter of government final consumption expenditure taken as a percentage of GDP is negative, this indicates that the allocation of a large portion of GDP for expenses of nature of final consumption, leads to a negative impact on GDP and thus on economic growth. These interpretations are meaningful if this model passed the following statistical study.

♦ **Statistical study:**

We start first with the test of the existence of multiple correlation between the dependent variable and the other independent variables, where this coefficient is estimated (R=97.82%) and it is evidence of a strong multiple correlation, through the study of total statistical significance for the model taking Fisher calculated statistic and comparing it with those tabular (F_{Tab} =2.87), we note that the tabular statistic is lower than those calculated, and therefore we accept the model initially, because it is not subject to random. By reference to the coefficient of determination debugger, we note that is large and indicates that 95.69% of the change in GDP is explained by the change in both labor and fixed capital and government final consumption expenditure, and therefore they have a positive total impact. To know the statistical significance of each of them separately go to Student confinement test for each parameter, as the critical Student statistic t_{Tab}=2.03, all the Student statistics calculated and in absolute value of the independent variables are greater than its tabular value, thus the explanatory variables have a statistical significance. Statistical evaluation improved after the model was suffering before from the existence of autocorrelation of errors, where we note that the new Durbin-Watson statistic is in the area of absence of autocorrelation of errors because $d_L = 1.32 < d_U = 1.66 < D\text{-}W_{Cal} = 1.682$. That is to say, the calculated Durbin-Watson statistic exited the area of presence of correlation and entered in the area of absence of autocorrelation of errors.

2. The suitability and productivity of government spending directed for final consumption.

It is okay to remember the model to be estimated as follows:

$$\frac{\partial y}{y} = a + (PmK)\left[\frac{\partial K}{y}\right] + (E_{L/y})\left[\frac{\partial L}{L}\right] + + (PmG)\left[\frac{\partial g}{g}\cdot\frac{G}{y}\right],$$

with $g = G/y$,

where y - gross domestic product GDP;

K - total accumulation of fixed capital;

G - government final consumption expenditure;

$E_{L/y}$ - elasticity of labour, for output;

PmG - marginal productivity of government spending directed for final consumption.

We write the estimated model attached with the most important indicators and statistics extracted from the results of the assessment, which appear in supplement n° 3 as extracted from the program stata.11 as follows:

$$\frac{\partial y}{y} = (0.06642) + (0.95077)\left[\frac{\partial K}{y}\right] +$$

$$t: \quad (1.73) \qquad (-1.46)$$

$$F = 20.32 \qquad DW = 2.099$$

$$+ (0.28008)\left[\frac{\partial L}{L}\right] - (2.055)\left[\frac{\partial g}{g}\cdot\frac{G}{y}\right],$$

$$(0.40) \qquad (-5.12) \qquad ; \; n = 37$$

$$R^2 = 64.88\ \% \qquad \overline{R^2} = 61.69\ \%$$

♦ **Economic study:**

From the economic terms, the estimated model is acceptable to a large extent, due to the positive signal of parameter of the change in capital relative to GDP, as well as for parameter of the change in employment relative to GDP, which reflects the flexibility (elasticity) of GDP relative to labour (from the definition of the model), and it is less than one, thus it reflects the diminishing returns of labour, however, the third parameter which represents the marginal productivity of government final consumption expenditure, shows that this variables is at the stage of negative yield.

♦ **Statistical study:**

Multiple correlation coefficient R=78.54 %, it allows the assessment of correlation in the model in its multi-form, and it shows that there is an acceptable correlation relationship. Fisher test of the model as a whole shows the total statistical significance of the model, where tabular Fisher statistic (F_{Tab}=2.87), and it is smaller than those calculated appeared in the model, while the coefficient of determination debugger is less than 70%, thus it is characterized by a somewhat weakness. Deepen to Student test for parameters of solo shows the significance of only the third variable, because (t_{Tab}=2.03), but the two other variables are insignificant, and it indicates the invalidity of the model, this model has been reached from the previous model. Since they are two linear models (synthesis), we can restart from the previous model and delete the first and the second independent variables to reach the current model without the two variables apparent insignificant. Estimate this model and the results appear through supplement n° 4, so we write the abbreviated writing of the model and the annexed statistics as follows:

$$\frac{\partial y}{y} = (0.09728) -$$

$$t: \qquad (4.16)$$

$$F = 57.36 \qquad DW = 1.89$$

$$- (2.43559)\left[\frac{\partial g}{g}\cdot\frac{G}{y}\right]$$

$$(-7.57) \qquad ; \; n = 37$$

$$R^2 = 62.10\% \qquad \overline{R^2} = 61.02\%$$

♦ **Economic study:**

The model is acceptable from the economic point, because it does not contain that breaches economic theory.

♦ **Statistical study:**

Correlation is available in variables where R = 78.11%. The coefficient of determination debugger shows a relationship not strong, calculated Fisher statistic is greater than the tabular F_{Tab}=2.83, where Student statistic for parameters shows the statistical significance of explanatory variable and the fixed, where t_{Tab} = 2.02. Finally, Durbin-Watson statistic shows the total absence of correlation between errors in the estimated model, where d_L = 1.43 < < d_U = 1.54 < DW_{Cal} = 1.89 < 4 - d_U = 2.46.

What we are interested in this model is the parameter that represents the marginal productivity of government final consumption expenditure, which appears significant in the model and equals (-2.43559), thus it benefits us in testing hypothesis previously mentioned of this model:

1. The first test: we accept the second alternative hypothesis, because the marginal productivity of government final consumption

expenditure is less than zero, and therefore, this spending is nonproductive, and is an inhibitor for economic growth;

2. The second test: we accept the first alternative hypothesis, because the marginal productivity of government final consumption expenditure is less than one, and therefore, this spending is greater than it should be, which means that each increase in this spending does not increase the economic growth.

3. The optimal volume of government spending directed for final consumption.

A. Estimating of the special model:

In order to measure the optimal volume of government spending directed for final consumption in Algeria, and comparing it to the universal optimal volume of 23% according to Karss study, we estimate the special model of this situation, which we remind as follows:

$$\frac{\partial y}{y} = \alpha + (PmK)\left[\frac{\partial K}{y}\right] + E_{L/y}\left[\frac{\partial L}{L}\right] + \zeta\left[\frac{\partial g}{g}\right],$$

with $g = (G/y)$.

As usual, we estimate the model, and proceeding from supplement n°5 demonstrating the results of the estimation, we write the model in the usual form below:

$$\frac{\partial y}{y} = (0.05435) + (2.20307)\left[\frac{\partial K}{y}\right] -$$

$$t: \quad (1.77) \qquad (5.08)$$

$$F = 36.37 \qquad DW = 2.368$$

$$-(0.41512)\left[\frac{\partial L}{L}\right] - (0.66749)\left[\frac{\partial g}{g}\right]$$

$$(-0.73) \qquad (-7.52)\ ;\ n = 37$$

$$R^2 = 76.78\% \quad \overline{R^2}74.67\%$$

♦ **Economic study:**

Despite the positive parameter of the coefficient of variation (change) in fixed capital relative to GDP, the coefficient of parameter of growth in employment appears negative, and the signal of parameter Zeta, appears negative -0.66, makes us reject this model from the economic point, which is not compatible with what we are going to test. Thus we reject the model from the economic terms, and to see if these results are statistically significant, we undertake the following statistical study.

♦ **Statistical study:**

From the statistical terms, the model is acceptable, because the critical value of Fisher F_{Tab}=2.87 is less than the calculated Fisher statistic, in addition to the amended coefficient of determination appears somewhat acceptable, where it expresses that 74.67% of the change (variation) in the dependent variable explained by the independent variables. The Student statistics shows the insignificancy of parameter of growth in employment because t_{Tab}= 2.042, and it is greater than t_{Cal} = 0.73 in absolute value for this parameter. The Durbin-Watson test shows the absence of autocorrelation of errors because the calculated Durbin-Watson statistic is greater than d_U=1.66, and less than 4 - d_U = = 4 - 1.66 = 2.34, being a two-sided test, and it is the scope of rejecting H_0.

B. Structural adjustment of the model:

Like what we did in the previous model, we delete the variable which its parameter is insignificant, then we re-estimate, and we'll see the extent of reality of the model for what please access. The results of assessment are demonstrated in supplement n°6, we write the model in the following form:

$$\frac{\partial y}{y} = (0.03727) + (2.14692)\left[\frac{\partial K}{y}\right] -$$

$$t: \quad (1.90) \qquad (5.06)$$

$$F = 55.05 \qquad DW = 2.296 \qquad R^2 = 76.41\ \%$$

$$-(0.65761)\left[\frac{\partial g}{g}\right]$$

$$(-7.55) \quad ;\ n = 37$$

$$\overline{R^2} = 75.02\ \%$$

♦ **Economic study:**

The model is acceptable from the economic terms, because it does not conflict with economic assumptions. If we target directly the parameter of the second independent variable (Zeta), we find that it does not correspond with what we are going to test, because it is negative and therefore didn't change.

♦ **Statistical study:**

The multiple correlation is R=86.61 %, which indicates its quality and strength relatively. The model is totally significant, and this is expressed by Fisher statistic F_{Cal} = 55.05 > F_{Tab} = 3.26. This is because all calculated Student statistics of parameters are greater than the critical Student statistic t_{Tab} = 2.02. Thus these parameters are significant, therefore the independent variables explain the dependent variable.

For its part, Durbin-Watson statistic shows us the absence of autocorrelation of errors, because: d_U = 1.59 < DW_{Cal} = 2.296 < 4 - d_U = 2.41.

We note that the parameter of the variable $\overline{g}$ was appearing negative (in the two last estimates), this is due to that we are in one of the previous models, it is:

$$y = \alpha + b_1 K + b_2 g + b_3 L + \varepsilon_t.$$

We found the negative relationship between both g and y, thus growth in the two variables i.e. $\frac{\partial g}{g}$ and $\frac{\partial y}{y}$ also maintains the negative relationship, this is to check the non-contradiction of two collective models which only one is derived from the other.

Recap

From the above, the analysis of models used showed that the government spending directed for final consumption does not dramatically affect the national output (product), also seemed it exceeds the necessary and its productivity is negative, therefore, it is a retarder of economic growth. This is due to the ineffectiveness of this type of spending nowadays, thus expanding it without justification at the expense of other spending is harmful for national product and thus economic growth, so a qualitative improvement in aspects of that kind of spending is better - ultimate consumer spending - rather than the increase in its quantity, because the effect would be double, on the hand, it will affect its alternative distribution - in other aspects of spending non consumerist - in addition to the negative impact resulting from its increase on the required level, as it turns out in the econometric models.

Annexes

Annexe 01:

```
. tsset annee
        time variable:  annee, 1970 to 2007
                delta:  1 unit
. reg Y K g L
```

Source	SS	df	MS		
Model	295552902	3	98517634.1	Number of obs	= 38
Residual	6558909.29	34	192909.097	F(3, 34)	= 510.69
				Prob > F	= 0.0000
				R-squared	= 0.9783
				Adj R-squared	= 0.9764
Total	302111812	37	8165184.1	Root MSE	= 439.21

Y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
K	2.102104	.2710285	7.76	0.000	1.551308	2.652901
g	-10475.91	1074.553	-9.75	0.000	-12659.66	-8292.156
L	.0007718	.0000917	8.42	0.000	.0005856	.0009581
_cons	-1531.599	188.2899	-8.13	0.000	-1914.25	-1148.948

```
. dwstat

Durbin-Watson d-statistic(  4,    38) =  1.128826
```

Annexe 02:

```
. reg Yp Kp gp Lp
```

Source	SS	df	MS		
Model	118455301	3	39485100.3	Number of obs	= 37
Residual	4869303.85	33	147554.662	F(3, 33)	= 267.60
				Prob > F	= 0.0000
				R-squared	= 0.9605
				Adj R-squared	= 0.9569
Total	123324605	36	3425683.46	Root MSE	= 384.13

Yp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Kp	2.034448	.3470981	5.86	0.000	1.328272	2.740625
gp	-9267.74	848.7987	-10.92	0.000	-10994.63	-7540.847
Lp	.0007859	.0001241	6.33	0.000	.0005334	.0010385
_cons	-900.6864	165.7252	-5.43	0.000	-1237.857	-563.5159

```
. dwstat

Durbin-Watson d-statistic(  4,    37) =  1.682252
```

Annexe 03:

```
. tsset annee
        time variable:  annee, 1971 to 2007
                delta:  1 unit
. reg cY dKY cL W
```

Source	SS	df	MS	Number of obs =	37
				F(3, 33) =	20.32
Model	1.1848559	3	.394951966	Prob > F =	0.0000
Residual	.641332007	33	.019434303	R-squared =	0.6488
				Adj R-squared =	0.6169
Total	1.8261879	36	.050727442	Root MSE =	.13941

cY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dKY	.9507791	.6497324	1.46	0.153	-.3711114	2.27267
cL	.2800822	.6933762	0.40	0.689	-1.130602	1.690767
W	-2.055257	.401714	-5.12	0.000	-2.87255	-1.237964
_cons	.0664275	.0385044	1.73	0.094	-.0119103	.1447653

```
. dwstat

Durbin-Watson d-statistic(  4,    37) =  2.099421
```

Annexe 04:

```
. reg cY  W
```

Source	SS	df	MS	Number of obs =	37
				F(1, 35) =	57.36
Model	1.13415172	1	1.13415172	Prob > F =	0.0000
Residual	.692036181	35	.019772462	R-squared =	0.6210
				Adj R-squared =	0.6102
Total	1.8261879	36	.050727442	Root MSE =	.14061

cY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
W	-2.435598	.3215884	-7.57	0.000	-3.088457	-1.782739
_cons	.0972881	.0234022	4.16	0.000	.0497791	.144797

```
. dwstat

Durbin-Watson d-statistic(  2,    37) =  1.896404
```

Annexe 05:

```
. tsset annee
        time variable:  annee, 1971 to 2007
                delta:  1 unit

. reg  cY  cL  dKY  cg
```

Source	SS	df	MS	Number of obs =	37
				F(3, 33) =	36.37
Model	1.40213638	3	.467378792	Prob > F =	0.0000
Residual	.424051807	33	.012850055	R-squared =	0.7678
				Adj R-squared =	0.7467
Total	1.82618818	36	.05072745	Root MSE =	.11336

cY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cL	-.4151249	.5704964	-0.73	0.472	-1.575809	.7455588
dKY	2.203077	.4340518	5.08	0.000	1.319992	3.086162
cg	-.6674968	.088805	-7.52	0.000	-.8481718	-.4868217
_cons	.0543509	.0306644	1.77	0.086	-.0080363	.1167381

```
. dwstat

Durbin-Watson d-statistic(  4,    37) =  2.368327
```

Annexe 06:

```
. reg  cY  dKY  cg
```

Source	SS	df	MS	Number of obs =	37
				F(2, 34) =	55.05
Model	1.3953325	2	.697666248	Prob > F =	0.0000
Residual	.430855687	34	.012672226	R-squared =	0.7641
				Adj R-squared =	0.7502
Total	1.82618818	36	.05072745	Root MSE =	.11257

cY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dKY	2.146923	.4241707	5.06	0.000	1.284904	3.008941
cg	-.657611	.0871503	-7.55	0.000	-.8347217	-.4805004
_cons	.0372747	.0196008	1.90	0.066	-.002559	.0771083

```
. dwstat

Durbin-Watson d-statistic(  3,    37) =  2.296492
```

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