The Relationship between government expenditure and gross domestic product in Algeria. Test study for Wagner's law and Keynesian hypothesis during the period 1991-2015

Dr.Melikaoui Mouloud [1]

Bordj Bou Arreridj University - Algeria
melikaouim@yahoo.fr

Abstract:

The present study aims to investigate the causal relationship between government expenditure and gross domestic product in Algeria during 1991-2015 and to try both the Keynesian hypothesis and the Wagner's law, by analyzing regression using the statistical program (SPSS). The results of the study have showed that government expenditure negatively affects GDP, and this is not consistent with the economic theory and thus not realization of the Keynesian hypothesis. The study also found that the Keynesian hypothesis was not achieved by using the economic classification of expenditures in Algeria. Also, the results of the study showed that gross domestic product (GDP) negatively affects government expenditure, and therefore the failure of the Wagner's law in the Algerian economy.

Key words: government expenditure, gross domestic product, Wagner's law, Keynesian hypothesis, algeria.

1. INTRODUCTION

Depending on their economic and ideological orientation and whether they are developed or developing countries, most countries in the world seek high economic growth rates; this can only be achieved by increasing the gross domestic product (GDP), which is the main indicator of the country's economic performance by increasing additions and reducing leaks. Expenditure, investment and exports are the most important factors that have a positive impact on GDP growth rates. Conversely, both savings and imports are factors that lead to a leakage of gross domestic product. Most countries tend to increase government expenditure to achieve this goal, even if the State's revenues are insufficient to cover this expenditure by causing a deficit in its annual budget for the increase of GDP growth rates.

The relationship between government expenditure and gross domestic product is one of the most important topics that preoccupied economic thought and economic theory in terms of determining which one affects the other. German economist Adolf Wagner is the first to discuss this relationship. Through studying the phenomenon of increased government expenditure, he has reached a range of factors that have an impact on government expenditure, including GDP growth rates. Wagner believes that the increase in gross domestic product (GDP) leads to an increase in government expenditure. By contrast, economist John Maynard Keynes, in his analysis of the multiplier, believes that the country's GDP is influenced by the size of government expenditure. The increase in government expenditure leads to a multiplier in the size of GDP. Since the 1990s, Algeria has adopted an expansionary fiscal policy based on the large expansion of government expenditure, even in the years in which conditioned structural agreements had been held by the IMF as well as the decline in oil prices.

On the other hand, GDP growth rates fluctuated from year to year despite the increasing level of government expenditure, what raises the problem of the relationship between the size of

---

government expenditure and GDP growth rates and the direction of this relationship under the Wagner and Keynesian thesis. The main question accordingly can be asked as:

What is the nature and direction of the relationship between government expenditure and the gross domestic product in Algeria, and is this relationship based on the Wagner or Keynesian theory?

The main question covers the following sub-questions:
- What is the content of Wagner's law between government expenditure and gross domestic product?
- What is Keynes' hypothesis content in the relationship between government expenditure and GDP?
- What are the reasons of increase in government expenditure in Algeria?
- How can government expenditure be divided in Algeria?
- How does government expenditure affect GDP in Algeria?
- How does GDP affect the government expenditure in Algeria?

Goals of the research:

This research aims at analyzing and clarifying the following points:
- To highlight the nature and direction of the relationship between the size of government expenditure and the gross domestic product in Algeria;
- An attempt to test both the Wagner law and the Keynesian hypothesis of the relationship between government expenditure and gross domestic product in Algeria;
- Searching for justifications for the increase in the size of government expenditure in Algeria;

The research hypotheses:

First hypothesis:
- H_0: There is no statistically significant impact of government expenditure in Algeria on GDP.
- H_1: There is a statistically significant impact of government expenditure in Algeria on GDP.

Second hypothesis:
- H_0: There is no statistically significant impact of Algeria's current government expenditure on GDP.
- H_1: There is statistically significant impact of Algeria's current government expenditure on GDP.

Third hypothesis:
- H_0: There is no statistically significant impact of the government capital expenditure in Algeria on GDP.
- H_1: There is statistically significant impact of the government capital expenditure in Algeria on GDP.

Fourth hypothesis:
- H_0: There is no statistically significant impact of the GDP in Algeria on the size of government expenditure.
- H_1: There is statistically significant impact of the GDP in Algeria on the size of government expenditure.

2. Previous studies

The study of Saad Alshahrani, Ali Jalsadiq[1] (2014) aims to address the effects of various types of government expenditure on economic growth in Saudi Arabia by using various econometric techniques to estimate short-term and long-term effects of government expenditure on growth and annual employment using data for the period 1969-2010. The study found that public and private investment, as well as health care expenditures, stimulated growth on the long run. It concluded that trade openness and expenditure in the housing sector could lead to increased production in the short term.

The study of Kabeya Clement Mulamba[2] (2009) strives to test the validity of Wagner's law and Keynes's hypothesis of the causal relationship between government expenditure and long-term economic growth in the SADC countries from 1988 to 2004 to determine a long-term causal relationship using panel sequences. The study found a long-term relationship between government expenditure and economic growth in the SADC countries. It also came out with the fact that economic growth is the cause of government expenditure, both in the long term or short term, which means the validity of the Wagner's law at the expense of the Keynes hypothesis.

The study of john Loizides, George Vamvoukas[3] (2005) also examined whether the relative growth in the size of government expenditure determines the rate of economic growth , or that the rate of economic growth can determine the size of government expenditure using the data of Greece (1948-1995), the United Kingdom and Ireland (1960− 1995). The study found that the government expenditure affects the economic growth in all study sample countries in the short term and in the UK and Ireland in the long term. The study also found that economic growth caused an increase in the relative size of expenditure in Greece.

The study of Lahirushan and Gunasekara[4] (2015) identified the impact of government expenditure on economic growth in Asian countries during the period 1970-2013. Among the countries included in the survey: Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India and Bhutan, with 44 views per country with a total of 396 views using the OLS model. The study found a positive impact of government expenditure on the GDP in the Asian region. It pointed however to a relationship between government expenditure and economic growth in the long term in Asian countries. The study showed eventually that there is a single causality from economic growth to government expenditure, and from government expenditure to economic growth. The study thus validates both the Wagner law and Keynesian hypothesis on the relationship between government expenditure and GDP growth.

The study of Danmola et al[5] (2013) focused on the test of the relationship between the various components of government expenditure and the real gross domestic product in Nigeria during the period 1970-2010 using the Granger causality, error correction model and cointegration techniques. The study concluded that the relationship between gross capital expenditure and real crude GDP supports Wagner's law. Through the Granger causality test, the results showed a causal relationship between the variables in a one-sided direction. The results also showed a two-way relationship between current gross expenditure and real GDP, but the impact of current gross expenditure on real GDP is strongly related.

The study of Uwazie and Olorunfemi Sola[6] (2015) examined the empirical relationship between government expenditure, real crude output, cash supply, and inflation in Nigeria during the period 1981-2014. Using OLS, the results of the study showed that government expenditure, government revenue, crude GDP and money supply have a positive correlation with inflation, where a change of 1% in previous variables, respectively, leads to a change in inflation by: 20.84%, 11.44%, 1.59%, 11.49%. The study also found that government expenditure affects the GDP, which means the validity of the Keynes hypothesis at the expense of Wagner's law.

The study of Njoku and Ugwu and Chigbu[7] (2014) targeted the impact of government expenditure on economic growth in Nigeria's economy during the period 1961-2013, using data from the Central Bank of Nigeria and UNCTAD statistics. The study found that government expenditure (capital management, current social expenditure, common services, current economic services) contributes positively to economic growth, While economic expenditure, capital transfers, current administrative expenditures and current transfers are contributing negatively to Nigeria's economic growth. The study recommended that the government continues to increase spending (capital management, ongoing social expenditures and common services, ongoing economic

services) to accelerate economic growth, while reducing economic expenditures, capital transfers, ongoing administrative expenditures and current transfers to promote economic growth.

The dickson and Oriakhi Clement Ighodaro and D[8] (2010) study examined the Wagner's law in Nigeria using government expenditure data as well as total government expenditure during the period 1961-2007 and particularly the expenditure on public administration and expenditure on public and common services, in which economic growth can affect, in addition to economic conditions and policy change, Which means that economic growth is not the only factor effect in government expenditure. Accordingly, other variables of fiscal policy and freedom policy are included to improve the functional form of the Wagner's law. The study found that all the variables used in the long term are correlated with the condition that the GDP is considered as an independent variable.

The analysis of the relationship between government budgetary expenditure and its impact on economic growth and the structure of GDP in Croatia over the past two decades was also examined in the study Ivo Sever and Sasa Drezgic and Helena Blazic[9] (2011). The study estimated that the total budgetary amount of expenditure (including external loans) had no effect on GDP growth. The study used the VAR method to analyze this relationship. The main findings of the study are consistent with the theoretical assumptions. The expenditure structure is the basis of the effect of budget expenditure on economic growth. The study also confirmed the positive impact of investment expenditure and purchases of goods and services and the negative impact of other types of expenditure on economic growth. The study found a major result: that the budget expenditure does not affect the growth of GDP, and therefore the possibility of influencing economic growth through a change in the structure of the budget expenditure as well as directing public loans towards financial investment.

Mohamed Abdel Rahman Salih[10] (2012) aimed to test the Wagner's law in the Sudanese economy during 1970-2010. The study used co-integration, causality and error correction model (ECM). The study on the relationship between economic growth and government expenditure in Sudan has led to support for the wagner's law , i.e, GDP is the source of government expenditure.

Torki El Fawwaz and Khaled Mohammed Al Sawaie[11] (2013) discussed the relationship between real GDP and government expenditure in Jordan during the period 1990-2010 by using the VAR model. The study outcomes indicated the effect of a one-sided direction of real government expenditure on real GDP. This result does not support Wagner's law but supports Keynes's hypothesis suggesting that expenditure is part of the effective demand that affects the GDP.

A second study by Torki El Fawwaz[12] (2016) aimed at measuring the impact of government expenditure on economic growth in Jordan during the period 1980-2013 using the multi-linear regression model. The results indicated a positive effect for both overall government expenditure and current government expenditure on economic growth. This result supports Keynes' hypothesis.

The study of Ersin Yavuz and Eren Ergen[13] (2017) aimed to address the effects of public expenditure and the economic classification of public expenditure on investment expenditure and transformative expenditure on economic growth in Turkey using the VAR method and the regression method to test data during the period 1975-2014. According to the results, a shock in overall public expenditure negatively affects economic growth in one cycle. When using the economic classification of expenditure, a shock in transformational expenditures adversely affects economic growth in two cycles. The transfer and investment expenditures negatively affect economic growth. According to the regression analysis, an increase of 1% in total public expenditures negatively affects economic growth by 0.85%, and a 1% increase in transformational expenditures negatively affects economic growth by 1.28%. Consequently, the results show that public expenditure in Turkey has not been effective in stimulating growth.

The study of Sevinc Yarasir Tulumce and Fatma Zeren[14] (2017) also dealt with the relationship between the two variables in Turkey during the same period. In contrast to the previous study, this study found a consensus with Wagner's law and Keynesian Hypothesis on Total Public Expenditures and Transfer expenditures. Muhlis Bagdigen and Hakan Cetintas[15] (2004) also examined the relationship between public expenditure and long-term GDP in Turkey in accordance with the Wagner's law from 1965-2000. The study assumes that public expenditure is a result and not a reason for growth in GDP, using the combined integration test and the Granger causality test. The study concluded that there was no causation in both directions, namely the non-validity of the Wagner's law and the invalidity of Keynes' hypothesis on the Turkish situation.

The study of Vijay Gangal and Honey Gupta[16] (2013) aimed to analyze the impact of government expenditure on economic growth in India during the period 1998-2012 using the combined integration test and the Granger causality test. It found that there is a positive impact on the overall government expenditure on long-term economic growth and in a one-way direction of total government expenditure towards economic growth.

The study of Al Gifari Husnul[17] (2015) also analyzed the relationship between government expenditure and economic growth in the case of Malaysia. In this study, government expenditure was divided into government expenditure on employment and government expenditure for development. It was also classified by sector. The study used OLS technology to find the impact of government expenditure on economic growth over the past 45 years (1970-2014). The study confirmed a negative correlation between government expenditure and economic growth in Malaysia during the period of study. Moreover, the classification of government expenditure indicates that expenditure on the housing and development sector contributes to the reduction of economic growth; however, expenditure on education, defense, health care, and government expenditure on employment do not have an impact on economic growth.

It is clear from previous studies that the relationship between public expenditure and GDP remains controversial. Some studies have shown a positive effect of public expenditure on GDP, which is consistent with Keynesian hypothesis, while some other studies have found a negative impact of public expenditure on GDP. Mean while some studies have concluded that Wagner's law is relevant to the relationship between public expenditure and GDP, other studies found no effect between the variables in both directions. On the other hand, some studies have sought to adopt the economic division of public expenditure to analyze the relationship between the structure of public expenditure and GDP. At the Algerian level, the studies did not test the validity of both the Wagner and Keynesian laws in the Algerian economy, which we will address in our study.

3. Theoretical literature
I - Wagner's Law on the relationship between public expenditure and GDP
1− Wagner's law content:

German economist Adolf Wagner considered that the relationship between government expenditure and GDP was based on the impact of GDP on government expenditure. According to him, government expenditure is a result, not a reason for GDP. Wagner is also the first to address the phenomenon of increased government expenditure and attributed to three main factors[18]:

First, the protectionist and administrative functions of the government. Second, economic development leads to an increase in government expenditure on education and health care in particular. Finally, technological progress leads to increasing the government expenditure.

2− Theoretical interpretation of Wagner's law

The hypothesis of the relationship between economic growth and government expenditure has been supported on the side of supply and demand. In the context of the economic theory of the demand side in favor of the state intervention in the economy through government expenditure and the use of money supply to stimulate demand for goods and services and to ensure economic growth

and stability. Although his view runs counter to the supply-side approach, government expenditure distorts economic growth through inflation[19].

According to Levitt and Joyce (1987), the Wagner's law expects economic growth to support government expenditure. This hypothesis requires that there is a tendency for the financial authorities to increase the level of government expenditure when the level of production expands. The increase in government expenditure is justified by the role of the state that it must play in society[20].

According to Abizadeh and Youcefi(1988), the size of government grows as an effect of industrialization , in other words, the richer a society becomes, the more the government spends in order to alleviate social and industrial stress. Peacock and Scott(2000) state that the interpretation of the Wagner´s law should be comprehensive in the sense that government expenditure, which must include public enterprises is considered as a key element to stimulate a measure of government control on the economy which is at a stage of infancy[21].

Different versions of Wagner´s law have been empirically investigated in functional forms since 1960s as shown below[22]:

$$GE=f(GDP)......(1)$$

Where *GE* is total government expenditure and *GDP* is gross domestic product. The first functional form above is popularly referred to as peacock− Wiseman(1961) version of Wagner´s law. As cited in Halicioglu(2003) functional form (1) was also used in Musgrave (1969) as well as Goffman and Mahar(1971). Asecond functional form of the Wagner´s law shown below was initially used by Pryor(1968):

$$GCE=f(GDP)......(2)$$

Where GCE is government consumption expenditure. Functional form (3) below represents a modified version of peacock−Wiseman(1961) version and this was also adopted by Mann(1980):

$$GE/GDP=f(GDP)......(3)$$
$$GE=f(GDP/N)......(4)$$

While functional form (5) is linked to Goffman(1968), that of (6) below is linked to Gupta(1967) and also adopted by Michas(1975).

$$GE/N=f(GDP/N)......(5)$$
$$GE/GDP=f(GDP/N)......(6)$$

Furthermore, the final functional form in *(6)* above is Musgrave(1969) version which was also adopted by Ram(1986), Murthy(1993), Herekson (1993) and Halicioglu(2003). The major difference among the models is the measurement of government expenditure and economic output. Halicioglu(2003) used data for 1960−2000 and found no support for empirical validity of Wagner´s law in turkey☐ following Mann´s(1980) study, chang Liu and Caudill(2004) used time series data for 1951−1996 for seven industrialized countries and three developing countries and found no causality between economic growth and government expenditure in either direction[23].

II− Keynesian approach to the relationship between government expenditure and economic growth.

The primary concern of most economists about government expenditure is to understand how it affects the economy. There is a lot of debate and debate about how government expenditure helps to improve production in the economy and this point is based on Keynes' hypothesis. According to Keynesian theory, government expenditure is a tool that financial authorities can use to influence economic activity. For instance, in order to correct cyclical imbalances, the government can use government expenditure. According to Ram (1986), government expenditure can help improve the level of investment productivity, thereby ensuring growth and economic development. Thus, government expenditure positively affects economic growth[24].

On the other hand, there is an opposing view that government expenditure can have a negative impact on economic growth. According to Barro (1990, 1991), government expenditure is generally associated with high taxes. If government intervention in economic activity increases through government expenditure and increases in taxes, it may distort economic incentives such as investment protection incentives and enterprise innovation incentives, and thus delay growth and economic development[25].

III. The phenomenon of increasing government expenditure

The phenomenon of increasing government expenditure is one of the distinguishing features of public finance. It is a general and progressive phenomenon that is achievable in all countries, both developed and developing, regardless of their economic and political system. It happens that in one year, public expenditure may fall from a previous year for one reason or another, but this is without prejudice to the general phenomenon of continuous increases in expenditure. The German economist Wagner was the first to be attracted by this phenomenon. It has been deduced that the comprehensive approaches among the various countries had shown that the nations in the process of civilization are steadily increasing the activity of their local or central governments. Public finance scholars have pursued research into the causes of this phenomenon. Some of them attributed it to increased wealth and the distribution of wealth. Some considered it a manifestation of an economic law that replaced public costs with private ones, i.e. the establishment of a number of functions by the State rather than leaving this activity to individuals. Others have attributed the public expenditure increase for political, legal, administrative and financial reasons. There are some who classified these reasons to apparent reasons and real reasons. The apparent reasons include: The decline in the value of cash, the difference in accounting methods, the breadth of the territory and the increase in the population. Whereas the real reasons are: the increase in GDP, the expansion of public projects, the increasing state intervention, and the increase in state revenues.

4. The growth rate of government expenditure and the GDP rate in Algeria.

I−Classification of the public expenditures in Algeria

Algeria's public expenditures are divided into two parts: management expenses and equipment expenses, due to the distinction in the nature of expenditures, where similar and homogenous expenditures are collected in terms of their nature, role, impact and objectives for the State.

1−Management expenses

They are the expenses paid for the conduct of public interests and administration, and summarizes the expenses of management in four points, which are divided according to article 24 of code 84/17 into:
- Public debt burdens and expenses deductions from income;
- Allocations of public authorities;
- Expenses of the services' instruments;
- Public interventions.

2− Equipment expenses

They are expenses that have the nature of the investment that generates an increase in GNP and thus increase the country's wealth. They are divided according to article 35 of code 84/17 into three points:
- Investment executed by the State;
- Investment subsidies granted by the State;
- Other expenses with capital.

II− Evolution of the growth rate of government expenditure.

Since the 1990s, government expenditure in Algeria has been steadily increasing at varying rates of growth from year to year. The largest growth rate of government expenditure was 65.1% in

1991. Whereas the largest increase in the growth rate of current expenditure (management expenses) was 89.25%. The growth rate in capital expenditure (investment and processing) reached 14%. Then the growth rates of the government expenditure decreased despite the continuing increase government expenditure. The average rate of growth in government expenditure during the period 1992-1997 was 23.86% while the average rate of growth of current expenditure was 23.37%, and the average rate of growth in capital expenditure amounted to 26.53%. During the 1990s, the year 1998 saw the largest decline in government expenditure growth rates where it fell to 3.65% compared to 1997, while current government expenditure fell to 3.2% and capital expenditure fell to 5.1% compared to 1997. The growth rate in government expenditure however has resumed to rise, and reached 22.5% in 2000. This rise was accompanied by higher growth in capital expenditure (investment and equipment), with a growth rate of 72%, while current government expenditure witnessed a growth rate of 10.52%. The growth rate in government expenditure continued to fluctuate up and down during the period (2000-2006), bringing the growth rate in 2007 to 28%. The biggest growth in capital expenditure (investment and equipment) was 44.58% while the growth rate in current government expenditure is 16.54%.

The year 2008 is marked by a big growth rate in government expenditure with 34.82%. The growth rate in the current government expenditure is 32.48% while the growth rate in capital expenditure (investment and equipment) decreased to 37.55% compared in 2007. However, the growth pace in the government expenditure growth rate fell significantly in 2009, where it was 1.32% and is currently 3.71%. While the growth rate of capital expenditure (investment and equipment) was (-1.37%) due to the decline in the capital expenditure, which kept decreasing in 2010 to reach (-7.11%) despite slight improvement in the growth rate of government expenditure and current expenditure.

In 2011, the growth in government expenditure increased by 28.3%. This increase was accompanied by a larger growth in current government expenditure by 42.8%. However, the growth rate of capital expenditure was less than 7%.

The year 2013 saw a decline in government expenditure, with growth rate of -14.65%, while current expenditure growth dropped to -13.61% and the capital expenditure fell to -16.83%. But in 2014 the growth rate of government expenditure increased to 16.13% while current expenditure rose to 8.78% and capital expenditure rose to 32.17%. Nonetheless, the year 2015 witnessed a decline in the growth rate of government expenditure to 9.44%. The current expenditure growth rate declined to 2.73% while the growth rate of capital expenditure declined to 21.5%. The table below shows growth rates in government expenditure, current expenditure and capital expenditure during the period 1991-2015.

Table(01): growth rates in government expenditure, current expenditure and capital expenditure in Algeria during the period 1991-2015.   unit:(%)

years	Growth rate in(capital GE)	Growth rate in (Current GE)	Growth rate in (GE)
1991	14	89.25	65.1
1992	39.6	28.87	31.25
1993	39.67	22.36	26.43
1994	15.58	19.28	18.3
1995	0	29	27.6
1996	48.46	23.84	22.95
1997	15.86	16.87	16.63
1998	5.1	3.2	3.65
1999	11.75-	16.65	9.78

2000	72	10.52	22.5
2001	11	12.54	12.13
2002	26.72	13.9	17.38
2003	25.28	2.3	9
2004	12.9	11.43	11.93
2005	25.94	0.48-	8.47
2006	22.96	15.35	18.35
2007	44.58	16.54	28
2008	37.55	32.48	34.82
2009	1.37-	3.71	1.32
2010	7.11-	15.6	5.2
2011	7	42.8	28.3
2012	17.65	25.95	23.15
2013	16.83-	13.61-	14.65-
2014	32.17	8.78	16.13
2015	21.5	2.73	9.44

Source: prepared by researcher depending on:
− Bank of Algeria reports
− Statistic national office
− World bank

III− Evolution of the growth rate of GDP

The GDP growth rate in Algeria was characterized by fluctuation and instability. The GDP growth in 1991 reached a negative rate of -1.2%, but in 1992 it rose to 1.79% then declined again in 1993 to a negative growth rate of -2.2%. These low and negative rates of growth in GDP improved in 1995 and 1996, with a growth rate of 3.8% and 4.1% respectively, falling in 1997 to 1.1%. However, in 1998 there was an increase of 5.1% in GDP growth rate, which continued to fluctuate until 2002 and 2003, with a growth rate of 4.7% and 6.9%, respectively. This improvement in the GDP growth rate continued until 2007, falling to 3%, then fell to 2.4% in 2008 and fell again to 1.4% in 2009. The GDP average growth for 2010-2015 was 3.35%. The table below shows Algeria's GDP growth rate for the period 1991-2015.

Table(02): Algeria's GDP growth rate for the period 1991-2015. unit:(%)

Years	Growth rate in real GDP
1991	1.2-
1992	1.79
1993	2.2-
1994	0.9-
1995	3.8
1996	4.1
1997	1.1
1998	5.1
1999	3.2
2000	2.2
2001	2.7
2002	4.7
2003	6.9
2004	5.2
2005	5.1
2006	4.9

2007	3
2008	2.4
2009	1.4
2010	3.4
2011	2.9
2012	3.4
2013	2.8
2014	3.8
2015	3.8

source: bank of Algeria reports and world bank

5. RESULTS AND DISCUSSION

To test the hypotheses of the study, the linear regression analysis of the government expenditure data and the gross domestic product were conducted both in real terms. The results of the analysis were as follows:

The first hypothesis

Through analyzing the linear regression of GDP data as a dependent variable and government expenditure as an independent variable, both in real terms. The results of the analysis were as follows:

Table(03): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,447[a]	,200	,165	1,93327

a. Predictors: (Constant), GE

b. Dependent Variable: GDP

source: statistical package for social sciences(spss)

It is noted from the table that the correlation coefficient between GDP as a dependent variable and government expenditure as an independent variable was 0.447, indicating a positive intermediate relationship between the two variables. the adjusted R Square has reached 0.165, this means that 16.5% of the changes in GDP growth rate are explained by the growth rate of government expenditure, While 83.5% of changes in GDP growth rate are explained by other variables. Although the explanatory power of the model is weak, the model is statistically significant and the reason for this is the statistical significance level (sig = 0.025), which is less than 0.05 and the calculated F test value (5.741) and is greater than the table F. We therefore reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), i.e, the effect of government expenditure on GDP (negative effect).

Table (04): ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21,458	1	21,458	5,741	,025[a]
	Residual	85,963	23	3,738		
	Total	107,420	24			
a. Predictors: (Constant), GE						
b. Dependent Variable: GDP						

source: statistical package for social sciences(spss)

Given the government expenditure coefficient, the results show that the model is not consistent with the economic theory that the increase in government expenditure results in a

multiblier of GDP. In order to determine the effect of government expenditure on GDP, the regression equation, in which GDP as a dependent variable and the government expenditure (GE) is represented as an independent variable, can be formed as follows:

GDP=4.098-0.064(GE)

The above model shows that the government expenditure coefficient is negative (-0.064), meaning that an increase of 1 DZD in the Size of government expenditure results in a decrease in the GDP (DZD 0.064). This result is not consistent with the economic theory, especially the Keynesian hypothesis, which indicates a positive effect of government expenditure on GDP. Accordingly, **the Keynesian hypothesis does not apply to the Algerian economy.**

Table (05):Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	4,098	,620		6,606	,000
GE	-,064	,027	-,447	-2,396	,025

a. Dependent Variable: GDP

source: statistical package for social sciences(spss)

The second hypothesis

By analyzing linear regression between GDP as a dependent variable and current government expenditure (management expenditure) as an independent variable, the results of the analysis were as follows:

Table (06):Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,487[a]	,237	,204	1,88738

a. Predictors: (Constant), CGE

b. Dependent Variable: GDP

source: statistical package for social sciences(spss)

The above table shows that the correlation coefficient between GDP and current government expenditure is positive with (0.487), this indicates a positive correlation between the two variables. In the meantime, the adjusted R square reached 0.204, which means that 20.4% of changes in GDP can be explained by current government spending. Although the explanatory power of the model is weak, it is statistically significant (SIG = 0.014), which is less than 5%, while calculated F test value reached 7.156 bigger than table F. We therefore reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), i.e, the effect of the current government expenditure on GDP.

Table (07):ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	25,489	1	25,489	7,156	,014[a]
Residual	81,931	23	3,562		
Total	107,420	24			

a. Predictors: (Constant), CGE

b. Dependent Variable: GDP

source: statistical package for social sciences(spss)

The model can be formed by the table below, where the GDP represents a dependent variable and the current government expenditure is an independent variable, and the model is given according to the following formula:

$$GDP= 3.907-0.054(CGE)$$

From the table, it appears that the current government expenditure coefficient is negative. This means that it has a negative impact on the GDP, as the increase in current government expenditure by 1 DZD resulted from a decrease in GDP (DZD 0.054), and this is contrary to economic theory, especially **the Keynesian hypothesis**.

Table (08):Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1(Constant)	3,907	,524		7,459	,000
CGE	-,054	,020	-,487	-2,675	,014

a. Dependent Variable: GDP

source: statistical package for social sciences(spss)

The third hypothesis:

By analyzing linear regression between GDP as a dependent variable and capital expenditure (equipment and investment expenditure) as an independent variable, the results of the analysis were as follows:

Table (09):Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,068[a]	,005	-,039	2,15605

a.   Predictors: (Constant), Capital GE

b.   Dependent variable GDP

source: statistical package for social sciences(spss)

The table shows that there is no correlation between GDP and government capital expenditure, where the correlation coefficient was 0.068. Given the level of morale (sig = 0.745) we note that it is bigger than 5% and the value of the calculated F test is estimated at 0.108 which is less than the table F.

Based on these results, it appears that the model is not statistically significant. We accept the null hypothesis (H_0) and reject the alternative hypothesis (H_1), i.e, there is no impact of the government's capital expenditure on the GDP.

Table (10):ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	,504	1	,504	,108	,745[a]
Residual	106,917	23	4,649		
Total	107,420	24			

a. Predictors: (Constant), Capital GE

b. Dependent Variable: GDP

source: statistical package for social sciences(spss)

Given that the coefficient of government capital expenditure appears to be negative (-0.007). This is not consistent with economic theory, especially Keynesian hypothesis. The model of the relationship between GDP as a dependent variable and capital expenditure can be formulated as an independent variable as follows:

$$GDP=3.077-0.007(CAGE)$$

Table (11):Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	3,077	,609		5,056	,000
CAGE	-,007	,022	-,068	-,329	,745

a. Dependent Variable: GDP

source: statistical package for social sciences(spss)

The fourth hypothesis:

The results of the linear regression between the government expenditure as a dependent variable and the GDP as an independent variable showed the following:

Table (12):Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,447[a]	,200	,165	13,47801

a.   Predictors: (Constant), GDP
b.   Dependent variable GE

source: statistical package for social sciences(spss)

The above table shows that the coefficient of correlation between government expenditure as a dependent variable and the GDP as an independent variable was 0.447, which indicates a moderate correlation between the two variables. The adjusted R square reached 0.165, which means that 16.5% of changes in government spending can be explained by GDP. And that 83.5% of the changes can be attributed to other factors (inflation, revenue volume, government policies ...). Consequently, the impact of GDP as a separate variable on government expenditure as a dependent variable is weak. Given the level of significance of the model estimated (sig = 0.025), which is less than the level of significance (5%)The value of the calculated F test is estimated at (5.741), which is bigger than the value of the table F.

This means that model is statistically significant, and therefore we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), i.e, there is a negative impact of GDP on government expenditure.

Table (13):ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1042,913	1	1042,913	5,741	,025[a]
Residual	4178,106	23	181,657		
Total	5221,018	24			

a. Predictors: (Constant), GDP

b. Dependent Variable: GE

source: statistical package for social sciences(spss)

On the other hand, the GDP coefficient is estimated of (-3.116) which means an increase in the GDP by one dinar resulting in a decrease in the volume of government spending by 3.116 dinars. This result runs counter to the economic theory, especially the Wagner's law, which states that a certain increase in the volume of GDP leads to a greater increase in government expenditure, and **the Wagner's law consequently can't be achieved in the Algerian economy.**

Table (14):Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	27,273	4,673		5,836	,000
GDP	-3,116	1,300	-,447	-2,396	,025

a. Dependent Variable: GE

source: statistical package for social sciences(spss)

The model of the relationship between GDP as an independent variable and government expenditure can be formulated as a dependent variable in the following equation:

$$GE=27.273-3.116(GDP)$$

6. CONCLUSION

The nature and direction of Relationship between government expenditure and Gross domestic Product (GDP) is controversial in economic thought. the economist adolf wagner′s considere the first who addressing this relation and his confirm that the size of the Gross domestic Product affects on the size of government expenditure, in addition he explain the phenomenon of increased government expenditure. In contrast, economist John Maynard Keynes confirm that the size of government expenditure positively affects on Gross domestic product through the multiplier effect. many studies have explored this Relationship, some studies have found to support Wagner's law and others have come to confirm Keynes's hypothesis, other Studies have found that both the Wagner law and Keynesian hypothesis have not been achieved. To this purpose, our study examined the nature of the Relationship between government expenditure and GDP, as well as the test of both Keynes and Wagner's theory of the Algerian economy.

Through the previous analysis, the following results can be achieved:

− The continued rise in the growth rates of government expenditure in Algeria during the study period;

− Fluctuation in GDP growth rates in Algeria during the study period;

− The failure of the Keynesian hypothesis in the Algerian economy. The coefficient of government expenditure as an independent variable was -0.064. This result is not consistent with economic theory, and the value of the capital expenditure coefficient (-0.007) was also the same as the economic theory.

− The failure of the Wagner's law in the Algerian economy. The value of the gross domestic product (GDP) as an independent variable of government expenditure reached (-3.116). This result is not consistent with economic theory.

7. Bibliography List :

1. Al gifari husnul(2015), the effects of government expenditure on economic growth: the case of malaysia, INCEIF , global university of islamic finance.Malaysia
2. Clement a .u.ighodaro, dickson e, oriakhi(2010), does the relationship between government expenditure and economic growth follow wagner law in nigeria ?, annals of the university of petrosani, economics, 10(2).

3. Danmola et al(2013), nexus between public expenditure and economic growth by testing wagner law time series: evidence from nigeria, international journal of development and sustainability, vol 2, n4.
4. Ersin yavuz, eren ergen(2017), impact of public expenditures and economic classification on growth: turkey analysis, research journal of public finance, vol3, issue 1.
5. Ivo sever et al(2011), budget spending and economic growth in croatia: dynamics and relationship over the past two decades, zb rad ekon fak rij, vol 29, n2.
6. John loizides and george vamvoukas(2005), government expenditure and economic growth: evidence from trivariate causality testing, journal of applied economics, vol VIII, n 1.
7. Kabeya clement mulamba(2009), long run relationship between government expenditure and economic growth: evidence from SADC countries, dissertation submitted in partial fulfillment of the requirements for the degree of master of commerce, university of johannesburg.
8. Lahirushan and gunasekara(2015), the impact of government expenditure on economic growth: a study of asian countries, international journal of humanities and social sciences, vol 9, n9.
9. Mohame abdel rahman salih(2012), the relationship between economic growth and government expenditure: evidence from sudan, international business research, vol 5, n8.
10. Muhlis bagdigen and hakan cetintas(2004), causality between public expenditure and economic growth: the turkish case, journal of economic and social research, vol 6, n1.
11. Njoku et al(2014), government public expenditure: effect on economic growth (the case of nigeria, 1961−2013), international journal of research in management , science and technology, vol 2, n1.
12. Saad alshahrani, ali alsadiq(2014), economic growth and government spending in saudi arabia: an empirical investigation, IMF working paper.
13. Sevinc yarasir tulumce and fatma zeren(2017), analysis of the relationship between public expenditures and economic growth in turkey by asylletric causality test, journal of management economics and business, vol 13, n2.
14. Torki fawwaz and khaled mohammed al sawai(2013), the relationship between gross demestic product and government expenditure in jordan, journal of contemporary research in business, vol 4, n9.
15. Torki al fawwaz(2016), the impact of government expenditure on economic growth in jordan(1980−2013), international business research, vol 9, n1.
16. Uwazie and olorunfemi sola(2015), government sponding, real gross domestic product, money supply and inflation in nigeria, european journal of business and management, vol 7, n24.
17. **Vijay gangal and honey gupta(2013), public expenditure and economic growth a case study of india, global journal of management and business studies, vol3, n2.**

8. Citations

[1] Saad alshahrani, ali alsadiq, economic growth and government spending in saudi arabia: an empirical investigation, IMF working paper, january 2014, p02.

[2] Kabeya clement mulamba, long run relationship between government expenditure and economic growth: evidence from SADC countries, dissertation submitted in partial fulfillment of the requirements for the degree of master of commerce, university of johannesburg, 2009, p02.

[3] John loizides and george vamvoukas, government expenditure and economic growth: evidence from trivariate causality testing, journal of applied economics, vol VIII, n 1, may 2005, pp 125-152.

[4] Lahirushan and gunasekara, the impact of government expenditure on economic growth: a study of asian countries, international journal of humanities and social sciences, vol 9, n9, 2015, pp3152-3160

[5] Danmola et al, nexus between public expenditure and economic growth by testing wagner law time series: evidence from nigeria, international journal of development and sustainability, vol 2, n4, 2013, pp2383-2395

[6] Uwazie and olorunfemi sola, government sponding, real gross domestic product, money supply and inflation in nigeria, european journal of business and management, vol 7, n24, 2015, pp161-170

[7] Njoku et al, government public expenditure: effect on economic growth (the case of nigeria, 1961−2013), international journal of research in management , science and technology, vol 2, n1, april2014, pp1-15

[8] Clement a .u.ighodaro, dickson e, oriakhi, does the relationship between government expenditure and economic growth follow wagner law in nigeria ?, annals of the university of petrosani, economics, 10(2), 2010, pp185-198

[9] Ivo sever et al, budget spending and economic growth in croatia: dynamics and relationship over the past two decades, zb rad ekon fak rij, vol 29, n2, 2011, pp291-331

[10] Mohame abdel rahman salih, the relationship between economic growth and government expenditure: evidence from sudan, international business research, vol 5, n8, 2012 , pp40-46

[11] Torki fawwaz and khaled mohammed al sawai, the relationship between gross demestic product and government expenditure in jordan, journal of contemporary research in business, vol 4, n9, 2013,pp336-344

[12] Torki al fawwaz, the impact of government expenditure on economic growth in jordan(1980−2013), international business research, vol 9, n1, 2016, pp99-105

[13] Ersin yavuz, eren ergen, impact of public expenditures and economic classification on growth: turkey analysis, research journal of public finance, vol3, issue 1, 2017, pp49-61

[14] Sevinc yarasir tulumce and fatma zeren, analysis of the relationship between public expenditures and economic growth in turkey by asylletric causality test, journal of management economics and business, vol 13, n2, 2017, pp299-314

[15] Muhlis bagdigen and hakan cetintas, causality between public expenditure and economic growth: the turkish case, journal of economic and social research, vol 6, n1, 2004, pp53-72

[16] Vijay gangal and honey gupta, public expenditure and economic growth a case study of india, global journal of management and business studies, vol3, n2, 2013, pp191-196

[17] Al gifari husnul, the effects of government expenditure on economic growth: the case of malaysia, INCEIF , global university of islamic finance, 2015, pp1-15

[18] Torki fawwaz and khaled mohammed al sawai, op.cit, p336.

[19] Kabeya clement mulamba, op.cit, p12.

[20] Ibid, p12.

[21] Ibid, p12.

[22] Clement a .u.ighodaro, dickson e, oriakhi, op.cit, p187.

[23] Ibid, pp 187, 188.

[24] Kabeya clement mulamba, op.cit,p p 12, 13

[25] Ibid, p13.