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Public Expenditure and Economic Growth in Algeria: An Analytical Study according toWanger's Law of Increasing Public Expenditure.

الإنفاق العام والنمو الاقتصادي في الجزائر: دراسة تحليلية وفق قانون فانجر لزيادة الإنفاق العام

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Abstract

The objective of this paper is to determine the causal relationship between government expenditure and economic growth in Algeria during the period 2000-2016.Based on testing the compatibility of Wagner's law with the Algerian economy.

The result shows that public expenditure is growing more rapidly than the growth of Gross Domestic Product. As individual spending can also be considered as an indicator of economic growth in Algeria during the period of 2000-2016.

Thus, Algerian economy does not match the Wagner's law. Therefore, the public expenditure should be adjusted at a rate equal to GDP development.

Keywords:Economic Growth,Public Expenditure, Wagner's law, GDP.

ملخص

تهدف هذه الورقة إلى تحديد العلاقة السببية بين الإنفاق الحكومي والنمو الاقتصادي في الجزائر خلال الفترة 2000–2016. وهذا بناءً على اختبار مدى تطابق قانون فانجر مع الاقتصاد الجزائري.

وتظهر النتيجة أن الإنفاق العام ينمو بوتيرة أسرع من نمو الناتج المحلي الإجمالي. كما أنه يمكن اعتبار الإنفاق الفردي مؤشراً لحالة النمو الاقتصادي في الجزائر خلال الفترة 2000–2016.

وبالتالي، فإن الاقتصاد الجزائري لا يتماشى مع قانون فانجر. لذلك، يجب تعديل الإنفاق العام بمعدل مساوٍ لتنمية الناتج المحلي الإجمالي.

الكلمات المفتاحية: النمو الاقتصادي، الإنفاق العام، قانون فانجر، الناتج المحلي الإجمالي.

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1. INTRODUCTION

The public expenditure reflects the role of government in economy activities, as it is the tool used by the government for their economics development. The effective use public expenditure aids to perform its functions.Thus, it achieve the set of political and economic goals that have been developed.

There has always been controversy over the role of the government in economic life and the scopes of its intervention, which has always been linked mainly to the size of its public spending.This reflects the fact of developmental role of the government, as it is a government requirement to stimulate the aggregate demand and thus create aggregate supply to match the demand level. The financial literature considers the public expenditure as the most important instrument of fiscal (or financial) policy in term of effectiveness in achieving economic growth. The public expenditure is a general indicator that highlights the economic situation and largely reflects the rest of the economic indicators, which is one of the objectives of economic policies.

In this context. Since the beginning of 2001, Algeria has adopted a financial policy based on increasing public expenditure. Especially the economic recovery program 2001/2004, the supplementary program to support economic growth 2005-2009, the five-year program 2010-2014, and the growth consolidation program 2015-2019 before it stops on 31 December 2016 due to the decline of oil prices and the government's tendency towards policy of rationalizing spending. The objective declared is to stimulate national economy and raise economic growth rate.

This study aims to explore the effectiveness of public expenditures in achieving economic growth during the period 2000-2016. By answering the following main question:

Can per capita expenditure be considered as an indicator of economic growth in Algeria during 2000-2016؟

2. Theoretical concepts of public expenditure

2.1 Public expenditure definition

The public expenditure concept has been defined in several ways, as follows:

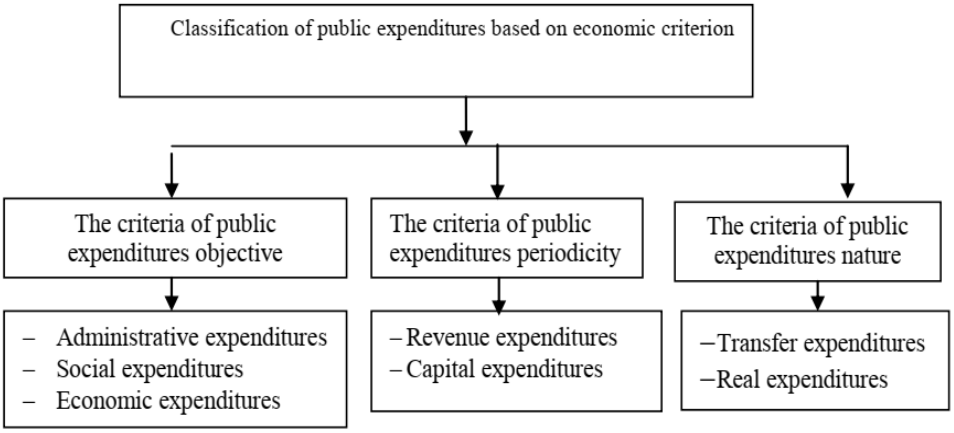
- Public expenditure is "the amount of a monetary assessment ordered by a public law person to spend it to satisfy the public need" (Draz, 2000, p. 387).
- Public expenditure is "the amount of money provided by the public treasury of the government through its different revenues, institutions, departments and ministries to satisfy public need" (Al-Haj, 1999, p.122).
- There is a difference between the estimated expenditures and the actual expenditures. The first is defined as the sum of budgeted appropriations in addition to special supplementary appropriations. The second represents the actual part of these expenditures, as shown in the final account of the government (Dagher&ali, 2010, p. 113)

2.2 Classification of public expenditures

The financial literature dealt with the public expenditures classification. In general, they were based on two main criteria.

The economic criterions and the positive (or practical) criterions, which can be represented in Figure 1.

Figure 1 : Classification of public expenditures based on economic criterions

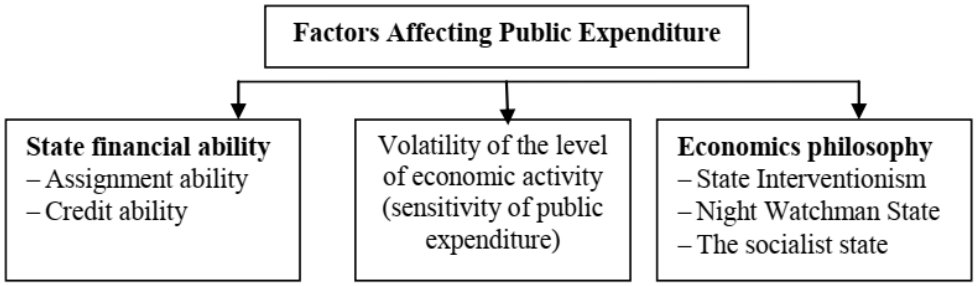


Source: Said Abdulaziz Othman (2008), Public Finance, University House for Publishing, Beirut, p. 470.

2.3 Factors Affecting Public Expenditures

The public expenditure is influenced by a number of factors that must be considered, as described in Figure 2.

Figure 2 : Factors Affecting Public Expenditure



Source: Nawazad Abdulrahman Al-Hitti, Munjid Abdul Latif Al-Khashali (2005), the Modern Approach in Public Finance, First Edition, Dar Al-Maaishah, Amman, p. 43.

– *Political philosophy of the economic system*

The economic philosophy of government is determined by its role in dealing with the national economy and the size of its participation in the national economy. There are three main types of this philosophy: the intervening state, the socialist state and the guardian state .In the socialist state, public expenditure includes all economic and administrative activities. In the case of the intervening state, expenditure is directed to supporting the national economy and addressing structural or cyclical imbalances, while the guardian state's role limited to basic functions, which are security, defense and justice.

– *Economic activity fluctuations*

Economic activity is subject to periodic fluctuations depending on the movement of the economic cycle, as these fluctuations vary in duration and causes.Generally the fluctuation takes the form of recession, depression, recovery, and expansion. Through the movements of this cycle, the different level of economic activity has an impact on public expenditure levels.

– *Thegovernment financial ability*

This divided into:

- The assignment ability: the ability of the economy or income to tolerate the tax burden without harming the living standard of

individuals or the capacity of national production, while the individual assignment ability means the ability of the individual to tolerate the tax burden (at the micro level) depending on his income and how to use it (Nasser, 2003, p.147).

- The credit ability: It is the factor that affects the size of public expenditure and it is related to the national income ability to meet the needs for loan of the government. This ability depends on two factors: first, the size of National Savings. Second, the distribution of the savings portion of loan between public and private sectors (Al-Zubaidi, 2015, p. 43).

3. The increasing public expenditure phenomenon

3.1 Interpretation of Wagner's law of the public expenditure increase

The first who show interest to this phenomenon was the German economic scientist Adolph Wagner (1835–1917), who was interested in studying the countries financial development after analyzing the size of public expenditure in many European countries in the nineteenth century. The objective is to identify the relationship between increased public expenditure and national income through the named law of 1892".

In accordance with this law, which was called the law of Increasing State Activity, Adolph Wagner tried to correlate positively between the economic development and public expenditure size. In his analysis, he argued that the development of public expenditure is a natural result of changing in economic and social structure of countries.

This law states that "If society achieves a certain rate of economic growth, this will lead to the expansion of the country's activity and increase the expenditure of the country at a rate greater than the per capita income" (Zermani, 1998, p.17). "This law includes that the government activity is increasing in quantity and quality at a rate greater than population rate increase, and this increase is explained through the development rate. The country is growing, developing and increasing its obligations accordingly to the expansion of its intervention's scope to serve individuals, and therefore the expenditure size increases accordingly" (Al-Wadi, 2015, p.111).

In his analysis, Wagner argues that industrialization leads to higher government intervention and public expenditure share in national income. Thus, industrialization leads to doubling expenditures for public revenues, infrastructure, education and social intervention

Wagner indicates several reasons to justify the high public expenditure expansion compared to the economic growth expansion. Thesereasons are (Karkhi, 2015, p. 36):

- The founding of the division labor principle and the process of urbanization that come with industrialization, which require more expenditures than the previous for organizing and managing the work؛
- The expansion of real income lead to the expansion of expenditures on cultural products and social welfare؛
- Economic progress, changes in technology and financing long-term investment lead to the expansion of government financial activity؛
- The scarcity of resources to cover the financing of large capital lead to the intervention of the government after the failing of private companies to finance the capital of large projects that emerged as a result of economic changes in general, and industries changes in particular؛
- The role of public expenditure on infrastructure according to the needs of the society and investments in the private sector in order to promote these activities.

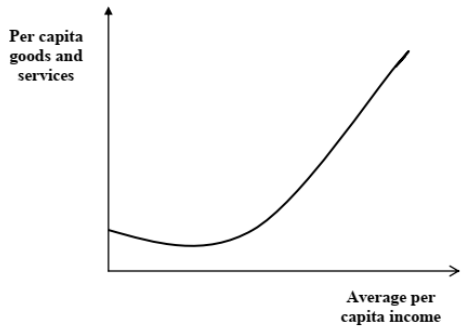
In addition to the various interpretations of Wagner's law over time, the constraint on the behavior study of public expenditure vis-à-vis the Gross Domestic Product and its sensitivity, we relied on the mathematical formula of the Wagner's law as follows:

$$G / N = F (Y / N)$$

Where

G represents public expenditure, N represents the population. Or that the elasticity of public expenditures for national income is more than one. It is clear that there is a constant relationship between expenditure / income ratio (G / Y) and per capita income (Y / N). Figure 2 illustrates the graphic representation of Wagner's law.

Figure 3: Graphic representation of Wagner's law



Source: Waleed A. Al-Aib(2010) The Macroeconomic Impact of Government Expenditure Policy. First edition, Hussein Al-Asriya Library, p.57

3.2 The real reasons: Multiple causes of increase

– *Economic reasons*

The expansion in realizing projects which has an economic dimension leads to an expansion of public expenditure whether these projects are internal or external. The government invests reserves and blocked balance, which are mostly direct and indirect tax funds. This is a response to evolution of the role of the government from a guardian state to an intervening state and sometimes-socialist state in order to support its economies.

– *Financial reasons*

These are two main factors (Mahrezi, 2005, p. 111):

- First, the borrowing ease in the modern era, which lead states to choice public loans in large scale to cover any deficit, which increase the public expenditures size because debt service requires payment of installments and benefits.
- Second, the existence of the public revenues surpluses not directed for a particular purpose, which encourages the government to spend it on both necessary and unnecessary expenditure. This is dangerous in times when good policy requires to the executive authority to reduce its expenditure because it is difficult for government to reduce many public expenditure scopes.

- *Administrative reasons*

The expansion of the state's activities and multiplicities impose the creation of public administrations in its various subdivisions. Consequently, the increase in the number of employees to supervise these establishments contributes to increase public expenditure to cover wages and further administrations charges.

- *Social reasons*

The demographic growth and the concentration of population in industrial zones, and the continuous government effort to maximize the social welfare through providing health care services, educational services, cultural services and transport services, all of these activities contribute to increase the public expenditure. The increase in social consciousness, as a result of education spread, increases the claim of citizens of their rights. Citizen became demanding the government to do look after the extended activities previously not known, such as unemployment insurance, poverty and senility insurance which increase in public expenditure (Mahrezi, 2005, p. 110).

In addition to the factors mentioned above, there are more reasons that increase public expenditure, including:

- The raise in general prices level and the currency depreciation in many developed and developing countries.
- The ease and increase of government's capacity of many countries to generate public revenue which has a strong motivation for governments to increase public expenditure
- The continued increase in the weight of public debt service in many countries, especially underdeveloped countries

3.3 Apparent reasons

- *Deterioration in the value of money*

When the value of money decreases, the government has to pay larger monetary units to obtain the same amount of goods and service and thus increase public expenditure. To find out the real increase of public expenditures in different periods, changes of purchasing power should be excluded by using the following equation (Al-Khatib&Shamia, 2012, p.79):

$$\text{Public expenditure at constant prices} = \frac{\text{Current expenditure at current prices}}{\text{general level of prices}} \times 100$$

- *The change in the financial rules of government accounts*

The difference in financial techniques used for setting the general budget lead to a significant increase of public expenditure size, as in the case of the transition from net budget to total budget where all public expenditures are recorded without deduction for public revenues and this must be taken into account when comparing between different periods. Furthermore, the increase occurs when the dates of the beginning and end of the fiscal year are adjusted (Al-Khatib&Shamia, 2012, p. 80).

- *Regional expansion and population growth*

The expansion of the country's territory increases public expenditure in response to the increasing demand for public goods and services.

Population growth is one of the most important phenomena that worry governments because they lead to increase the public expenditure in order to meet the citizens' needs for security, development, infrastructure, education, etc., regardless of the quantitative growth or change in population structure. The increase of population has a real impact on public expenditure size for two reasons (Zeinab, 1998, 60):

- The raise of poor class compared to the rich ones. The poor class require more public expenditure, while it enjoy tax benefits or taxes reliefs because their incomes are low.
- The increase population requires more services, more productive technical capital, which require more expenditure.

4. Public expenditures in Algerian economy

4.1 Public Expenditures in Algeria

Public expenditure is one of the available tools of the fiscal policy used by the state to achieve its economic and social objectives, through the so-called general budget.

- *Classification of current expenditure*

Current expenditures are those expenses necessary for the functioning of the State's administrative establishment, which consist of employees' salaries and equipment maintenance expenses, tools, equipment, etc. Current expenses are expenditures paid for public services and administration as part of actual expenditures (Al-Ruwaili, 1992, p. 32).

The current budget in the Finance law is presented in Table B, showing the ministerial departments and its amounts allocated. The common costs are inter-ministerial expenses (Finance law , 2016).

The current expenditures are classified into four titles, which are set out in Article 24 of Law 84-17 on the financial laws of public debt burdens.

Expenditures from revenues, allocations to the public authorities, expenditure on means of services. While the transfer expenses include the first title, namely the burden of public debt, the expenditures deducted from the revenues and allocations of public authorities. The fourth title is the public interventions (finance law, 2017).

The current expenditures consist of the regular expenses and the transferring expenses. The regular expenses include the second title, i.e., the allocations of the public authorities and the third title, i.e., the expenditure on the means of services, while the transferring expenses include the first title, i.e., the public debt burdens, the expenditures deducted from the revenues and the fourth title. These title are divided into sections motioned above, but they are not the same for all ministries but vary according to each ministry (Lamamra, 2003, p. 53).

- *Classification of capital expenditures*

These expenditures are divided according to the annual development plan of the government and are shown in the table attached to the Finance Law of each year by sectors. The budget for capital or investment is the budget that opens the allocations in the annual finance law. The allocations are directed to economic sectors in order to equip the sectors with the necessary production factors to reach a comprehensive development. The capital expenditures are divided into titles, sub-sectors, chapters and articles (Lamamra, 2003, p.58).

4.2 Analyzing the public expenditure evolution and the increased expenditure phenomenon in Algeria

- *Public expenditures analysis*

Public expenditure has a remarkable development during the study period due to the government's developing of economic recovery plans and its adoption of an expansive expenditures policy. The following are some statistics that illustrate the most important developments in the public expenditures.

Table 1: Evolution of Public Expenditure Components in Algeria during 2000-2016 (Unit: 1 Million ADZ)

capital expenditures %	current expenditures %	Total public expenditure	capital expenditures	current expenditures	years
72.7	27.3	17778122	856193	321929	2000
72.95	27.05	1321028	963633	357395	2001
70.8	29.2	1550646	1097716	452930	2002
66.4	33.6	1690175	1122761	567414	2003
66.2	33.8	1891769	1251055	640714	2004
60.7	39.3	2052037	1245132	806905	2005
58.6	41.4	2453014	1437870	1015144	2006
53.9	46.1	3108569	673931	1434638	2007
52.92	47.08	4191051	2217775	1973276	2008
54.4	45.8	4246334	2300023	1946311	2009
59.6	40.4	4466940	2659078	1807862	2010
66.3	33.7	523569	389206	1974363	2011
67.8	32.2	7058173	4782634	2275539	2012
68.6	31.4	6024131	413536	1892595	2013
64.3	35.7	5995769	4494327	2501442	2014
60.3	39.7	7656331	4617009	3039322	2015
62.9	37.1	7297494	4585564	2711930	2016

Source: the researcher based on different sources

Through table 1, we notice the growing of the capital expenditures. This is especially important in the circumstances of developing countries because of its lack the of public wealth, educational, health and social services, which are the basic components of serious economic development. This is what makes the economic development plans especially important in the expansion of the country's productive capacity. The increase in current expenditure through the increase in salaries, wages and current transfers will lead to an increase in aggregate demand that will stimulate the economic wheel and increase the GDP through the multiplier mechanism (Al-Aib, 2010, p. 260).

It is noted that the percentage of public expenditure did not decrease under 60% during the study period, due to the limited control and the difficulty of reducing this expenditures, unlike capital expenditure, which highlighted the economic role of government by the increasing growth rates of capital expenditure in detriment of current expenditure. The capital expenditure increase 52% between 2000-2008, where it represented 27.3% in 2000 and reached 2008 to 47.08%, this compline with the improvement

in oil prices and the establishment of economic recovery programs by the authorities, which are based on the injection of huge financial resources into the economy in order to implement infrastructure projects. The current expenditure compared to investment spending in Algeria is completely consumed due to limited absorption in the Algerian economy (Algeria bank report, 2007, p.75).

- *test of the Wagner's law on Algeria case*

This law was introduced by the German economist Adolf Wagner, who was interested in studying the country's financial development, after his analysis to public expenditure size of many European countries in the 19th century; the objective is to identify the relationship between increasing in public expenditure and national income growth. According to Wagner, economic activity increases in quantity and quality at a much higher rate than population growth. "This law gives us in evidence that public expenditure cannot be reduced because its reduction is a natural violation of things and a contrary path to evolution" (Al-Wadi; 2010, p. 111). Wenger describes the function of financial economy as a financial effort managed by government to collect public revenues to finance public expenditures and to use them to satisfy public needs (Al Mashhadani& Al-Tai, 2014, p. 71).

Several studies have been conducted to verify the appropriateness of this law, includingKargianni et al (2002), study the relationship between public expenditure and national income in the EU over the long term during 1949/98. The results were ambiguous; it shows that the validity (or invalidity) of Wagner's law is sensitive to the method applied (Karagianni et al, 2002). In 2006, BernardinAkitoly conducts study of 51 developing countries to test the relationship between public expenditure and GDP. According to Wagner's law, this study shows evidence that reflects the trend of increased government expenditure over time, which means that exist a long-term relationship between these two variables (Sinha, 2007).

In this study, we attempt to highlight the public expenditure phenomenon in Algeria through the application of Wagner's law.

– *Statistical analysis*

The statistics below represent the average per capita expenditure as well as per capita income.

Table 2: Per Capita Expenditure and GDP in Algeria (2000-2016)

Per Capita GDP rate (%)	Per Capita Public expenditure rate (%)	Per Capita GDP	GDP	Per Capita Public expenditure	Public expenditure	years
-	-	135570.5	4123513	38733.6	1178122	2000
3.41	10.44	136892.8	4227113	42780.7	1321028	2001
17.16	15.59	144234.8	4522773	49451.35	1550646	2002
41.82	7.3	164918.3	5242321	53070.05	1690175	2003
47.25	10.14	189998.6	6149116	58452.40	1891769	2004
68.1	6.68	229805.6	7561894	62360.50	2052037	2005
38.6	17.48	253924.1	8501635	73265.8	2453014	2006
27.8	24.43	274310.3	9352886	91171.07	3108569	2007
49.30	32.89	319265.2	1104370	121160.1	4191051	2008
30.2-	0.62-	282636.5	9968025	120401.8	4246940	2009
42.08	3.11	33302.6	11991563	124157.5	4466940	2010
51.56	28.40	397323.6	14588531	159423.9	5853569	2011
21.93	18.07	432289.5	16208698	188243.04	7058173	2012
1.31	16.43-	434764.6	16650181	157300.3	6024131	2013
3.8	13.70	440827.9	17245448	178855.8	6995769	2014
16.8-	5.95	410689.9	16591875	189513.1	7656331	2015
2.06	6.53-	414607.6	17081836	177123.6	7297494	2016

Source: the researcher based on different sources

Statistics and data on public expenditure during the period 2000-2016 indicate that there is growing path of public expenditure which has fluctuated in many cases, particularly the ratio of public expenditure to GDP (i.e., the amount allocated for GDP trough public expenditure), which reflects the extent of government intervention on economic development. Furthermore, the result founds that the average per capita expenditure was 10.03% during the study period, while the average per capita growth rate was 21.73% for the same period, which confirms that the increase rate of per capita public service is less than the increase in per capita GDP. Surprisingly, the result opposites Wenger's law, this is mainly due to the fact that the increase in domestic demand was met by imports, which caused a significant leakage of the national currency.

- *Measurement and Analysis*

The Wagner's law defines the relationship between public expenditure and economic activity, i.e., the government exercises its economic role. The study uses per capita government expenditure as a significant indicator of public expenditure increase and per capita GDP as a significant indicator of the government's role in economic life.

$$DP/POP=\alpha+\beta 1GDP/POP+\mu$$

We have relied on annual data using EVIEWS9. The results are as follows:

Dependent Variable: DPP
Method: Least Squares
Sample: 1 17
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29773.82	8669.265	-3.434411	0.0037
GDPP	0.478768	0.027616	17.33671	0.0000
R-squared	0.952466	Mean dependent var		110909.8
Adjusted R-squared	0.949297	S.D. dependent var		55859.88
S.E. of regression	12578.18	Akaike info criterion		21.82745
Sum squared resid	2.37E+09	Schwarz criterion		21.92547
Log likelihood	-183.5333	Hannan-Quinn criter.		21.83719
F-statistic	300.5615	Durbin-Watson stat		1.497964
Prob(F-statistic)	0.000000			

- *Statistical significance of the model*

The application of simple linear regression relationship to test the correlation between per capita expenditure (as dependent variable) and per capita GDP (as independent variable) produced the following results:

DEPP=-29773.8+0.48GDPP

(-3.43)** (17.33)**

R2=0.94 R=0.97 F=300.56** DW=1.49

**significant level at %5

The regression show that there is a correlation between the per capita expenditure of DEP (as dependent variable) and the GDPP (as independent variable). this is explained by the correlation coefficient estimated at 0.97, and the coefficient of determination which is estimated at 0.94 which means that 94% per capita expenditure comes from per capita gross income, while

5% comes from other changes not included in the model. The estimated model is statistically significant (test P-VALUE). The null hypothesis was rejected, meaning that the model is statistically significant at 5%. The DW test indicates that the model is free from auto-correlation problem.

- *Economic interpretation of the model*

The analysis of linear regression equation weight is 0.48; this means that an increase in per capita GDP by 100 units leads to an increase in per capita government expenditure by 48 units, which opposites Wagner's law. This law insists that the increase in per capita public expenditure should be greater than the increase in per capita GDP.

Although many developed economies have confirmed the application of this law, many researchers have questioned the model hypothesis. The measurement models have confirmed the nonexistence of relationship in developing countries as Wagner pointed out. This can be explained by the fact that the economic process is a complex and cannot be limited to one indicator such as per capita GDP. The Wagner's effect is applicable only in developed countries because the public expenditure in these countries is financed by tax deductions, while public expenditures in developing countries are mostly dependent on rental resources (Such as the case of Algeria).

This result is due to poor tax collection. For example, the coverage rate for current expenditure did not exceed 43% in 2014 (Ghagati), so the regression coefficient shows that GDP per capita is not an indicator of performance in developing countries. "GDP per capita reflects one aspect of economic development; therefore, developing countries need more accurate and more meaningful indicators than per capita GDP indicator" (Al-Aib, 2010, 275).

5. CONCLUSION

In this study, we found that the Wagner's law was appropriate to verify the Algerian economy situation; especially that Algeria has adopted a series of economic development plans that require an increase in public expenditure size to promote national economy in order to stimulate the aggregate demand that leads in turn to an increase in GDP.

However, the almost total dependence of the Algerian economy on oil exports, and the continuation link of the entire plan to oil exports have had a major impact on economic stability. In this study, we recommend this point:

- Adoption of new financing tools for public expenditures to reduce

the economic dependency on rents (oil);

- Directing the public investments towards productive investments of wealth, which require the labor intensity and the role of entrepreneurship as the main engine of any economy;
- The need to direct public expenditure toward sustaining domestic demand of domestic products in order to boost GDP;
- Implementing a serious control system on public expenditure and directing the public budget according to management by objectives (MBO) approach in order to achieve the economic and social objectives of public expenditure programs.

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