

# The Causal Link Between Government Expenditure And Economic Growth In Egypt Over The Period From 1952 To 2020.

Mohammed Galal AbdAllah Mostafa

Economic Department- Faculty of commerce -Mansoura university  
Corresponding author: Mohammed Galal AbdAllah Mostafa

## ABSTRACT

Several studies have examined the causal relationship between government expenditure and economic growth. These studies yielded mixed results. Therefore, this study seeks to know the direction and nature of the relationship between government expenditure and economic growth in Egypt during the period from 1952 to 2020. Advanced econometric models were used for this purpose. The ADF (Augmented-Dickey Fuller) and PP (Phillips and Perron) test were used to verify the stationarity of the time series of the variables under study. The Granger causality test was also relied on to determine the direction of the relationship between government expenditure and economic growth in Egypt, and the VAR model (Vector auto regression model) to find out the nature of the relationship between government expenditure and economic growth. The study found that government expenditure is the motive of economic growth in Egypt, and the relationship between them is positive, meaning that the relationship between them is in one direction and starts from government expenditure. This means that the second trend, led by Keynes, applies to the state of the Egyptian economy. It also expresses that the Egyptian economy is still dependent on the government to achieve economic growth and is governed by excessive governmental interventions, tight administrative policies and restrictions, a large and inefficient public sector and a low role for the private sector. In the future, the researcher hopes that other studies will seek to search for the direction and nature of the relationship between the components of government expenditure and economic growth in Egypt.

**Keywords:** causality government expenditure economic growth

## Correspondence:

Mohammed Galal AbdAllah Mostafa  
Economic Department- Faculty of commerce -Mansoura university

\*Corresponding author: Mohammed Galal AbdAllah Mostafa

## Introduction

The relationship between government expenditure and GNP is one of the most controversial topics in the economic growth literature. The size and direction of this relationship has aroused a lot of interest among many economic and political researchers (Abu-Eide, 2015; Debnath & Mazumder, 2016). So studying the relationship between these macroeconomic variables is of crucial importance, especially with policy makers, who need to Adequate understanding of these dynamic variables to be able to design and implement appropriate policies (Salih, 2012; Ghazy et al., 2020).

Hence, many studies sought (Samudram & Vaithilingam, 2009; Kalam & Aziz, 2009; Wu et al., 2010; Ageli's, 2013; Rana, 2014; Magableh et al., 2014; Alshahrani & Alsadiq, 2014; Kyissima et al., 2017; Kouassi, 2018; Ahuja & Pandit, 2020) to look for the causal relationship between government expenditure and economic growth to demonstrate which of them drives the other. These studies concluded that the relationship between economic growth and government expenditure may be in one or both directions<sup>1</sup> (Debnath & Mazumder, 2016):

**The first approach** was pioneered by Wagner, in which economic growth is the drive of government expenditure. Wagner saw that the gross domestic product or national income is the determinant of the size of government expenditure. Wagner formulated his law on the basis of his empirical observation of several advanced capitalist industrialized nations as he found an ever increasing long-term trend of government expenditure as per capita income rose. Among the studies that have reached the validity of this trend is a study of (Kolluri et al., 2000;

Islam, 2001; Chang, 2002; Al-Faris, 2002; Aregbeyen, 2006; Sideris, 2007; Kalam & Aziz, 2009; Rehman et al., 2010)<sup>2</sup>. As for **the second approach**, its leadership is Keynes, in which government expenditure is the motive of economic growth, and Keynes adopted this approach as a result of the Great Depression in 1929, upon which he proposed a fiscal policy according to the increase in overall demand by increasing government expenditure to counteract the decline in gross domestic product in this Period. In other words, government expenditure as one of the two wings of fiscal policy is an external variable whose goal, according to the Keynes, is to maintain economic stability in the short term and enhance growth in the long term (Debnath & Mazumder, 2016). Among the studies that have found the correctness of this approach is the study (Jiranyakul & Brahmasrene, 2007; Pradhan, 2007; Babatunde, 2008; Magazzino, 2010; ghodaro & Oriakhi, 2010)<sup>3</sup>.

Although most of the studies that dealt with the first approach have agreed on the validity of the Wagner law in the early periods of the development process, the applied studies that adopted the second approach and dealt with the impact of government expenditure on economic growth have reached mixed results. While some of them see that government expenditure has a positive effect on economic growth (Ram, 1986;

<sup>2</sup> these studies covered different countries, some of which are advanced and some others are developing. The study (Al-Faris, 2002) was applied to all of the Gulf Cooperation Council, while the study (Rehman et al., 2010) was applied to Pakistan, while the study (Kolluri et al., 2000; Islam, 2001) was applied to. The seven industrial countries and the United States of America.

<sup>3</sup>These studies also included different countries, including both developed and developing countries

<sup>1</sup> the relationship between them may be in one of the following forms: (1) a one-way relationship, (2) a two-way relationship, or (3) no relationship.

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Kormendi & Meguire, 1986; Grossman, 1988; Diamond, 1989; Carr, 1989), others have reached a conclusion that contradicts the above, which is that government expenditure is performing a negative impact on economic growth (Folster & Henrekson, 1999; 2001; Dar & Amirkhalkhali, 2002; Chen & Lee, 2005). Moreover, not a few studies conclude that government expenditure does not have a specific effect on economic growth, and it may be positive in periods. It may be negative in other periods, and it may differ from another country and from one expense to another, in addition to that the relationship between them may be reciprocal in two directions (Ayo et al., 2011).

As a result of the clear controversy in the relationship between government expenditure and economic growth, the researcher will seek to know the nature and direction of this relationship in Egypt during the period from 1990 until 2020. To achieve this purpose, the research was divided into three main sections. The first section deals with the introduction. The second section deals with the theoretical framework that clarifies the nature of the relationship between the study variables. Then, in the final part, we look at the model that clarifies the direction and nature of the relationship between government expenditure and growth in Egypt in order to arrive at the results and recommendations of the study.

### First: the theoretical framework

In this part, we will discuss the intellectual schools that dealt with the nature and direction of the relationship between economic growth and government expenditure. In general, economic opinions in this regard were divided into two directions:

**The first approach:** economic growth as a motive for government expenditure

Studies looking at the impact of economic growth on government expenditure have concluded that there is a one-way causal relationship. government expenditure is an endogenous variable and a function of economic growth. The significant relationship between government expenditure (G) and economic growth (Y) can be illustrated as follows (Ansari et al., 1997; Khairul, 2011):

$$G = f(Y) \quad (1)$$

In general, the proponents of this Approach see that there is a positive one-way relationship between economic growth and government expenditure, and this relationship begins with growth. This view was adopted by a study (Ghazy et al., 2020; ORCID et al., 2020; El Hussein, 2019; Eldemerdash & Ahmed, 2019; Narayan et al., 2008). What is more, the study (ORCID et al., 2020; Sideris, 2007) not only concluded that there is a one-way causal relationship between economic growth and government expenditure, but also that there is a long-term equilibrium relationship between them. The pioneer in this approach is Adolf Wagner's law (1835-1917). His study has shown that there is a positive and one-way relationship between economic growth and government expenditure, as shown in Figure (1), which shows that achieving economic growth prompts the achievement of more development and modernization processes in society, which drives the state to assume the responsibility of providing more of public goods and services, in addition to working on the rule of law and implementing of contracts, and facing the control of monopolies and market failures, in addition to taking into account social and cultural aspects in order to achieve the

well-being of members of society, which leads to an increase in government expenditure. In general, Wagner's study is regarded as the most famous pioneering research in explaining the phenomenon of the steady increase in government expenditure. Wagner diagnosed this phenomenon in 1892 and drafted a law called the "Law on the Continuous Expansion of Governmental Activity," in which he decided that the progress achieved in society would result in a continuous increase in government expenditure, whether in absolute or relative size. (Afzal & Abbas, 2010). Wagner explained this increase that the rise in the level of income as a result of growth pushes the state to the necessity to provide more public services and goods to meet the demands of its people, and thus increase government expenditure, in addition to the structural changes, whether economic or social, represent other factors that feed more public services, and then more government expenditure (Adallah, 2004; Ghazy et al., 2020).

Anyway, the positive relationship between growth and government expenditure according to the proponents of this view can be explained by the following reasons (Papas et al., 2019; Afzal & Abbas, 2010; Slemrod et al., 1995):

-Social and political pressures arising from modernization and industrialization. The high rate of economic growth due to the industrial development resulting from it may be accompanied by a disparity in the distribution of income, which requires the state to intervene through its social role to redistribute income in order to achieve social justice and then increase aid, social benefits and social care, which necessarily leads to an increase in government expenditure (Henrekson, 1993; Richter & Paparas, 2013).

-The continuous increase in the role of the state over time due to economic growth and the consequent expansion of the size of the public sector and the increase in demand for its products. In addition, the acceleration of economic growth requires a greater increase in government expenditure than the normal size, as the state's need for more administrative and protective jobs increases, as well as providing a greater number of sound administrative controls to ensure that market forces operate efficiently (Guesh, 1997).

-The high rate of economic growth leads to a rise in the average real per capita income, and hence the increase in the income elasticity. Wagner assumed that income elasticity exceeds one, which leads to an increase in the demand for luxury goods, which he identified with education and culture. It is entrusted with providing those commodities. Hence, the state must provide a greater amount of social and cultural goods and services, which also leads to an increase in government expenditure (Slemrod et al., 1995).

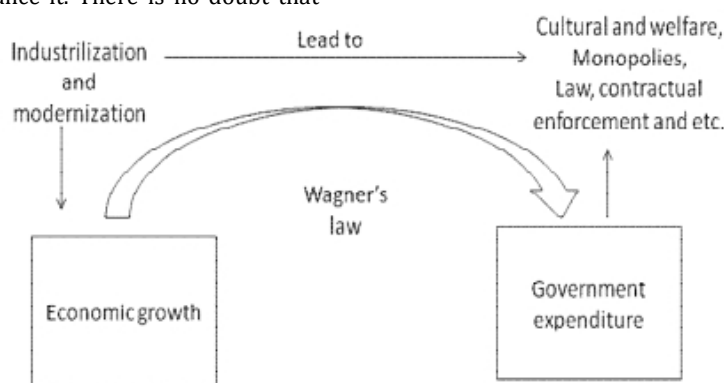
-The existence of natural monopolies - for example, railway projects - that the private sector is unable to assume responsibility for managing due to the high cost of operating them, as well as the huge investments needed to establish them, which means that the state is responsible for spending on establishing and managing such monopolies, which contributes to its role as well. In increasing government expenditure, the state's control over these monopolies is due to its view, because it is the most capable of managing them efficiently compared to the private sector (Ghazy et al., 2020).

-Historical reasons and he mentioned the previously accumulated debt service as an example, and this was

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justified by the fact that a steady increase in government expenditure may lead to a deficit of the public budget and an increase in debt to finance it. There is no doubt that

the budget deficit has expansionary effects on the economy.



**Figure( 1): Circular flow expressing Wagner's law**

Source:( Khairul, 2011)

In a final comment on this Approach, it can be said that Wagner's law has not been valid in all cases as follows:

- several studies have shown that this law has proven invalid at the high growth levels of some countries, and when applied to more recent time periods. This indicates that this law has specific conditions and scope to prove its validity (Karceski& Kiser, 2019). Therefore, the study (Gatsi etal., 2019) concluded that there is no causal relationship between economic growth and government expenditure in Ghana between 1960 and 2017, and thus the invalidity of Wagner's law in the case of the Ghanaian economy. The study (Ahsan et al., 1992; Bagdigen & Cetintas, 2003; Taban, 2010) reached the same conclusion when applied to other countries such as the United Kingdom and Turkey

- government expenditure is not affected by economic growth alone in order to increase. There are, in addition to known and specific factors, some socio-economic factors that cannot be quantified and have an impact on it .

### **The second approach: government expenditure as a motive for economic growth.**

Contrary to the previous approach, proponents of this approach argue that the chain of multiplier that occurs to the national economy begins with government expenditure, and Keynes is the leader in this approach<sup>4</sup>.

<sup>4</sup> Keynes showed the importance of government expenditure in support of economic growth, as Keynes believed that government expenditure is an external variable that is used as a tool that works to manage aggregate demand and enhance economic growth. The Keynesian view is that there is no strong automatic mechanism in the economy that can move production and employment levels to the level of full employment, and then government intervention through government expenditure in order to move economic activity and rid it of the recession that suffers from. . The theoretical imaging of Keynes' theory can be analyzed with the AS-AD aggregate demand model. The national income equation is:

$$Y = C + I + G + NX$$

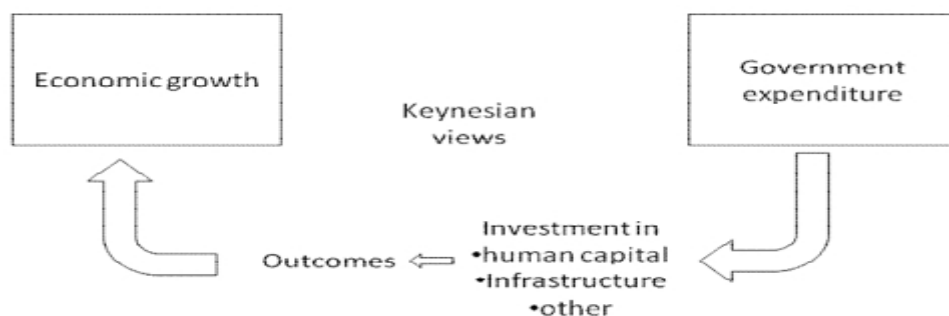
Where, Y represents GNP (national income or gross national product), C represents total consumption, I represents investment, G represents government expenditure, NX represents net exports (exports - imports). It is clear from the previous relationship that the variable G is one of the components of total spending, which is equal to the gross national product (GNP), as any increase in G will lead at the

Faced with the Great Depression in 1929, Keynes proposed an expansionary fiscal policy based on increased government expenditure. Thus, he consider the variable government expenditure that will save the economy from its drop and then raise economic growth. There is no doubt that this reveals that government expenditure according to it is the drive of all economic variables, including economic growth. Figure No. (2) shows this point of view as it shows the existence of a positive one way relationship, moving from government expenditure to economic growth, as an increase in government expenditure, whether consumer or investment (in the areas of infrastructure, education and health), will lead to an increase in effective demand. And then increase the profitability of companies, especially those owned by the private sector, which may lead to an increase in investment as a whole and private investment in particular, and then increase economic growth, either as a result of increased incomes due to an increase in the employment rate, which increases the demand for its products, or because of the strengthening of private sector investments through the effect of integration. Where a study (Lin, 1994) confirmed that the contribution of government investment spending to the economy will be higher than that of government consumption spending because it tends to encourage private investment. The study (Argimón etal., 1997) showed that the effect of integration (Crowding in) is through the positive effect that public investments in the infrastructure sector have on the productivity of private investment.

same time to an increase in the GNP, which depends on the effect of the multiplier. The overlapping relationships between the Y and G variables can be illustrated through the AD - AS model, as any movements in the aggregate demand curve AD will occur due to the total expenditure components such as (C, I, G, NX):

$$AD = Y = C + I + G + NX$$

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Figure(2): The circular flow expressing Keynes's view  
Source:( Khairul, 2011)

In general, it can be said that although the government expenditure policy adopted by Keynes has had a special importance in economic thought, applied studies in this regard have revealed that the role it can play in achieving economic growth is still a matter of debate among economists In all countries equally (Samudram et al., 2009). These studies concluded with TOW opinions, as follows:

**government expenditure plays a positive role in enhancing economic growth**

Several studies have shown that there is a positive relationship between government expenditure and economic growth (Rubinson, 1977; Ram, 1986; Kormendi & Meguire, 1986; Grossman, 1988; Diamond, 1989; Lin, 1994; Sinha, 1998; Yasin, 2000; Jiranyakul& Brahmasrene, 2007; Ranjan & Sharma, 2008; Cooray, 2009; Gisore et al., 2014; Putri et al., 2018; Ahuja & Pandit, 2020). Moreover, a study (Sinha, 1998) concluded that the relationship between them is long-term. What is more, many theoretical and empirical studies in this area (Sattar, 1993; Bairan, 1998; Macnair et al., 1995) have shown that a larger government may be more able to accelerate the acceleration of economic growth.

In general, the positive role of government expenditure in stimulating economic growth may be justified by the following:

-There is no doubt that the role that government expenditure plays in achieving integration between the public sector and the private sector within the framework of optimal economic efficiency supports economic growth. Both the market forces<sup>5</sup> or the government cannot work alone to achieve economic efficiency. Their roles are complementary to the other. This integration is what may encourage the private sector to invest, and thus raise the rate of economic growth. The role of the government in this integration is through either establishing market-supportive institutions and providing legal and institutional frameworks without which markets do not function efficiently, remediation externalities, establishing a stable monetary system, supporting exports and protecting intellectual property rights (Taylor, 1988; Lindauer& Valenchik, 1992; Khairul, 2011) Or through the provision of public goods that improve the economic environment, such as defense, security, justice and social safety services, and correct market failures, which achieve efficiency in resource allocation (Dalamagas, 2000; Khairul, 2011).

<sup>5</sup> Market forces alone cannot achieve economic efficiency because the assumptions on which they are based are not available, as they assume the existence of perfect competition in the markets, while the current situation is the demonstrating of monopolistic competition and monopoly

-The contribution that government expenditure on the field needed for human capital development – education, health and training – to improve the productivity of the labor force and then raise the rate of economic growth on the one hand as well as attract investments in general and foreign capital in particular, which also leads to stimulating economic growth on the other hand (Ahamed& Ahamed, 2005; Khairul, 2011).

- government expenditure plays a fundamental role in several fields that may support economic growth. These fields may be **either** by providing an attractive environment for investment through concern for social capital, such as spending on infrastructure, **or** by directing government expenditure towards productive fields (Yasin, 2000) and operating idle resources such as interest in agriculture and industry, especially labor-intensive industries, especially in developing countries. Achieving balanced development for regions, establishing poverty reduction programs, and achieving economic and social stability, which in turn may also contribute to stimulating economic growth. In addition, support for growth may be through efforts to achieve efficiency in resource allocation.

-government expenditure may lead to stimulate aggregate demand and then increasing the national product as one of the components of national spending - in addition to consumption, investment and net export (C + I + G + NX) - and thus increasing investment and employment and improving economic growth rates. The increase in government expenditure for investment and employment in the economy is through the multiplier effect on aggregate demand (Edward, 2009; Chobanov& Mladenova, 2009). The following equation shows the effect of the increase in government expenditure (G) on GNP (Y) as follows:

$$Y = [\frac{1}{1-b}] \partial G$$

Where  $G\partial$  denotes the change in government expenditure and  $Y \partial$  denotes the change in GNP, and **b** expresses the marginal propensity to consume. This indicates that any increase in government expenditure will lead to greater increases in income or GNP (economic growth) by the action of the multiplier (Maingi, 2011).

**Government expenditure negatively effects on economic growth**

Contrary to the previous opinion, many applied and theoretical studies have concluded that government expenditure may exert a negative impact on economic growth, including these studies (Ram, 1986; Landau, 1986; Barro, 1990; 1991; Gwartney et al., 1998; Folster& Henrekson, 1999; Engen et al., 2001; Dar& Amirkhalkhali, 2002; Chen& Lee, 2005; Schaltegger& Torgler, 2006; Afonso & Furceri, 2008; Romer & Romer, 2010; Hamzah, 2011; Churchill & Yew, 2017). What is more, the findings of a study (Bairam, 1990), which showed that the



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government intervention in the economy in an exaggerated manner through its fiscal policy, of which government expenditure is one of its tools, may have positive effects for some countries and negative effects for others. (Grossman, 1988;1990) also confirmed the same opinion, but showed that although government intervention in the economy in an exaggerated manner may have positive and negative effects on economic growth, the net effects will be negative. In the same context, (Conte& Darrat, 1998) showed that changes in economic growth are not affected by the expansion of the public sector. (Gemmell, 1983) also showed that the expansion of the public sector and the large size of government contribute to the growth of non-market sectors, which may have negative effects. On the overall economy, in addition to the fact that these effects differ greatly from one country to another.in general, explanations that demonstrate this point of view are presented as follows:

-The increase in government expenditures is usually accompanied by a weakness in public administration and a low level of efficiency in the performance of the public sector as a result of the absence of democracy, the spread of bureaucracy, favoritism, poor leadership selection, the ineffectiveness of legislative authority, the presence of unconscious executive authority, the high cost of public service as well as the emergence of rent seeking activities That brings quick profit. There is no doubt that this environment is an environment that is not attractive to investment on the one hand and directing resources away from productive fields on the other hand, which may contribute to misallocation of resources and thus discourage economic growth (Khairul, 2011).

-The existence of a group of factors that spur negative effects on the political process<sup>6</sup>, thus weakening the possibility of public policy achieving the principle of optimal economic efficiency, which negatively effects on economic growth, the most important of these factors; **1)** The inability of the voter to vote consciously and consciously due to his ignorance of many facts related to the political process and national issues, which negatively affects his motives and behavior, and **2)** the pressures exerted by economic and political pressure groups to achieve special interests by influencing the political behavior of the government, and **3)**The hidden cost and political myopia. It is often difficult for voters to know the correct effects of public policy on their living , and failure to know the benefits of a policy may lead to the rejection of highly efficient investment projects, and the lack of information may lead to the acceptance of inefficient projects, which weakens the economic efficiency(Brown& Jackson, 1982; Facchinil& Melki, 2008).

-when government larger than its optimum size leads to a decline in the efficiency of the public sector, especially in developing countries. This undoubtedly will negatively affect the total productivity of the factors of production

and the productivity of the capital in particular, thus hindering the process of capital accumulation and thus negatively affecting economic growth in the long term (Odawara, 2011).

-The negative impact arising from the crowding out effect that occurs as a result of competition between public and private investments in obtaining loans. The study (Koori, 1984; Lippman et al., 2005) showed that the crowding out effect appeared between public and private investments in Kenya in the manufacturing industries, electricity and water sectors, which negatively affected the overall productivity of the economy.

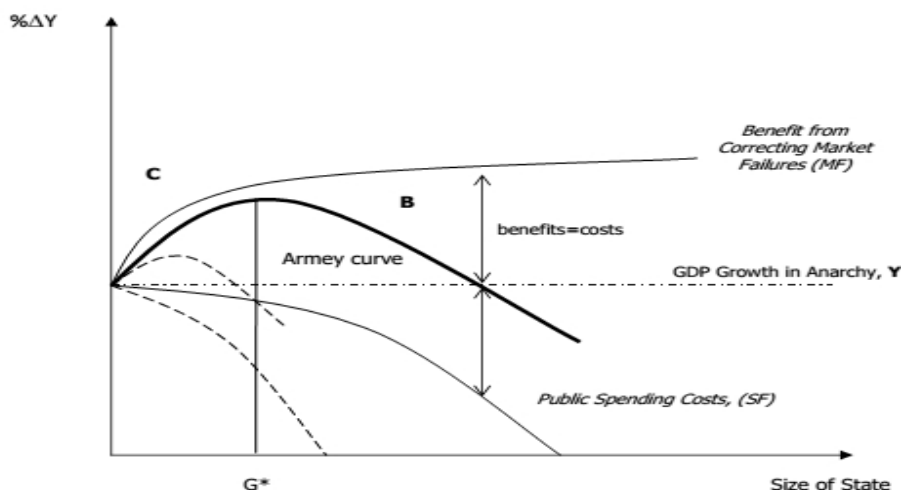
-The decrease in income that may occur as a result of taxes that may be imposed to finance increased government expenditure, which may negatively affect overall demand on the one hand, saving and investment on the other hand, and then negatively effect on economic growth, in addition to some who saw that public consumption has no direct impact on Private sector productivity. Even if taxes are considered public saving, but in light of misallocation of resources, this will also have a negative impact on economic growth (Engen et al., 2001; Romer& Romer, 2010). Therefore, the study (Romer & Romer, 2010) confirmed that the tax increases imposed for Financing the increase in government expenditure in the United States after World War II negatively effect on its economic growth.

-Some interpreted the negative impact of government expenditure on economic growth through the costs arising from the government's failure when it intervened in the economy at a level exceeding of its optimal size, which was determined by previous literature review at a rate ranging between 30-50% from GNP, considering that government expenditure is a proportion of GNP is the measure of government intervention. The reason for the negative impact of this is that governments transcend the limits of their functions and intervene heavily in economic activity in order to correct the negative results arising from market failure, which will inevitably lead to the occurrence of many distortions and deviations, which negatively effect on economic growth. This confirms that although government intervention in economic activity is a basic and necessary requirement, especially in developing countries to increase and enhance economic growth and its stability, this intervention has limits in order not to lead to a reduction in economic growth rates (Krueger, 1990; Evangelopoulos, 2007; Boettke et al., 2007; Munger, 2008). Figure (3) shows that.

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<sup>6</sup> Representative democracy - like a competition market - establishes an ideal model that does not necessarily reflect the reality of application. For the system to function efficiently, it is necessary; 1) the availability of information among the voters, 2) competition between politicians to obtain votes, 3) the occurrence of large-scale coalitions between political parties, and 4) the sensitivity of voting systems to desires, and (5) minimal distortion through behavior.

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**figure No. (3):** the positive and negative impact of government intervention on economic growth and its optimal size

**Source:** (Facchinil& Melki, 2008)

**Before  $G^*$**  the ARMY curve is upward indicating a positive effect of government expenditure on economic growth. This curve is an expression of the net positive effect of the slope of both the MF curve and the SF curve ( $c + b$  sum in figure). The net positive effect of the two curves together occurs as a result of the marginal benefits accruing from government intervention to correct market failure, expressed as the slope of the MF curve ( $b$ ), **greater than** the marginal costs incurred by the government when intervening in the economy and expressed as the slope of the SF curve( $c$ ). Moreover, in this part of the SF curve, when government expenditure increases, economic growth increases at an diminishing increasing rate then diminishing decreasing rate (Imai, 2009; Hillman, 2009). In addition to the above, some interpreted the increase in the ARMY curve in this part through the equation representing the ARMY curve as follows (Facchinil& Melki, 2008):

$$GDP\ growth = a + bG - cG^2 \quad (2)$$

According to equation(2), the rates of increase in  $cG^2$  have a slower effect than the rates of increase in  $bG$ , which makes the negative effects of government intervention less than the positive effects, which ultimately effects positively on economic growth rate.

**After  $G^*$**  the ARMY curve is downward sloping indicating that government expenditure has a negative effect on economic growth. This curve is an expression of the net positive effect of the slope of the MF curve and the SF curve ( $c + b$  from figure). The net positive effect of the two curves together occurs as a result of the marginal benefits accruing from government intervention to correct market failure, expressed as the slope of the MF curve ( $b$ ), being less than the marginal costs incurred by the government when intervening in the economy and expressed as the slope of the SF curve( $C$ ). Moreover, in this part of the SF curve, when government expenditure increases, economic growth decreases as a result of excessive government intervention in the economy and exceeding the optimum size, as well as the emergence of the negative influence exercised by public pressure groups to achieve their interests and the absence of a rational and bureaucratic voter (Williamson, 2005; Imai, 2009) ; Hillman, 2009) In addition to the above, some

interpreted the slope of the ARMY curve in this part through Equation No. (2), in which the rates of increase in  $cG^2$  have a faster effect than the rates of increase in  $bG$ , which makes the negative effects of government intervention more than its positive effects, which effect negatively on economic growth rates.

**Finally:** The researcher believes that when studying the relationship between government expenditure and economic growth, **focus should be placed on the following:**

-The theoretical and applied studies that attempted to explain the direction and nature of the relationship between government expenditure and economic growth did not reach a conclusive conclusion about that relationship. There were different results, and this discrepancy is due **either to** the different degree of economic development that different countries go through, whether developed countries or developing countries, **or** it may be due to the different time periods for each study or to the different methodologies and econometric methods based on the application, or the results may differ According to the study sample used. Moreover, when studying this relationship, it should take place in light of the structure of government expenditure, as public expenditures have many types and thus have homogeneous effects on economic growth, which means that the positive or negative impact may be determined based on the nature and purpose of the expenditure.

-The relationship between government expenditure and economic growth is a reciprocal one. Meaning that the causal relationship between government spending and economic growth can be one-way or two-way. It may move from government spending to economic growth, or vice versa. It is clear that there is a link between the two viewpoints, as an increase in government expenditure, raises the rate of economic growth according to Keynesian thought, and economic growth leads to an increase in overall demand, which in turn requires that there be an increased role for the government through government expenditure to meet this demand, according to Wagner law (Ayo et al., 2011).

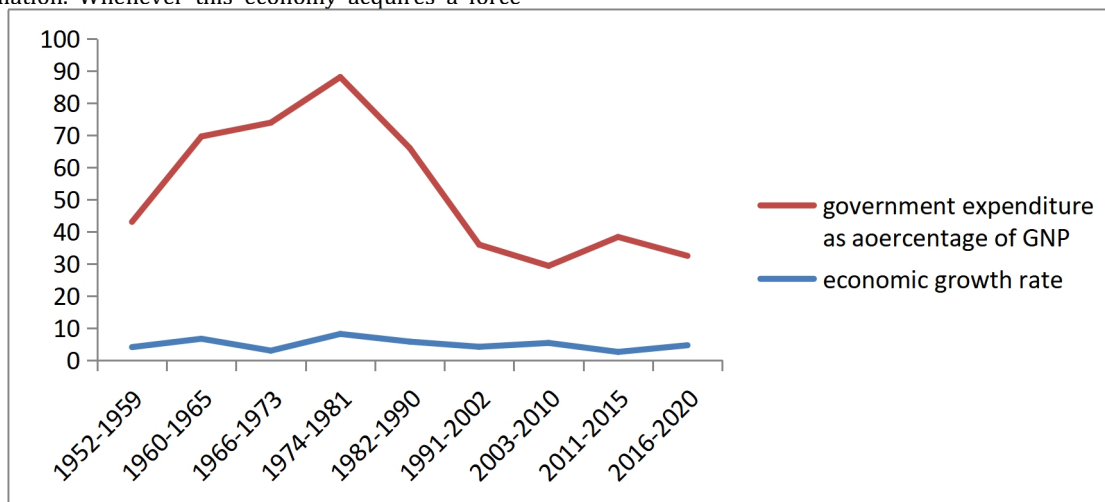
-Both Wagner's law and Keynes' hypothesis represent a short-term phenomenon. Hence, the causality test methodology helps to identify the short-term overlap between government expenditure and economic growth (Tang, 2010).

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### Second: evolution of government expenditure and economic growth in Egypt

We aren't far from being the truth when we say that the Egyptian economy since the 1952 revolution until 2020 suffers from several problems and challenges. Those familiar with the data on the Egyptian economy will find that this economy has suffered and is still suffering from deteriorating economic and social conditions. Despite the different economic policies that were followed during the aforementioned period, there is no general stable upward trend in the rate of economic growth. Figure (4) shows that the rate of economic growth in Egypt is characterized by instability around low rates. **This is due to many factors**, including; (1) His lack of continuity and accumulation. Whenever this economy acquires a force

that pushes it upward, this power recedes and turns into a force that pulls it backward, and remains unable to launch a captive of the factors of weakness and the strong backwardness and dependency, the persistence of poverty and the government's inability to improve the quality of life, and (2) the structural imbalances that the economy suffers from, and (3) The weak contribution of productive or commodity sectors to the GNP, (4) external shocks and internal conditions such as the global financial crisis in 2008 and BOTH revolutions OF the January 2011 and June 2013, and (5) misuse of resources and poor productivity of the labor Factor, and ( 6) Social obstacles such as the high population growth rate, weak public administration, etc



**Figure no(4):** evolution of government expenditure as a percentage of GNP and economic growth in Egypt during (1952-2020)

**Source:** The researcher prepared and based on the World Bank database, reports of the Ministry of Finance.

Moreover, figure No.(4) shows that the ratio of government expenditure to GNP has decreased from about 63.25% during the period from 1952 to 1981 to about 35.94% during the period from 1982 to 2020. This increase is due to the first period to the economic policies that were followed at that time and which were dependent on the state and its public sector to move the economy. The gradual liberalization towards a market economy as a result of the economic reform programs implemented by Egypt in implementation of the instructions of the International Monetary Fund since the nineties of the last century also contributed to the decline in the ratio of government expenditure to GDP compared to the first period.

### Third: data and Methodology

The next part of the research aims to identify the direction and nature of the relationship between government expenditure and economic growth in Egypt. To achieve this purpose, the researcher will use the following two variables:

**Y:** Express economic growth. The rate of economic growth is used as an indicator. It was obtained from the World Bank database and the International Monetary Fund database

**G:** It expresses government expenditure. The ratio of government expenditure to GNP was used as an indicator. His data was obtained from several sources. The period from 1952 to 1990 from the reports of the Ministries of

Finance and Planning, while the period from 1990 to 2015, the World Bank and International Monetary Fund database, and finally the period from 2015 to 2020 obtained from the Ministry of Finance reports.

### Unit root test

The application of the causality test and the VAR model (Vector auto regression model) requires the determination of the degree of integration of the variables under study, which is determined through time-series stationarity tests using the Augmented Dickey-Fuller (ADF) test or the Phillip-Peron test<sup>7</sup>.

In order to apply the Causality Granger Test, the time series of the variables under study be stationarity. In general, unit root tests aim to examine the time-series properties of variables and ensure their stationarity. As the estimation through time series of nonstationarity variables gives misleading results, in what is called "spurious regression".

Therefore, before embarking on the study of any economic phenomenon, it is necessary to ensure the stationarity of the time series. A stationarity time series is one whose levels change with time without the mean in it constantly changing towards increasing or decreasing.

### The time series is stationarity if it has the following characteristics:

<sup>7</sup> To test the stationarity of the time series for the study variables, we rely on what is known as tests Unit Root. There are many such tests, the most important of which are: Phillips and Perron (PP), 1988 & Kwiatkowski, Phillips, Schmidt and Shin (KPSS), 1992 & Augmented Dickey-Fuller (ADF), 1979.

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-Its expectation (its mean) is constant over time and independent of it

-Its variance is constant over time and independent of it  
-The covariance between any two values of the time series ( $Y_t, Y_{t+k}$ ) is related only to the time gap between them (k), and not to the actual value of the time at which the covariance is calculated. So that the values of the variable don't depend on its value in the previous period, and that time doesn't explain an important aspect of the changes occurring in those variables.

The Augmented Dicky-Fuller test (ADF) begins with equation No.(3) where only difference between the independent variables and the dependent variable is time lag (K) in order to get rid of the autocorrelation of the residual.

$$\Delta y_t = \alpha + \delta t + \rho y_{t-1} + \sum_{i=1}^k \gamma_i \Delta y_{t-i} + e_t \quad (3)$$

Where  $1 > \rho > -1$ .  $e_t$  : refer to the random error, and the stationarity condition is  $|\rho| < 1$ . The idea of this test is to make a regression of ( $y_t$ ) on its time lags value ( $y_{t-1}$ ), so if the value of estimated  $\rho$  equal to the one. In another meaning, if  $\rho = 1$ , that means ( $y_t$ ) is non-stationary, hence it is called the unit root.

### This test is based on the following assumptions:

Null hypothesis:  $1 = \rho$

Alternative hypothesis:  $\rho < 1$

We obtained the general form of the "Dicky-Fuller" test through Equation No. (4)

$$y_t = \rho y_{t-1} + u_t \quad (4)$$

Then we subtract ( $y_{t-1}$ ) from both sides of the equation to get the following formula:

$$\begin{aligned} y_t - y_{t-1} &= (\rho - 1)y_{t-1} + e_t \\ \Delta y_t &= (\rho - 1)y_{t-1} + e_t \\ \Delta y_t &= \end{aligned} \quad (5)$$

$\theta y_{t-1} + e_t$

Where ( $\rho - 1 = \theta$ ), while denotes the first difference of the time series ( $y_t$ ), and to determine if there is a unit root, estimate that new equation, and test the null hypotheses  $\theta = 0$ , which means that  $\rho = 1$  meaning there is one root. Whereas, if  $\theta = 0$ , the series follows a random path of the dependent variable. The Augmented Dicky-Fuller test

(ADF) tests the null hypothesis of a unit root, and hence the non stationarity time series, against the alternative hypothesis that the time series is stationarity. The null hypothesis is accepted or rejected through a statistical comparison the estimated (t) for parameter ( $\theta$ ) with the critical values in the Dicky Fuller table or the developed Mackinnon tables. If the absolute value of calculated (t) exceeds the tabulated value, then the null hypothesis is rejected, meaning that the time series is stationarity at its original level (the time series integral of degree zero). But if the absolute value of the calculated (t) is less than the tabulated value, the null hypothesis is accepted, that the time series is non stationarity "there is a unit root" and then the first difference of the time series must be tested, and if non stationarity The test is repeated for higher-difference... and so on. Where it must be noted that if there is a variable such as  $y_t$  stationarity in its original state before any modifications are made to it, it is integral of degree zero (0), and if this variable is non stationary in its original state, it becomes stable after taking the first difference  $\Delta y_t = y_t - y_{t-1}$  then The series is said to be stationary of degree(1). In general, if the series becomes stationary after obtaining a number of differences equal to d, then this series is stationary of degree (d).

As for the Philip and perron test (PP), it is based on the same regression equations of The Augmented Dicky-Fuller test (ADF), except that it differs from it in how to handle the chain link of higher ranks. So the Philip perron test has more accuracy than the The Augmented Dicky-Fuller Test (ADF)", especially when the sample is small in size. Therefore, in the event of a conflict between the results of the two tests, it is preferable to rely on the "Philip perron" test.

The unit root test was applied to the model under study and the results included in Table (1).

Before applying the Causality Granger Test, unit root tests were conducted, the results of which indicated that all time series are complementary from the zero order ( $I_0$ ) and at the level. So this meaning the absence of integrated time series at the first difference ( $I_1$ ) and the second difference. ( $I_2$ ).

**Table (1): results of unit root test**

Group unit root test: Summary				
Series: G, Y				
Date: 01/16/21 Time: 14:25				
Sample: 19				
Exogenous variables: Individual effects				
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 0 to 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
Obs	Cross-sections	Prob.**	Statistic	Method
Null: Unit root (assumes common unit root process)				
15	2	0.0139	-2.19947	Levin, Lin & Chu t*
Null: Unit root (assumes individual unit root process)				
15	2	0.1442	-1.06145	Im, Pesaran and Shin W-stat
15	2	0.0778	8.40540	ADF - Fisher Chi-square
16	2	0.0868	8.13400	PP - Fisher Chi-square
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.				

Source : outcome of e-views v.10 program



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Based on the table(1), it is evident through the Diky Fuller test or Philip perron test that the data on the variables under study, which are government expenditure and economic growth, are stationarity and significant at level , so the time series are integrated from the zero order, which means that the necessary condition to apply both the causality test and the VAR model is fulfilled.

### Granger causality test

To determine the direction of the relationship between government expenditure and economic growth in Egypt, the Granger Causality test is used. According to it, if we have two time series that express X (government expenditure) and Y (economic growth) during time (t). If the time series of X contains information that can be achieved by improving the prediction values of Y, then in this case X has an effect on Y (Granger, 1969).

In general, a causality test is required to determine the direction of the relationship between government expenditure (X) and economic growth (Y) through:

$$Y_t = \alpha + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{i=1}^p \phi_i X_{t-i} + \mu_{1i} \dots\dots\dots(6)$$

$$X_t = \delta + \sum_{i=1}^p \omega_i X_{t-i} + \sum_{i=1}^p \theta_i Y_{t-i} + \mu_{2i} \dots\dots\dots(7)$$

Where  $\mu_{1i}$  and  $\mu_{2i}$  represent the residual for two equation(6, 7). Moreover, the causality test begins with determining the number of time lags appropriate for the model, and uses the AIC and SC tests. Several studies have shown that the best number of time lags is the second time lags. Then the following steps are taken:

-estimate equation No.(6) with the assumption of  $\sum_{i=1}^p \phi_i = 0$  and this meaning that X has no effect on Y,

then the sum of the squares for the residual is calculated

$$\sum_{i=1}^p \bar{\epsilon}_{1i}^2$$

-test The null hypothesis that  $\sum_{i=1}^p \phi_i = 0$ , using the Fisher statistic F as follows:

calculated F

$$= \frac{(\sum_{i=1}^p \bar{\epsilon}_{1i}^2 - \sum_{i=1}^p \bar{\mu}_{1i}^2) / P}{\frac{\sum_{i=1}^p \bar{\mu}_{1i}^2}{N - K}} \quad (7)$$

Where n is the sample size, k is the number of estimated parameters, n-k degrees of freedom. Next, we get the tabulated value of F. In order to know whether or not the null hypothesis is accepted, a comparison is made between the computed F and the tabulated F, since if the computed F is greater than the tabulated F, the null hypothesis is rejected and this means that X has an effect on Y.

-We repeat the previous steps on Equation No (7) by estimating the equation with the assumption  $\sum_{i=1}^p \theta_i = 0$  and this meaning that Y has no effect on X and then the sum of the squares for the residual is calculated by

$$\sum_{i=1}^p \bar{\epsilon}_{2i}^2.$$

After performing the test, we have four possibilities, as follows:

- X has no effect on Y and Y has no effect on X.
- Y has no effect on X and X has no effect on Y.
- X has effect on Y and Y has effect on X.
- Y has effect on X and X has effect on Y.

When applying the previous mechanism to the model under study using the E-views V.10 program, the results were as shown in Tables (2),(3),(4).

**Table (2):** Granger Causality test results For the value of Government expenditure and economic growth

Pairwise Granger Causality Tests			
Date: 01/16/21 Time: 14:33			
Sample: 19			
Lags: 2			
Prob.	F-Statistic	Obs	Null Hypothesis:
0.9286	0.07689	7	Y does not Granger Cause G
0.0033	298.993		G does not Granger Cause Y

Source : outcome of e-views v.10 program

**Table (3):** Granger Causality test results for the first difference of Government expenditure and economic growth

Pairwise Granger Causality Tests			
Date: 01/16/21 Time: 16:09			
Sample: 19			
Lags: 2			
Prob.	F-Statistic	Obs	Null Hypothesis:
0.0990	50.5654	6	DG does not Granger Cause DY
0.8446	0.20098		DY does not Granger Cause DG

Source : outcome of e-views v.10 program

**Table (4):** VAR Granger Causality test results For the value of Government expenditure and economic growth VAR Granger Causality/Block Exogeneity Wald Tests

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Date: 01/16/21 Time: 16:30

Sample: 1 9

Included observations: 7

Dependent variable: Y			
Prob.	df	Chi-sq	Excluded
0.0000	2	597.9852	G
0.0000	2	597.9852	All
Dependent variable: G			
Prob.	df	Chi-sq	Excluded
0.9260	2	0.153783	Y
0.9260	2	0.153783	All

**Source :** outcome of e-views v.10 program

It is obvious from Tables No. (2), No. (3), No. (4) that when conducting the causality test in different ways, whether for the absolute values of both government expenditure (G) and economic growth (Y), or for the first difference of these values, government expenditure in Egypt is the drive for economic growth, and that the relationship between these two variables in Egypt is in one way and starts from government expenditure. This relationship is correct and significance at the level of 5% and 10% in the three tables, which means rejecting the null hypothesis that government expenditure isn't the motive of economic growth in Egypt. There is no doubt that this indicates the non-applicability of Wagner's hypothesis to the Egyptian economy, and then at the

same time the second approach, pioneered by Keynes, is fitting for the Egyptian economy in that study.

### VAR(Vector auto regression) MODEL

Through the Garnger causality test, we were able to determine the direction of the relationship between government expenditure and economic growth in Egypt. It remains for us to determine the nature of the relationship between them, and to achieve this we will use the VAR model. But before we implement it, we will determine the optimum time lage. Table (5) shows that the optimum time lag are 2, at which time the AIC and SC test have the lowest values.

**Table (5): the optimum time lag for the VAR model**

VAR Lag Order Selection Criteria						
Endogenous variables: Y G						
Exogenous variables: C						
Date: 01/16/21 Time: 14:43						
Sample: 1 9						
Included observations: 7						
HQ	SC	AIC	FPE	LR	LogL	Lag
13.08272	13.25827	13.27373	2002.017	NA	-44.45805	0
11.97127	12.49795	12.54431	1082.308	7.489107	-37.90508	1
7.231776*	8.109563*	8.186834*	25.46884*	11.00067*	-18.65392	2
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

**Source :** outcome of e-views v.10 program

After determining the time lag, the VAR model can be applied to estimate the  $\alpha$  and  $\beta$  parameters of equations 9 and 10 as follows:

$$Y = \beta_0 + \beta_1 Y_{-1} + \beta_2 Y_{-2} + \beta_3 G_{-1} + \beta_4 G_{-2} + u \quad (9)$$

$$G = \alpha_0 + \alpha_1 Y_{-1} + \alpha_2 Y_{-2} + \alpha_3 G_{-1} + \alpha_4 G_{-2} + u \quad (10)$$

**Table (6): results of VAR model**

Vector Autoregression Estimates
Date: 01/16/21 Time: 14:37
Sample (adjusted): 3 9
Included observations: 7 after adjustments

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Standard errors in ( ) & t-statistics in [ ]		
G	Y	
-2.703555 (6.89677) [-0.39200]	-1.311790 (0.06085) [-21.5579]	Y(-1)
-2.498988 (8.30301) [-0.30097]	-0.921907 (0.07326) [-12.5846]	Y(-2)
1.123473 (0.51786) [ 2.16944]	0.040530 <b>(0.00457)</b> [ 8.87062]	G(-1)
-0.358089 (0.72181) [-0.49610]	0.093386 <b>(0.00637)</b> [ 14.6637]	G(-2)
34.10141 (54.3971) [ 0.62690]	9.127177 (0.47994) [ 19.0173]	C
0.746631	0.997143	R-squared
0.239894	0.991430	Adj. R-squared
783.9340	0.061024	Sum sq. resid
19.79816	0.174677	S.E. equation
1.473408	174.5380	F-statistic
-26.44702	6.665798	Log likelihood
8.984863	-0.475942	Akaike AIC
8.946228	-0.514578	Schwarz SC
47.24857	4.740000	Mean dependent
22.70845	1.886938	S.D. dependent
8.666480	Determinant resid covariance (dof adj.)	
0.707468	Determinant resid covariance	
-18.65392	Log likelihood	
8.186834	Akaike information criterion	
8.109563	Schwarz criterion	
10	Number of coefficients	

Source : outcome of e-views v.10 program

According to Table No.(6) and the Causality test, the estimated equation expressing the nature of the relationship between government expenditure and economic growth in Egypt is:

$$Y = 9.127 - 1.312Y_{-1} - 0.922Y_{-2} + 0.040G_{-1} + 0.093G_{-2}$$

The previous equation shows that there is a positive and significance relationship between government expenditure and economic growth in Egypt, which means that the Egyptian economy is still dependent on the state and its public sector to achieve economic growth and is governed by excessive government interventions, tight administrative policies and restrictions, and a large and inefficient public sector. It also indicates the absence of the private sector role. This relationship is significant, whether the time lag for both variables is one or two years. There is no doubt that the previous results have evidence of their validity. The Egyptian economy, since the 1952 revolution and up to now, has been suffering from numerous instability periods that don't encourage the private sector to play its role and make the state, with its government expenditure, the pioneer in moving the economy. During the period from 1967 to 1974, the

economy suffered from the ravages of war, and then faced numerous terrorist attacks in the 1990s, at the beginning of the third millennium, and finally the January Revolution in 2011 and then a corrective revolution in June 2013. This makes the Egyptian economic environment unattractive to private investment.

#### CONCLUSION

Fiscal policy is one of the leading policies that guides macroeconomic performance and enhances growth opportunities in the short, medium and long term. Therefore, many studies aimed to determine the direction of the relationship between government expenditure and economic growth. Both theoretical and applied studies have yielded conflicting results. Some have indicated that economic growth is the drive of government expenditure in what is known as the first approach and others that government expenditure is the drive for economic growth in what is known as the second approach. Regarding the first approach, the study concluded that the Wagner Law didn't prove its validity at the high levels of growth in some countries, and when

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applied to recent periods of time. This indicates that this law has specific conditions and scope in order to prove its validity. As for the second approach, the study found that the effect of government expenditure on economic growth may be positive or negative, and this is determined based on many factors, including the degree of economic development that the country is going through, and also that government expenditure have many types and thus generate homogeneous effects On economic growth, which means that the positive or negative impact may be determined depending on the nature and purpose of the expenditure. The study also found that the relationship between government expenditure and economic growth is a reciprocal relationship. Meaning that the causal relationship between government expenditure and economic growth can be one-way or two-way. It may move from government expenditure to economic growth, or vice versa. It is clear that there is a link between the two viewpoints, as an increase in government expenditure raises the rate of economic growth according to Keynesian thought, and economic growth leads to an increase in overall demand, which in turn requires that there be an increased role for the government through public spending to meet this demand, according to For Wagner's Law. In addition to the above, both Wagner's law and Keynes' hypothesis represent a short-term phenomenon, and then the causality test methodology helps to identify the short-term overlap between government expenditure and economic growth. Also, government expenditure isn't affected by economic growth alone, and economic growth also is not affected by expenditure alone. In order for each of them to increase, there are many known and specific factors that can be measured. There are also some socio-economic factors that cannot be quantified and have an impact on them. The fiscal policy is considered an essential element of the Egyptian economy due to the importance of government expenditure in financing investment and consumption activities and its role in meeting the increasing need for public social services.

From here, the study showed that there is a positive and significance relationship between government expenditure and economic growth in Egypt, and this relationship is in one way starts from government expenditure. This means that Wagner's hypothesis doesn't apply to the Egyptian economy, and then at the same time the second approach, pioneered by Keynes, is the trend applicable to the Egyptian economy, as it indicates that the Egyptian economy is still dependent on the state and its public sector in achieving economic growth and is governed by excessive government interventions, policies and administrative restrictions Court, a large and inefficient public sector, and a low role of the private sector.

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