Policy Aspects and the Causal Relationship between Public Expenditure and Economic Growth in Egypt

Dr/ Mostafa Hosny Elsayed

Associate Professor- Economic Department
Higher Institute of Management and Information Technology (HIMIT)
Kafr El Sheikh

Dr/ Shimaa Omar Al Shahawy

Economics Lecturer- Economic Department
Faculty of Politics and Economics
Suez University

Abstract:

The research aims to analyze the causal relationship between the main components of government spending and economic growth. The analysis period is divided into two different periods with different aspects in fiscal policy. The first analysis period from 2002 to 2013, while the second period extends from 2013 to 2023 using quarterly data. The research seeks to verify the validity of the hypothesis whether these differences in policy aspects will affect the causality and direction of the relationship between the variables or not. The Toda-Yamamoto causality test was used, and the validity of the hypothesis was confirmed. That is, after there was a mutual causal relationship between government consumption spending and GDP in the first period, it turned into a unidirectional causal relationship from the first variable to the second in the second

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

period. In addition, after there was a unidirectional causal relationship extending from government investment to both GDP and government consumption spending in the first period, the relationship turned in the opposite direction.

Keywords: causal relationship, public expenditure, economic growth, Wagner's law, Keynes' hypothesis.

التوجهات السياسية والعلاقة السببية بين الإنفاق الحكومي والنمو الاقتصادي في مصر

الملخص:

يهدف البحث الى تحليل العلاقة السببية بين مكونات الإنفاق الحكومي الرئيسية والنمو الإقتصادي. حيث تنقسم فترة التحليل الى فترتين مختلفتين في توجهات مختلفه في السياسة المالية، حيث تم تقسيم فترة التحليل الى فترة اولى تمتد من ٢٠٠٢ الى ٢٠١٣ ، وفترة ثانية تمتد من ٢٠١٣ وحتى ٢٠٢٣ بإستخدام بيانات ربع سنوية. ويسعى البحث الى التحقق من صحة فرض ما اذا كانت هذه الإختلافات في التوجهات سوف تؤثر على سببية وأتجاه العلاقة بين المتغيرات ام لا. وقد تم استخدام اختبار Toda-Yamamoto causality test، وتم التأكد من صحة الفرض، فبعد ان كان هناك علاقة سببية متبادلة بين الانفاق الاستهلاكي الحكومي والناتج المحلي الاجمالي في الفترة الأولى، تحولت الى علاقة سببية احادية الإتجاه من المتغير الأول الى الثاني في الفترة الثانية. وبعد ان كان هناك علاقة سببية احادية الإتجاة تمتد من الإستثمار الحكومي الى كل من الناتج المحلي الإجمالي والإنفاق الإستهلاكي الحكومي في الفترة الاولى، تحولت العلاقة في الإتجاه المعاكس.

الكلمات المفتاحية: الإنفاق الحكومي، النمو الإقتصادي، قانون فاجنر، نظرية كينز

1- Introduction

The last ten years (2013-2023) were characterized by a radical shift in fiscal policy in Egypt, as the state turned to mega national projects, mainly in real estate sector, accompanied by a continuous increase in government services and energy prices, a reduction in social subsidies, and an increase in internal and external public debt. Despite the major shift in government fiscal performance, the economic growth rate did not rise as expected, but rather witnessed some decline. That is, the average growth rate declined in the period from 2013-2023 to 4.18% compared to 4.27% in the period from 2002-2013, despite the increase in the ratio of government investment spending to GDP from 7.7% (in 2002-2013) to 8.12% (in 2013-2023). Government consumption spending also decreased to 9.74% (in 2013-2023) compared to 11.74% (in 2002-2013). Therefore, this research aims to study the impact of this shift in the state's financial policy on the causal relationship between government spending and economic growth.

Hypothetically, the relationship between public expenditure and economic growth is debatable, because the causal relationship can be in one or two directions. Public expenditure may effect on economic growth, or economic growth may effect public expenditure. That is, increasing public expenditure raises the rate of economic growth according to

Keynesian viewpoint, and economic growth leads to an increase in aggregate demand, which in turn requires broadening the role of government through public expenditure to correspond that level of aggregate demand according to Wagner's law **Ayo et al. (2011)**. Both Wagner's law and Keynes' hypothesis represent short-run phenomena.

It should be take into account the varying ability of public expenditure components to influence economic growth. It is likely that, the impact of change in the structure of public expenditure varies depending on the size and type of this component. Consequently, the decision to determine public spending trends and priorities is an issue of great importance in influencing the path of income growth and income distribution.

1-1 Research problem:

Many researchers distinguish between productive and unproductive public spending, and are interested in knowing how a country can improve its economic performance by changing the mix between the two types. **Barro, (1989), (1990), (1991)** found that spending on basic infrastructure has a positive relationship with private sector productivity.

Many other studies have also reached similar conclusions regarding the effects of government investment spending on economic growth such as, **Kamps (2006), Sanchez-Robles (1998), Nourzad and Vrieze (1995)**.

Moreover, a many studies have provided evidence that public investment can have a higher return if it spent on infrastructure that constitutes productive inputs for private investment, or which increases the productivity of the private sector due to external economies of scale.

Therefore, the research problem is to identify the direction of the relationship between government spending (both consumption and investment spending) and economic growth in two distinctive periods, from 2002-2013 and from 2013-2023 in quarterly data.

1-2   Research objective:

The research seeks to explain whether public expenditure and its various components support, slow down, or have an unspecified impact on economic growth in Egypt, by examining the causal relationship between the two variables in two distinctive periods.

1-3 Importance of the study:

This research gains its importance from the importance of the topic it addresses, which related to estimating the causal relationship between public spending and economic growth in Egypt, in order to work on optimal exploitation of the resources available in society. Public spending is one of the basic tools of fiscal policy, through which it can influence levels of aggregate demand, and thus growth, employment,

national income, and its distribution pattern. In light of the limited resources available for such spending, it becomes necessary to ensure the efficiency of spending those resources and their optimal exploitation. Hence, the importance of the study emerges, which seeks to examine the causal relationship between government spending and economic growth in Egypt.

So, the importance of this research is that, it considered one of the steps to verify the identification of the way that Egyptian government uses and manages its economic policies, especially its financial policy, and specifically the public expenditure, with the aim of achieving increased rates of economic growth and its continuity in order to overcome poverty on the one hand, and provide a better future, For future generations, on the other hand, by identifying the relationship between public expenditure and economic growth, with the aim of knowing the type and the degree of relationship.

1-4 Research hypotheses:

The research seeks to verify the validity of the following hypothesis:

- The changes in fiscal policy aspects from 2002-2023 will affect the structure of the causal relationship between government spending and economic growth.

This main hypothesis can be divided into eight sub-

hypotheses:

1. There is a causal relationship moving from government consumption expenditure to economic growth in Egypt for the period 2002-2013.
2. There is a causal relationship moving from government investment expenditure to economic growth in Egypt for the period 2002-2013.
3. There is a causal relationship moving from economic growth to government consumption expenditure in Egypt for the period 2002-2013.
4. There is a causal relationship moving from economic growth to government investment expenditure in Egypt for the period 2002-2013.
5. There is a causal relationship moving from government consumption expenditure to economic growth in Egypt for the period 2013-2023.
6. There is a causal relationship moving from government investment expenditure to economic growth in Egypt for the period 2013-2023.
7. There is a causal relationship moving from economic growth to government consumption expenditure in Egypt for the period 2013-2023.
8. There is a causal relationship moving from economic growth to government investment expenditure in Egypt for the period 2013-2023.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

1-5 Research Methodology:

The nature of the study requires relying on the descriptive approach, in which we highlight the theoretical framework of public spending and economic growth, and the most important theoretical schools of the relationship between them. Also We will be going to use the analytical approach, quantitative techniques, and econometrics methods, to analyze the causal relationship between public spending and economic growth in Egypt.

1-6 Research limits:

1. The study is time limited to 2002Q3- 2023Q2.
2. The study focus on the relationship between public spending and economic growth, in the Arab Republic of Egypt.

2- Literature review:

Many studies have sought to search for the causal relationship between public expenditure and economic growth to prove which of them affects the other. These studies have concluded that the relationship between economic growth and government spending may be in one direction or in two.

2-1 Wagner's law:

The supporters of this approach believe that there is a one-way positive relationship between economic growth and

government spending, and this relationship begins with economic growth as the independent variable.

Sinha (1998) reported that Wagner was probably the first scientist to recognize a positive relationship between economic growth and growth in government activity. Additionally, **Henrekson (1993)** pointed that there are three main reasons for the increase in the government's role (illustrates Indirect relationship in short-run) explained as follows;

(1) Industrialization and modernization will lead to public activities replacing private activities and to increased government spending on law and contract enforcement.

(2) an increase in real income will lead to an expansion of the "cultural and social expenditures", where the state could provide better services than the private sector.

(3) natural monopoly industries must be taken over by governments because the operating costs of such activities are too high. Furthermore, the private sector is unable to carry out these activities effectively.

Slemrod et al. (1995) , Ansari (1997) , and Hamzah (2011) concludes that citizens' demand for goods and services provided by the state increases due to "the pressure for social 'progress' to be income elastic , concluded that there is a unidirectional causal relationship where government spending is an endogenous variable and a function of economic growth.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

Therefore, the relationship between the growth of a country's government activities (government spending, G) and economic progress (GDP growth) The theoretical model of general functional relationships can be described as follows:

Version	Variables
1. Peacock-Wiseman Traditional Version [1961]	E = f [GDP]
2. Pryor Version [1969]	C = f [GDP]
3. Goffman Version [1968]	E = f [GDP/P]
4 Musgrave Version [1969]	E/GDP = f [GDP/P]
5. Gupta-Mitches Version [1967]	E/P = f [GDP/P]
6. Mann version [1980]	E/GDP = f [GDP]
Source: Authors' summary from theory. Where, E = Government total expenditure P = Population C = Government consumption expenditure GDP = Gross Domestic Product.	

Source: Mama, N., Nyugha, T. P., Wayih, A. J., & Dinga, G. D. (2022). Government Spending and Economic Growth: Keynes or Wagner for Cameroon? ARDL/TY-VAR Approach. *Law and Economy*, *1*(3), 74-85.

Afzal & Abbas (2010) and **Paparas et al. (2019)** pointed that the positive relationship between economic growth and government spending can be explained by the following reasons:

- The high rate of economic growth is usually accompanied by a difference in the distribution of income. Which requires the state to intervene through its social role to achieve social justice, which is what It necessarily leads to an increase in public spending .

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

- The subsequent expansion in the size of the public sector and the increase in demand for its products.

- The state needs more administrative and protective jobs to ensure that market forces work efficiently.

- an increase in demand for education and culture. Because the provision of these goods is entrusted to the state, it is necessary for it to provide a greater amount of social and cultural goods and services, which also naturally leads to an increase in public spending.

- **Ghazy et al (2021)** indicated that the existence of natural monopolies with high operating and establish cost, which means that the state is responsible for establishing and managing these monopolies, and contributes to Increasing the role of the state.

- The accumulated debt service and dependence on internal loans to finance the budget deficit, which leads to an increase in the size of the local public debt and its accumulated services.

2-2 The Keynesian hypothesis

This approach shows the existence of a positive unidirectional relationship represented by the transition from government spending to economic growth. where increasing government spending will lead to an increase in effective demand, which may lead to an increase in investment as a whole

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

and private investment in particular, and consequently increase the rates of economic growth.

Samudram et al. (2009) asserts that applied studies in this regard have revealed that the role that public spending can play in achieving economic growth is still a matter of debate among economists between most countries. The results of these studies revealed that there are two different and opposite roles played by government spending, each of them takes a different approach, as follows:

The positive role in promoting economic growth:

Many studies have shown that there is a positive relationship between government spending and economic growth such as **Cooray (2009)** , **Mose et al. (2014), Putri et al. (2018), Ahuja, et al. (2020)**, which can be explained by the following:

1) Neither the market forces nor the government can work alone to achieve economic efficiency, as their roles are complementary to each other. This integration (crowd in effect) is what may support the private sector to invest, and thus raise the rate of economic growth.

2) Public spending contributes to the development of human capital (through attention to education, health and training), aims to improve the productivity of the workforce and thus raising the rate of economic growth on the one hand, and attracting investments in general and foreign capital in

particular, which also leads to promoting economics growth on the other hand **Hamzah (2011) , Ahmed & Ahmed (2005)**.

3) Public spending plays an essential role in several fields that together contribute to supporting economic growth. These fields are:

- Providing an attractive environment for investment by paying attention to social capital, such as spending on infrastructure.

- Directing public spending towards productive fields and employing idle resources.

- Achieving balanced development of geographical regions at the state level and between rural and urban areas in each region.

- Developing programs to reduce poverty and reduce Income inequality.

- Achieving economic and social stability, which may in turn contribute to promoting economic growth.

- Working to achieve efficiency in allocating economic resources.

4) **Maingi (2017)** pointed that public spending promotes aggregate demand and then increases national output, which naturally leads to increased investment and employment and improved economic growth rates.

The negative role of depressed economic growth

Many applied and theoretical studies such as **Romer (2011), Hamzah (2011), Awaworyi, et al. (2015)** have

concluded that public spending may have a negative impact on economic growth. Enlightenments can be given as follows:

1) The increase in public spending is usually accompanied by weakness in public administration and a decrease in the level of efficiency of performance in the public sector as a result of the absence of democracy, spread of bureaucracy, the poor selection of leaders, the ineffectiveness of the legislative authority,   the existence of an unconscious executive authority, and high cost of public services.

2) **Hamzah (2011)** pointed that the presence of an environment with these characteristics is not attractive for investment and directs resources away from optimal productive areas and thus reduce economic growth.

3) **Loayza & Odawara (2010)** asserts that when the amount of public spending exceeds its optimal size, the efficiency of the public sector will decline. This will undoubtedly negatively affect the total factor productivity, which will obstructs the process of capital accumulation and thus negatively affect economic growth in the long run.

4) The negative impact resulting from the crowding out effect because of competition between public and private investments to obtain loans.

5) **Engen & Skinner (1992) and Romer & Romer, (2010)** assert that; the decrease in income that occurs as a result of imposing or increasing taxes which aimed to financing

increased public spending, undoubtedly have negatively effects on aggregate demand, saving and investment, and will also have a negative impact on economic growth. Therefore, **Romer (2011)** confirmed that the tax increases imposed to finance increased public spending in the United States after World War II negatively affected its economic growth.

3- Empirical review:

Moving to the applied side, there are a large number of studies that have examined the impact of public spending on output growth, and have examined Wagner's hypothesis on the extension of the impact from output to government spending, which will be discussed briefly.

3-1 Government spending as a stimulus for economic growth:

In this regard, **Shkodra et al. (2022)** Analyzed the impact of government of Southeast European countries, concluded that governance continues to have a positive impact on economic growth. This result is consistent with that obtained by **Al-Shammari et al (2022)** for a sample of 20 countries from the Middle East and North Africa (MENA) region.

Ghadana (2015) reviewed the relationship between public expenditures and economic growth in Algeria in the period from 1990 to 2012, by applying the co-integration and the error correction model (VECM). The results indicated the existence of a long-term relationship between public expenditures and the GDP, and the existence of a one-way causal relationship from

public expenditures to GDP, which supports the Keynesian hypothesis.

Al-Fawwaz, (2016) aims to measure the impact of government spending on economic growth in Jordan from 1980-2013, a multiple linear regression model was used. Results indicated a positive effect of total government spending on economic growth, which supports the Keynesian approach.

Swaid (2017) aimed to test the causality of the relationship between government spending and economic growth in Yemen. The study confirmed the existence of a positive causal relationship that goes from real government spending to real economic growth due to the fundamental impact on real domestic product.

Katrakilidis & Tsaliki (2009) in their study of the causal relationship between public spending and output growth, using data for Greece between 1958 and 2004, showed the existence of a long-run equilibrium relationship extending from public spending to GDP and thus proving Keynes' hypothesis.

Ebaid & Bahari (2019) also found, using Kuwait data from 1970 to 2015 and using the Toda-Yamamoto causality model, a unidirectional causal relationship extending from spending to economic growth.

Forte & Magazzino (2016) studied the relationship between public spending and output growth using data from the Italian economy from 1861 to 2008, and the result showed a non-

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

linear relationship between public spending and economic growth that takes the U shape.

Kazem (2016) study analyze the relationship between public spending and economic growth in Egypt from 1975 to 2010 in the short and long terms. The study tested both the Wagner's law and the Keynesian hypothesis, using vector error correction model (VECM) and Granger causality. The results showed that, public spending and economic growth have a co-integrated relationship. The statistical results of the model indicate that there is evidence that there is a short- and long-term causal relationship in one direction, from economic growth to public spending.

Studies conducted by **Gupta (2018)** in Nepal from 2002 to 2016, and **Diyoke, et al (2017)** in a sample of sub-Saharan African countries, revealed a strong positive relationship between government spending and economic growth. These are similar findings reached by **Dudzevičiūtė, et al (2018)** using data from 8 EU member states, and **Idris & Bakar (2017)** using data from the Nigerian economy on the relationship between government spending and per capita income.

Ihugba & Njoku (2017) also found a positive effect of government social spending on output growth. **Chimobi (2009)** studied the cointegration between government spending and national income in Nigeria from 1970 to 2005 and found that there is a stable long-run relationship between the two variables extending from government spending to national income.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

It is worth noting that the series of studies mentioned above contradict the suggestion of neoclassical growth models that government expenditures cannot increase the growth rate, but they confirm Keynes's view of the existence of a positive relationship extending from public expenditures to economic growth.

3-2 Government spending as a deterrent to economic growth:

In contrast, **Khalkhali & Dar (2012)** tested the impact of government spending on economic growth by applying it to OECD countries during the period 1970-1999. This study pointed out that the volume of government spending has a negative and significant impact on economic growth**.**

Oktayer & Oktayer (2013) investigated the relationship between public spending and output growth using Turkish data for the period 1950–2010, and found no long-run cointegration between the variables of interest. **Molefe & Choga (2017)** also analyzed the impact of government spending on economic growth in South Africa over the period 1990–2015 using a VECM model. Their results suggest that government spending has a negative long-run relationship with economic growth.

Additionally, **Olayungbo & Olayemi (2018)** usied vector error correction model for the period 1981-2015, demonstrated in Nigerian data that government expenditure has a negative and significant impact on economic growth in both the short and long run. While controlling for structural breaks in the ARDL model, the same result was reached by **Awode & Akpa (2018)** using Nigerian

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

economic data for the period 1981-2016 using ARDL model; **Odumusor, & Idor (2023)** also investigated the impact of public expenditure on economic growth in Nigeria from 1981 to 2020 using ARDL model. The results showed that current expenditure has a negative impact on economic growth, while public capital expenditure was positive but insignificant. Meanwhile, the Granger causality test used indicated a bidirectional relationship between growth and public expenditure variables.

Similarly, **Srinivasan (2013)** studied the causal relationship between government spending and output growth in India. The results suggest a single causal direction extending from economic growth to government spending in both the short and long run. **Jalles (2019)** investigated the validity of Wagner's law in a sample of 61 developed and emerging markets between 1995 and 2015. The evidence from the sample data analyses showed that Wagner's law appears to be more pronounced in advanced economies. In a similar vein, **Paparas et al (2019)** studied Wagner's law in the United Kingdom from 1850 to 2010. The result was a long-run relationship between national income and government spending, while the causal relationship is bidirectional.

Jamshaid et al (2010) also studied the nature and direction of causality between public expenditure and national income along with various selected components of public expenditure, development expenditure, administrative expenditure, debt service and defense service in Pakistan. Their

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

study applied the Toda-Yamamoto causality test on annual data for the period 1971-2006 and concluded that there is a unidirectional causality between GDP and government expenditure, a finding that supports Wagner's law.

However, when disaggregated, the impact of GDP was only felt on administrative expenditure, while development, debt service and defense expenditures were not affected. **Samuel and Oruta (2021)** also used detailed data from 1981 to 2020 on government expenditure in Nigeria, and using the ARDL model they concluded that current expenditure on agriculture, health and education had a negative impact in the short run while all variables had a positive impact in the long run. There was no conclusive evidence for the validity of either Wagner or Keynes' hypothesis.

Churchill et al (2017) also investigated the relationship between public spending and output growth using hierarchical meta-regression analysis of data from 87 studies of different countries around the world, and the result supported the traditional belief that large government size harms growth in developed countries.

4- Methodology
4-1 Data.

The sample period is from 2002q3 to 2023q2 and the time-series data obtained from the Ministry of Planning and Economic Development database. This study investigates the causality between government spending and economic growth in two

distinctive time series, the first from 2002 to 2013, and the second series is from 2013 to 2023 in which there are many fiscal policy differentiations. Government spending is divided into government consumption (gc) and government investment (gi).

The Granger non-causality or Toda-Yamomoto test employed to determine the causality between the component of government spending and economic growth.

Table 1. Data description

gdp	Gross domestic product in current value
gi	Government investment spending in current value
gc	Government consumption spending in current value

4-2 Method of analysis:

The Granger non-causality or Toda-Yamomoto test performed to treat the data that not in the same order of integration in time-series, the test uses a modified Wald test (MWALD) to test causality, which does not consider whether series are stationary or co-integrated in the same order. The test uses a Vector Autoregressive (VAR) system, represented in standard VAR (k) in levels with (k+d_{max}) order of integration. Here, k=optimal lag length and d_{max} = maximum order of integration, as follows:

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

$$gdp_t = \alpha_{10} + \sum_{i=1}^{k+d_{max}} \alpha_{1i}\, gdp_{t-i} + \sum_{i=1}^{k+d_{max}} \beta_{1i}\, gc_{t-i}$$

$$+ \sum_{i=1}^{k+d_{max}} \gamma_{1i}\, gi_{t-i} + \varepsilon_{1t} \; --- (1)$$

$$gc_t = \alpha_{20} + \sum_{i=1}^{k+d_{max}} \alpha_{2i}\, gdp_{t-i} + \sum_{i=1}^{k+d_{max}} \beta_{2i}\, gc_{t-i}$$

$$+ \sum_{i=1}^{k+d_{max}} \gamma_{2i}\, gi_{t-i} + \varepsilon_{2t} \; --- (2)$$

$$gi_t = \alpha_{30} + \sum_{i=1}^{k+d_{max}} \alpha_{3i}\, gdp_{t-i} + \sum_{i=1}^{k+d_{max}} \beta_{3i}\, gc_{t-i}$$

$$+ \sum_{i=1}^{k+d_{max}} \gamma_{3i}\, gi_{t-i} + \varepsilon_{3t} \; --- (3)$$

4-4   Empirical results

4-4-1 Unit root test.

Table 2 reported the results of ADF test and the order of integration of each series.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

Table 2. Unit root test

	Augmented Dickey-Fuller test statistic for GDP								
	Level			1st difference			2nd difference		
	Intercept	Intercept & trend	none	Intercept	Intercept & trend	none	Intercept	Intercept & trend	none
t-Stat	4.0033	2.6625	4.1190	0.7912	-2.4153	1.5318	-3.9784	-4.3140	-3.7360
prob	1.0000	1.0000	1.0000	0.9933	0.3688	0.9682	0.0025	0.0051	0.0003
	Augmented Dickey-Fuller test statistic for GI								
	Level			1st difference			2nd difference		
	Intercept	Intercept & trend	none	Intercept	Intercept & trend	none	Intercept	Intercept & trend	none
t-Stat	2.9972	-0.0076	4.7651	-12.6214	-13.9696	-4.4657	-	-	-
prob	1.0000	0.9955	1.0000	0.0001	0.0001	0.0000	-	-	-
	Augmented Dickey-Fuller test statistic for GC								
	Level			1st difference			2nd difference		
	Intercept	Intercept & trend	none	Intercept	Intercept & trend	none	Intercept	Intercept & trend	None
t-Stat	7.6615	3.3914	11.4697	1.9835	-15.0402	2.6869	-10.3284	-10.4517	-10.2284
prob	1.0000	1.0000	1.0000	0.9998	0.0001	0.9981	0.0001	0.0000	0.0000

Table (2) shows that all series are nonstationary and integrated in different order, which makes use of Granger non-causality or Toda-Yamomoto test that adopted for different order of integration series.

4-4-2 Toda-Yamomoto causality test.

The null hypotheses for testing causality between two series, say X and Y stated as:

H_{o1}: X does not Granger cause Y.

H_{o2}: Y does not Granger cause X.

The test starts with determination of optimal lag length for the standard VAR model, using lag length selection criteria using eviews.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

Table (3) presents lag length selection criteria at 5% significance level.

Table 3. Lag length selection criteria

Sample: 2002Q3 2013Q4
Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1254.525	NA	1.11e+25	66.18553	66.31481	66.23152
1	-1170.820	149.7873	2.19e+23	62.25370	62.77083	62.43769
2	-1154.816	26.11250	1.53e+23	61.88505	62.79003	62.20703
3	-1098.392	83.15142	1.29e+22	59.38904	60.68187	59.84902
4	-1084.465	18.32411	1.05e+22	59.12976	60.81044	59.72773
5	-1065.006	22.53138*	6.55e+21*	58.57929	60.64782*	59.31526
6	-1060.708	4.298627	9.53e+21	58.82673	61.28311	59.70069
7	-1048.796	10.03097	9.95e+21	58.67348	61.51771	59.68543
8	-1026.529	15.23535	6.65e+21	57.97521*	61.20729	59.12516*

Sample: 2013Q1 2023Q2
Included observations: 34

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1267.134	NA	5.63e+28	74.71379	74.84847	74.75972
1	-1190.246	135.6853	1.04e+27	70.72036	71.25907	70.90407
2	-1178.817	18.15200	9.16e+26	70.57747	71.52022	70.89898
3	-1153.531	35.69762	3.64e+26	69.61948	70.96627	70.07878
4	-1133.040	25.31220	1.98e+26	68.94355	70.69438	69.54063
5	-1116.437	17.57952*	1.43e+26	68.49632	70.65118	69.23119
6	-1101.903	12.82468	1.25e+26	68.17076	70.72965	69.04341
7	-1091.656	7.233264	1.58e+26	68.09740	71.06033	69.10784
8	-1062.304	15.53900	7.78e+25*	66.90025*	70.26722*	68.04849*

* 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

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

Table (3) shows that AIC and HQ chose lag order 8, and from ADF test, it could be simply conclude that $d_{max} =2$. So, the optimal lag length is $K + d_{max} = 8+2=10$ for both time series, and Toda-Yamamoto Granger non-causality test can be run, Table 4 presents the results of Toda-Yamamoto causality test.

Table 4. Toda-Yamamoto causality test

First time period 2002-2013		
	Chi-sq	Prob
GC causes GDP	23.6894	0.0085
GI causes GDP	50.6731	0.0000
GDP causes GC	25.1395	0.0051
GI causes GC	22.3076	0.0136
GDP causes GI	12.1089	0.2778
GC causes GI	10.4194	0.4045
Second time period 2013-2023		
	Chi-sq	Prob
GC causes GDP	26.8682	0.0015
GI causes GDP	11.6682	0.2327
GDP causes GC	7.6952	0.5651
GI causes GC	3.8497	0.9210
GDP causes GI	50.1664	0.0000
GC causes GI	34.0403	0.0001

From Table 4, it can be observed the following causality connections between the two variables in the two periods
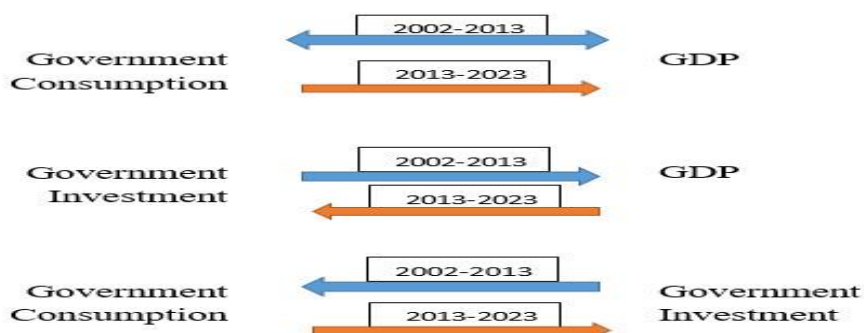
5- conclusions:

The main hypothesis has been confirmed, that is; the changes in fiscal policy aspects from 2002-2023 affects the structure of the causal relationship between government spending and economic growth; this is based on the following results:

- The relationship between government consumption and GDP changed from bicausality to unicausality from the first variable to the second variable.

- The relationship between government investment and GDP changed from unicausality from the first variable to the second variable, turned into causality in the opposite direction.

- The relationship between government consumption and government investment changed from unicausality from the second variable to the first variable, turned into causality in the opposite direction.

In addition; theoretical and applied studies tried to explain the type and direction of the relationship between public expenditure and economic growth, but they did not reach a decisive result regarding that relationship. There were different results, and these various in results is due to four differences: (1) The levels of economic development that countries are experiencing, whether the countries are developed or developing, or (2) The time periods for each study, or (3) The study methodologies and econometric methods used in the application, or (4) The variation in study samples.

In addition to, when studying this relationship, attention must include the structure of public expenditure, where public expenditures have many types, and therefore have heterogeneous effects on economic growth, which means that the positive or negative impact can be determined based on the nature and purpose of spending.

Policy recommendations:

Given the previous results, the change in fiscal policy orientations has had a negative impact on the causal relationship between the two variables under study. Therefore, these orientations should be *reconsidered*. Especially with regard to government investment and its stimulating role for private investment. The change in causality implicitly indicates that government investment was not effective in stimulating private investment, which should be treated.

1. Expanding the process of dividing government spending to include the main items of the public budget, and analyzing the impact of each item on the previous causal relationship.
2. Studying the impact of government investment spending on private investment before and after the new aspects of fiscal policy.
3. Studying the impact of changing the structure of financing government spending on the causal relationship between government spending and economic growth.

References :

1) Afzal, M., & Abbas, Q. (2010). Wagner's law in Pakistan: Another look. Journal of Economics and International Finance, 2(1), 12.

2) Ahmad, N., & Ahmed, F. (2005). Does government size matter? A case study of D-8 member countries. *Pakistan Economic and Social Review*, 199-212.

3) Ahuja, D., & Pandit, D. (2020). Public expenditure and economic growth: Evidence from the developing countries. *FIIB Business Review*, 9(3), 228-236. https://www.researchgate.net/publication/343474767_Public_Expenditure_and_Economic_Growth_Evidence_from_the_Developing_Countries

4) Al-Fawwaz, T. M. (2016). The impact of government expenditures on economic growth in Jordan (1980-2013). International Business Research, 9(1), P.(99-105).

5) Al-shammary, M. D., Khalid, N., Karim, Z. A., & Ahmad, R. (2022). Government expenditures and economic growth in the MENA region: A dynamic heterogeneous panel estimation. *International Journal of Finance & Economics*, 27(3), 3287-3299.

6) Ansari, M. I., Gordon, D. V., & Akuamoah, C. (1997). Keynes versus Wagner: public expenditure and national income for three African countries. Applied economics, 29(4), 543-550.

7) Awaworyi, S., Yew, S. L., & Ugur, M. (2015). Effects of government education and health expenditures on economic growth: a meta-analysis. Greenwich Papers in Political Economy 14072, University of Greenwich, Greenwich Political Economy Research Centre.

8) Awode, SS & Akpa, EO (2018). Testing Wagner's Law in Nigeria in the Short and Long-run, AUDŒ, 14(7), 7-23.

9) Ayo, O.S., Ifeakachukwu, N.P., Ditimi, A. (2011), A trivariate causality test among economic growth, Government expenditure and inflation

rate: Evidence from Nigeria. The Journal of World Economic Review, 6(2), 189-199.

10)   Barro, R. J. (1989). A cross-country study of growth, saving, and government . Cambridge,   National Bureau of Economic Research. NBER Working Papers, 2855.

11)   Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. *Journal of political economy*, *98*(5, Part 2), S103-S125.

12)   Barro, R. J. (1991). Economic growth in a cross section of countries. *The quarterly journal of economics*, *106*(2), 407-443.

13)   Chimobi, O. P. (2009). Government expenditure and national income: A causality test for Nigeria. *European Journal of Economic and Political Studies*, *2*(2), 1-12.

14)   Churchill A. , S., Ugur, M., & Yew, S. L. (2017). Does government size affect per- capita income growth? A hierarchical meta- regression analysis. *Economic Record*, *93*(300), 142-171.

15)   Cooray, A. (2009). Government expenditure, governance and economic growth. Comparative economic studies, 51, 401-418.

16)   Diyoke, K., Yusuf, A., & Demirbas, E. (2017). Government expenditure and economic growth in lower middle income countries in Sub-Saharan Africa: an empirical investigation. *Asian Journal of Economics, Business and Accounting*, *5*(4), 1-11.

17)   Dudzevičiūtė, G., Šimelytė, A., & Liučvaitienė, A. (2018). Government expenditure and economic growth in the European Union countries. *International Journal of Social Economics*, *45*(2), 372-386.

18)   Ebaid, A., & Bahari, Z. (2019). The nexus between government expenditure and economic growth: Evidence of the Wagner's Law in Kuwait. *Review of Middle East Economics and Finance*, *15*(1), 20170001.

19) Engen, E. and J. Skinner (1992), "Fiscal Policy and Economic Growth", National Bureau of Economic Research Working Paper No. 4223.

20) Forte, F., & Magazzino, C. (2016). Government size and economic growth in Italy: a time-series analysis. *European Scientific Journal*, *12*(7), 149-168.

21) Ghazy, N. H., Ghoneim, H., & Paparas, D. (2021). The validity of Wagner's law in Egypt from 1960–2018. Review of Economics and Political Science, 6(2), 98-117.

22) Ghedabna, L. (2015). The Relationship between Government Expenditure and Economic Growth in Algeria: An Empirical Study of the period" 1990-2012". Jordan Journal of Economic Sciences, 2(1).

23) Gupta, R. (2018). The impact of government expenditure on economic growth in Nepal. Available at SSRN 3099218. . https://ssrn.com/abstract=3099218 or http://dx.doi.org/10.2139/ssrn.3099218.

24) Hamzah, K. S. (2011). The association between government expenditure and economic growth in Malaysia. A Thesis Presented to the Department of International Cooperation Policy, Ritsumeikan Asia Pacific University, Malaysia.

25) Henrekson, M. (1993). Wagner's law-a spurious relationship?. Public finance, 46(3), pp. 406-415.

26) Idris, M., & Bakar, R. (2017). Public sector spending and economic growth in Nigeria: In search of a stable relationship. Asian Research Journal of Arts & Social Sciences, 3(2), 1-19.

27) Ihugba, O. A., & Njoku, A. C. (2017). Social and community services government expenditure and Nigeria's economic growth. In Advances in Applied Economic Research: Proceedings of the 2016 International Conference on Applied Economics (ICOAE) (pp. 59-71).

Springer International Publishing. https://doi.org/10.1007/978-3-319-48454-9 5.

28) Jalles, J. (2019). Wagner's law and governments' functions: Granularity matters. Journal of Economic Studies, 46(2), 446-466.

29) Jamshaid, Ur R., Iqbal, Asim., and Siddiqi, Wasif M., (2010). Cointegration-Causality analysis between public expenditures and economic growth in Pakistan. European Journal of Social Sciences, 13(4), pp. 556-565.

30) Kamps, C. (2006). New estimates of government net capital stocks for 22 OECD countries, 1960–2001. IMF staff papers, 53, 120-150.

31) Katrakilidis, C. & Tsaliki, P. (2009). Further evidence on the causal relationship between spending and economic growth: the case of Greece, 1958-2004. Acta Oeconomica, 59(1), 57-78.

32) Kazem N . A . " ، (2016). The causal relationship between public spending and economic growth, an econometric study in Egypt for the period ١٩٨٥-٢٠١٤ , Master's thesis, Al-Qadisiyah University, Al-Qadisiyah University, Administration and Economics, Iraq.

33) Khalkhali, S. A., & Dar, A. A. (2012). On the effectiveness of regulatory policies: Some empirical results. The Business & Management Review, 2(2), 53.

34) Loayza, N., & Odawara, R. (2010). Infrastructure and economic growth in Egypt. World Bank Policy Research Working Paper, (5177).

35) Maingi, J. N. (2017). The impact of government expenditure on economic growth in Kenya: 1963-2008. Advances in Economics and Business, 5(12), 635-662.

36) Molefe, K., & Choga, I. (2017). Government expenditure and economic growth in South Africa: a vector error correction modelling and Granger causality test. Journal of Economics and Behavioral Studies, 9(4 (J)), 164-172.

Policy Aspects and the Causal Relationship between Public Expenditure and ...

Dr/ Mostafa Hosny & Dr/ Shimaa Al Shahawy

37)   Mose N., Kiprop S., Kalio A., Ochieng J.& Kibet L. (2014), "Effect of government expenditure on economic growth in East Africa: a disaggregated model", European Journal of Business and Social Sciences, 3(8), pp. 289-304.

38)   Nourzad, F., & Vrieze, M. D. (1995). Public capital formation and productivity growth: Some international evidence. Journal of Productivity Analysis, 6, 283-295.

39)   Odumusor, C. J., & Idor, R. M. (2023). Impact of Public Expenditure Accounting on the Economic Growth of Nigeria (1981 – 2020). Himalayan Economics and Business Management, 4(1), (Jan-Feb)-256-269

40)   Oktayer, A., & Oktayer, N. (2013). Testing Wagner's law for Turkey: Evidence from a trivariate causality analysis. Prague Economic Papers, 2, 284-301.

41)   Olayungbo, D. O., & Olayemi, O. F. (2018). Dynamic relationships among non-oil revenue, government spending and economic growth in an oil producing country: Evidence from Nigeria. Future Business Journal, 4(2), 246-260.

42)   Paparas, D., Richter, C., & Kostakis, I. (2019). The validity of Wagner's law in the United Kingdom during the last two centuries. International Economics and Economic Policy, 16, 269-291. https://doi.org/10.1007/s10368-018-0417-7.

43)   Putri, D. T., Azwardi, A., Marwa, T., & Andaiyani, S. (2018). Does Government Budget Drive Regional Economic Growth. International Journal of Economics and Financial Issues, 8(5), 261-265.

44)   Romer, C. (2011). What do we know about the effects of fiscal policy? Separating evidence from ideology. Speech at Hamilton College, November, 7, 2012.

45) Romer, C. D., & Romer, D. H. (2010). The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks. American economic review, 100(3), 763-801.

46) Samudram, M., Nair, M., & Vaithilingam, S. (2009). Keynes and Wagner on government expenditures and economic development: the case of a developing economy. Empirical Economics, 36(3), 697-712.

47) Samuel, U. D., & Oruta, I. L. (2021). Government expenditure and economic growth in Nigeria: A disaggregated analysis. *Path of Science*, *7*(11), 4022-4035.

48) Sanchez- Robles, B. (1998). Infrastructure investment and growth: Some empirical evidence. Contemporary economic policy, 16(1), 98-108.

49) Shkodra, J., Krasniqi, A., & Ahmeti, N. (2022). The impact of government expenditure on economic growth in Southeast European countries. Journal of Management Information & Decision Sciences, 25(4), 100-1025.

50) Sinha, D. (1998). Government expenditure and economic growth in Malaysia. Journal of Economic Development, 23(2), 71-80.

51) Slemrod, J., Gale, W. G., & Easterly, W. (1995). What do cross-country studies teach about government involvement, prosperity, and economic growth?. Brookings papers on economic activity, 1995(2), 373-431.

52) Srinivasan, P. (2013). Causality between public expenditure and economic growth: the Indian case. Journal of Economic and Management, 7(2), 335-340.

53) Swaid , S. (2017) .The impact of government spending on economic Andalus -AD, Al ٢٠١٤-١٩٩٠growth in Yemen during the period Andalus University of -Journal of Humanities and Social Sciences, Al Science and Technology ، ISSN: 2410-1818.